FINANCIAL MANAGEMENT
FOR DECISION MAKERS

NINTH EDITION

Peter Atrill

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Preface

This book has been written for those wishing to achieve a broad understanding of financial management at either undergraduate or postgraduate/post-experience level. It is aimed primarily at students who are studying financial management as part of their course in business, management, accounting, economics, computing, or some other area. The book should also be suitable for those not engaged in formal study but, nevertheless, need to understand financial management to help manage their business.

As there are several excellent books on financial management already published, it is reasonable to ask why another book is needed in this area. Many of the available books are too detailed and demanding to provide a suitable introduction to the subject. They are often around a thousand pages in length and contain mathematical formulae that many find daunting. This book assumes no previous knowledge of financial management (although a basic understanding of financial statements is required) and every attempt has been made to make the writing as accessible as possible. Each topic is introduced carefully and there is a gradual building of knowledge. In addition, mathematical formulae have been kept to a minimum.

The book rests on a solid foundation of theory but the main focus throughout is its practical value. It is assumed that readers are primarily concerned with understanding financial management in order to make better financial decisions. The title of the book reflects this decision-making focus.

The book is written in an 'open learning' style. That is, it tries to involve the reader in a way not traditionally found in textbooks. Throughout each chapter there are activities and self-assessment questions to attempt. The purpose of these is to help check understanding of the points being made and to encourage the reader to think around particular topics. The open learning style has been adopted because, I believe, it is more 'user friendly'. Irrespective of whether the book is being used as part of a taught course or for independent study, the interactive approach employed makes it easier to learn.

As it is likely that most readers will not have studied financial management before, the use of technical jargon has been kept to a minimum. Where technical terminology is unavoidable, I try to provide clear explanations. As a further aid, all key terms are highlighted in the book and then listed at the end of each chapter with a page reference to enable rapid revision of the main concepts. All key terms are listed alphabetically with a short definition in the glossary, which can be found towards the end of the book.

In writing the ninth edition, I have taken account of helpful comments and suggestions made by lecturers, students and other readers. To improve clarity, I have rewritten some sections and have added further diagrams. To improve coverage, I have expanded certain topics including share valuation and behavioural finance, and have added a completely new chapter dealing with the international aspects of financial management. This new chapter, which was co-written with my colleague Eddie McLaney, covers topics such as foreign exchange markets, foreign investments and exchange rate risk. I have also introduced additional activities throughout to enhance the interactive nature of the text. Finally, to help deepen understanding, I have replaced some of the review questions and end-of-chapter exercises with others that are a little more challenging.

I do hope that you will find the book both readable and helpful.

Peter Atrill
April 2019

Publisher's acknowledgements

Text

Chapter 1

THE WORLD OF FINANCIAL MANAGEMENT

INTRODUCTION

In this first chapter, we shall look at the role of the finance function within a business and the context within which financial decisions are made. This should help to set the scene for subsequent chapters. We begin by identifying the tasks of the finance function and how they relate to the tasks of managers. We then go on to consider the objectives that a business may pursue.

Modern financial management theory assumes that the primary objective of a business is to maximise the wealth of its shareholders. We shall examine this and other possible objectives for a business to understand why shareholder wealth maximisation is considered the most appropriate. There is always a danger, however, that businesses will adopt too narrow a focus in pursuit of this objective. We shall see that, for a business to survive and prosper over the long term, it must be pursued in a way that takes account of the surrounding environment. This requires managers to behave in an ethical manner and to be sensitive to the interests of the various groups that have a stake in the business.

Simply stating that a business's primary objective is shareholder wealth maximisation will not automatically cause this to happen. There is always a risk that managers will pursue their own interests at the expense of shareholders' interests. This is often referred to as the *agency problem*. We end the chapter by considering how this problem may be managed through regulation and through the active involvement of shareholders.

Learning outcomes

When you have completed this chapter, you should be able to:

- Discuss the role of the finance function within a business.
- Identify and discuss possible objectives for a business and explain the advantages of the shareholder wealth maximisation objective.
- Explain how risk, ethical considerations and the needs of other stakeholders influence the pursuit of shareholder wealth maximisation.
- Describe the agency problem and explain how it may be managed.

THE FINANCE FUNCTION

Put simply, the finance function within a business exists to help managers to manage. To understand how the finance function can achieve this, we must first be clear about what managers do. One way of describing the role of managers is to classify their activities into the following categories:

■ *Strategic management.* This involves developing aims and objectives for a business and then formulating a strategy (long-term plan) to achieve them. Deciding on an appropriate strategy will involve identifying and evaluating the various options available. The option chosen should be the one that offers the greatest potential for achieving the aims and objectives developed.

■ *Operations management.* To ensure that things go according to plan, managers must exert day-to-day control over the various business functions. Where events do not conform to earlier plans, appropriate decisions and actions must be taken.

■ *Risk management.* The risks faced by a business must be identified and properly managed. These risks, which are many and varied, arise from the nature of business operations and from the way in which the business is financed.

As we can see from Figure 1.1, these three management activities are not separate and distinct. They are interrelated, and overlaps arise between them. When considering a particular strategy, for example, managers must also make a careful assessment of the risks involved and how these risks may be managed. Similarly, when making operational decisions, managers must try to ensure they fit within the strategic (long-term) plan that has been formulated.

The figure shows the three overlapping roles of management.

Figure 1.1 The role of managers

The finance function is concerned with helping managers in each of the three areas identified. This is achieved by undertaking various key tasks, which are set out in Figure 1.2 and described below.

■ *Financial planning.* It is vital for managers to assess the potential impact of proposals on future financial performance and position. They can more readily evaluate the implications of their decisions if they are provided with estimates of financial outcomes. These can often take the form of projected financial statements, such as projected cash flow statements and projected income statements.

■ *Investment project appraisal.* Investment in new long-term projects can have a profound effect on the future prospects of a business. By undertaking appraisals of the profitability

and riskiness of investment project proposals, managers can make informed decisions about whether to accept or reject them. These appraisals can also help in prioritising investment projects that have been accepted.

■ *Financing decisions.* Investment projects and other business activities have to be financed. The various sources of finance available need to be identified and evaluated: each will have its own characteristics and costs. When evaluating different sources, consideration must be given to the overall financial structure of the business. An appropriate balance must be struck between long- and short-term sources of finance and between the contribution of shareholders (owners) and that of lenders. Not all of the finance required may come from external sources: some may be internally generated. An important source of internally generated finance is profits, and the extent to which these are reinvested within the business, rather than distributed to the owners, requires careful consideration.

■ *Capital market operations.* New finance may be raised through the capital markets, which include stock markets and banks. Managers will often seek advice and guidance on how finance can be raised through these markets, how securities (shares and loan capital) are priced, and how the markets are likely to react to proposed investment and financing plans.

■ *Financial control.* Once plans are implemented, managers must ensure that things stay on course. Here, regular reporting of information on actual outcomes, such as the profitability of investment projects, levels of working capital and cash flows, can play a vital role. This can help monitor performance and detect when corrective action is needed.

The figure shows the main tasks of the finance function and their key relationships.
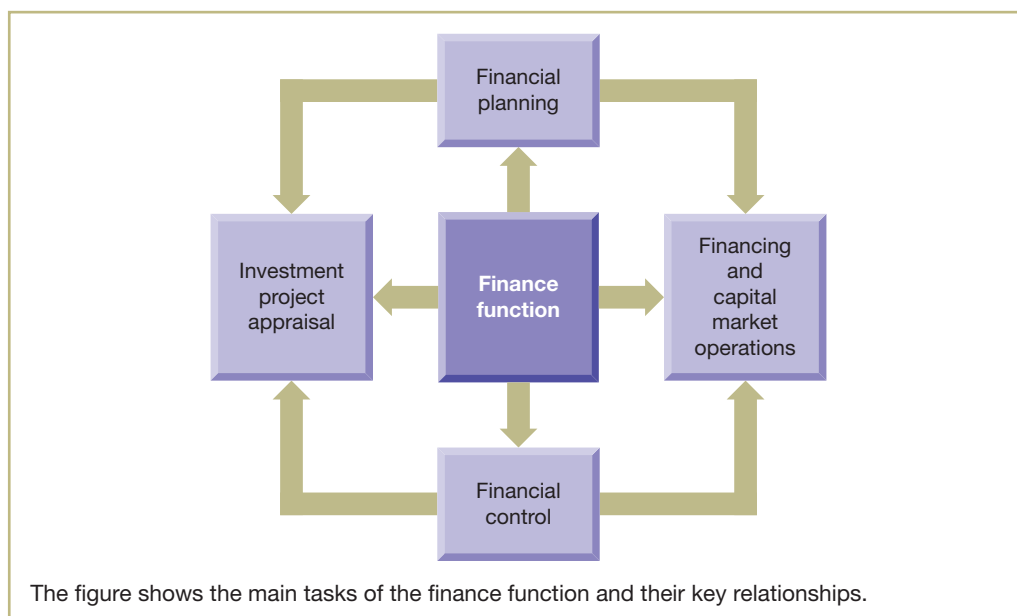
Figure 1.2 The tasks of the finance function

Links between the tasks of managers and those of the finance function, which have just been discussed, are many and varied. Strategic management, for example, may require an input from the finance function on issues relating to financial planning, investment project appraisal, financing and capital market operations. Operations management may require an input on issues relating to financial planning, investment project appraisal, financing and financial control. Risk management may require an input on issues relating to all of the finance function tasks identified above.

STRUCTURE OF THE BOOK

This book considers each of the tasks of the finance function in some detail. In Chapter 2, we begin by examining how financial plans are prepared and the role of projected financial statements in helping managers assess likely future outcomes. We then go on to consider how risks and returns to shareholders are affected by the way in which a business is financed and by the cost structure that it adopts.

In Chapter 3, we consider how financial statements can be analysed and interpreted. We discuss, in some detail, techniques that can be applied to the financial statements to help assess various aspects of financial health. These techniques are also used in short-term financial planning decisions, such as the control of working capital, as well as for long-term financing decisions, such as the issue of shares. We shall, therefore, encounter these techniques again in later chapters.

Chapters 4 and 5 are concerned with the appraisal of investment projects. This is a vitally important area as investment decisions can have far reaching financial consequences. In these two chapters, we examine the main methods employed to assess the viability of investment proposals. We also discuss how risk may be taken into account when evaluating investment projects and how, once implemented, projects may be monitored and controlled.

Chapters 6 to 9 are concerned with various aspects of the financing decision. We begin by identifying the main sources of finance available and the role and efficiency of capital markets. We then go on to examine the cost of each of the main sources of finance and to discuss whether the financing decision has any effect on shareholder wealth. Finally, we consider the decision concerning whether to retain or to distribute profits to shareholders. We identify the key factors to be taken into account when making this decision as well as the issues surrounding the form that any distribution might take.

In Chapter 10, we discuss the importance to a business of managing its working capital effectively. We then go on to examine the key elements of working capital (inventories, receivables, cash and payables) and describe the various techniques available for controlling each element.

In Chapter 11, we consider the main methods available for measuring shareholder wealth and for promoting its creation. We begin by discussing the limitations of conventional methods and then continue by discussing newer, alternative, methods that may be employed. Finally, we consider how managerial rewards may be aligned to the goal of creating shareholder wealth.

In Chapter 12, we examine the rationale for mergers and takeovers. We also consider how they may be financed and who benefits from this form of business activity. The chapter concludes by looking at ways in which shares in a business may be valued. This is relevant for merger and takeover decisions as well as for other purposes. This chapter draws on our understanding of topics covered in earlier chapters such as investment appraisal, financing methods and capital market operations.

Finally, in Chapter 13, we consider the international aspects of financial management. In this modern era, many businesses have an international reach. This goes beyond buying and selling goods and services and will often involve investing and financing activities. Engaging in international operations is accompanied by various financial risks. In this chapter, we identify these risks and discuss how they may be managed.

MODERN FINANCIAL MANAGEMENT

In the early years of its development, financial management was really an offshoot of accounting. Much of the early work was descriptive, and arguments were based on casual observation rather than on any clear theoretical framework. Over the years, however, financial

management became increasingly influenced by economic theories and the reasoning applied to particular issues has become more rigorous and analytical. Indeed, such is the influence of economic theory that modern financial management is often viewed as a branch of applied economics.

Economic theories concerning the efficient allocation of scarce resources have been taken and developed into decision-making tools for management. This development of economic theories for practical business use has usually involved taking account of both the time dimension and the risks associated with management decision making. An investment decision, for example, must look at both the time period over which the investment extends and the degree of risk associated with the investment. This fact has led to financial management being described as the *economics of time and risk*. Certainly, time and risk will be recurring themes throughout this book.

Economic theories have also helped us to understand the importance of **capital markets**, such as stock markets and banks, to a business. Capital markets have a vital role to play in bringing together borrowers and lenders. They also help investors to select the type of investment that best meets their risk requirements and to evaluate the performance of businesses through the prices assigned to their shares.

Real World 1.1 is an extract from an article by Professor Dimson of London Business School. It neatly sums up how time, risk and capital markets are at the centre of modern financial management.

Real World 1.1

Finance on the back of a postage stamp

The leading textbooks in finance are nearly 1,000 pages long. Many students learn by making notes on each topic. They then summarise their notes. Here is one student's summary of his Finance course: Time is money . . . Don't put all your eggs in one basket . . . You can't fool all the people all of the time.

- The idea that time is money refers to the fact that a sum of money received now is worth more than the same sum paid in the future. This gives rise to the principle that future cash flows should be discounted, in order to calculate their present value.
- You can reduce the risk of an investment if you don't put all your eggs in one basket. In other words, a diversified portfolio of investments is less risky than putting all your money in a single asset. Risks that cannot be diversified away should be accepted only if they are offset by a higher expected return.
- The idea that you can't fool all of the people all of the time refers to the efficiency of financial markets. An efficient market is one in which information is widely and cheaply available to everyone and relevant information is therefore incorporated into security prices. Because new information is reflected in prices immediately, investors should expect to receive only a normal rate of return. Possession of information about a company will not enable an investor to outperform. The only way to expect a higher expected return is to be exposed to greater risk.

These three themes of discounted cash flow, risk and diversification, and market efficiency lie at the very heart of most introductory finance courses. Each of these themes will be considered in this book.

Source: Dimson, E. (1995) *Assessing the Rate of Return*, Financial Times Mastering Management series, supplement issue no. 1, p. 13. © Professor E. Dimson 1995, reproduced with permission of the author. All rights reserved.

WHY DO BUSINESSES EXIST?

A key assumption underpinning modern financial management is that businesses exist to create wealth for their shareholders. This has provoked much debate and so is worth exploring in some detail. Shareholders are considered of paramount importance because they effectively own the business and therefore bear the residual risk. During the good times they benefit, but during the bad times they must bear any losses. Furthermore, if the business fails and its remaining assets are distributed, the shareholders' claim against those assets goes to the bottom of the pile. The claims of other 'stakeholders', such as employees, customers, lenders and suppliers, are given legal priority over those of shareholders. These other stakeholders may also have the added advantage of being able to protect themselves against the risk of losses.

Activity 1.1

Can you think of any way in which:

(a) a lender, and
(b) a supplier

could take steps to avoid the risk of loss, even though the business with which they are dealing is in financial difficulties and may even fail?

Lenders can insist that the business offers adequate security for any loans that they provide. This may allow assets to be seized to pay off amounts due in the event of a default in interest or loan repayments. Suppliers can insist on being paid in advance for the goods or services provided.

Note that shareholders have a residual claim on the wealth generated by a business, while other stakeholders, such as employees, lenders and suppliers, normally have a fixed claim. In other words, shareholders receive whatever remains after other stakeholders have received the fixed amounts due to them. Having a residual claim means that shareholders have an incentive to increase the size of their claim by ensuring that the business undertakes new and risky ventures. Entrepreneurial activity is therefore encouraged, which can benefit all those connected with the business. Stakeholder groups with a fixed claim on the business do not have the same incentive as that of shareholders. Providing the business can meet their claims, this will normally be enough. (To minimise their risks, they might even prefer the business to avoid new ventures.)

Wealth maximisation

We have just seen that a business is assumed to exist to create wealth for its shareholders. We can be more precise, however, by saying that a business is assumed to pursue the goal of **shareholder wealth maximisation**. Within a market economy, shareholders provide funds to a business in the expectation that they will receive the maximum possible increase in wealth for the level of risk involved. When we use the term 'wealth' in this context, we are referring to the *market value of the ordinary shares*. The market value of these shares will, in turn, reflect the future returns that shareholders are expected to receive *over time* from the shares and the level of risk that must be faced. It is important to emphasise that the assumed goal is not to

maximise shareholders' returns over the short term, but rather to generate the highest possible returns over the long term.

Wealth maximisation or profit maximisation?

Instead of seeking to maximise shareholder wealth, a business may seek to maximise profit. In broad terms, profit represents the surplus generated by a business during a period and so it is tempting to conclude that the maximisation of profit will ultimately lead to the maximisation of shareholder wealth. Unfortunately, things aren't quite so straightforward.

The goal of profit maximisation is rather vague and fails to capture all aspects of shareholder wealth. Various difficulties lay in the path of attempts to implement this goal including:

- *Lack of precision*: the term 'profit' is imprecise and different measures of both profit and profitability exist. They include:

  - operating profit (that is, profit before interest and tax)
  - profit before tax
  - profit after tax
  - profit available to shareholders per ordinary share
  - profit available to shareholders as a percentage of ordinary shareholders' funds invested.

These measures do not always move in lockstep. An injection of new share capital, for example, may increase profit after tax but may lead to a decrease in profit available to shareholders per ordinary share. Different profit measures may, therefore, provide a different narrative of financial performance.

- *Lack of objectivity*: the profit measures mentioned cannot be objectively determined. They are all influenced by the particular accounting policies and estimates employed, such as those relating to depreciation, inventories and bad debts. They are also vulnerable to manipulation by managers wishing to present a particular picture of financial health to investors.
- *Time period*: the period over which profit should be maximised is unclear. This is a serious flaw as conflict can occur between short-term and long-term profit maximisation. It is possible, for example, to maximise short-term profits at the expense of long-term profits.

Activity 1.2

How might the managers of a business increase short-term profits at the expense of long-term profits? Try to think of at least two ways.

Managers may reduce operating expenses, and so increase short-term profits, by:

- reducing research and development expenditure
- cutting staff training and development
- buying lower-quality materials
- reducing marketing expenditure
- cutting quality control mechanisms.

The methods identified, however, may undermine the long-term competitiveness and performance of the business.

- *Risk*: the goal of profit maximisation takes no account of the risks involved. Shareholders, however, are normally very concerned with risk. To protect their investment, they may shy away from high-risk projects even though they have the potential to generate large profits.
- *Opportunity cost*: suppose that managers decide to reinvest current profits in order to boost future profits. This policy may well be consistent with the goal of profit maximisation, but what if the returns on profits reinvested were lower than those that shareholders could achieve from investing in a similar business with similar levels of risk? It would mean that by reinvesting the profits, rather than distributing them, shareholders are being prevented from maximising their wealth.

The weaknesses just mentioned do not apply to the goal of shareholder wealth maximisation. It is more precise and, as we shall see in later chapters, takes account of both risk and the opportunity cost of shareholders' funds.

Do managers really have a choice?

Within a market economy there are strong competitive forces at work to ensure that failure to maximise shareholder wealth will not be tolerated for long. Competition for funds provided by shareholders and competition for managers' jobs should ensure that the interests of the shareholders prevail. If the managers of a business do not provide the expected increase in shareholder wealth, shareholders have the power to replace the existing management team with a new team that is more responsive to their needs. Alternatively, the shareholders may decide to sell their shares in the business (and, perhaps, reinvest in other businesses that provide better returns in relation to the risks involved). The sale of shares in the business is likely to depress the market price of the shares, which management will have to rectify in order to avoid the risk of takeover. This can be done only by pursuing policies that are consistent with the needs of shareholders.

Real World 1.2 below concerns a recent failed takeover bid and its consequent effect on the target business. It neatly illustrates some of the points raised above.

Real World 1.2

A lesson quickly learned

The failed attempt by Kraft Heinz, the US food business to take over Unilever, the Anglo-Dutch business, can be viewed as a case study in what happens when a business loses sight of the importance of maximising shareholder value. Prior to the failed bid, the chief executive of Unilever, Paul Polman, was an outspoken critic of the shareholder value approach. Instead, he demonstrated a concern for environmental, social and corporate governance issues as a means of promoting the interests of all stakeholders.

The takeover bid came as a shock to the Unilever board, despite growing evidence that shareholder returns were disappointing when compared with those of the business's main rivals. Once the bid had been withdrawn, the board recognised that things could not simply carry on as before. It, therefore, announced a 12 per cent increase in dividends as well as a share buyback programme. It doubled planned cost cuts to two billion euros by 2020, to boost profit margins, and announced a strategic review of business operations to find ways 'to accelerate delivery of value for the benefit of our shareholders'. The overall effect of these

It should be mentioned that managers are usually encouraged to maximise shareholder wealth through their remuneration arrangements. Financial incentives are normally on offer to help align the interests of the managers with those of the shareholders. These incentives, which are often linked to share price performance, may take the form of bonus payments and awards of shares in the business.

Criticisms of shareholder wealth maximisation

Critics of the shareholder wealth maximisation objective believe that many of the problems of modern business can be laid at its door. It has been argued, for example, that the relentless pursuit of this objective will lead businesses to implement measures such as cost cutting, redundancies and forcing suppliers to lower prices. These measures can be carried to a point where serious conflict can arise between the various stakeholders (shareholders, employees, suppliers and so on) associated with a business. As a result, the business becomes weakened and incapable of exploiting profitable opportunities.

While the kind of behaviour mentioned may well occur, it is difficult to see how it would be consistent with the goal of maximising shareholder wealth.

Activity 1.3

Can you see why?

As mentioned earlier, shareholder wealth maximisation is a long-term goal and the sort of behaviour described would only undermine the achievement of this goal.

A further criticism made is that, by making shareholders the dominant group, other stakeholders will feel like second-class citizens and so will not fully engage with the business. Shareholder wealth maximisation cannot be achieved if other stakeholders are unhappy with their lot. Discontented staff can lead to low productivity and strikes. Discontented suppliers can lead to the business being given lower ordering priority and receiving slower deliveries in the future. In both cases, the wealth of shareholders will be adversely affected. At the very least, this means that the needs of other stakeholders must be considered if shareholder wealth maximisation is to be successfully pursued.

A final criticism is that shareholder wealth maximisation encourages unethical behaviour. In a highly competitive environment, managers are under huge pressure to produce the returns that shareholders require. To achieve these returns, they may be tempted to act in unethical ways.

Can you think of *three* examples of what managers might do in pursuit of higher returns that would be regarded by most people as unethical?

These might include:

- exploiting child labour in underdeveloped countries
- polluting the environment in order to cut costs
- paying bribes to government officials in order to secure contracts
- subjecting employees to dangerous working conditions in order to cut costs
- evading taxation on profits and gains through 'creative accounting' methods
- abusing market power by delaying payments to small suppliers
- covering up safety defects in the products sold in order to avoid compensation claims.

You may have thought of others.

The rise of globalised businesses, so it is argued, has driven some of the unethical behaviour that has been reported. It is claimed that managers dealing with operations in remote locations may often find it easier to escape their ethical obligations.

The kind of behaviour mentioned above cannot be reconciled with the goal of shareholder wealth maximisation. To survive and prosper over the longer term, a business needs the approval of the society in which it operates. Increasingly, society expects high standards of business behaviour, and so it may well be that ethical behaviour has become a necessary condition for maximising shareholder wealth. We shall return to this point a little later in the chapter. However, let us conclude this section with a cautionary tale. **Real World 1.3** reveals how one well-known retailer was hit by allegations of improper conduct towards its employees and other failings. This coincided with a plummeting share price.

Not being a good sport

Following a halved share price over the last six months, and a value that has fallen by £1.6bn over the last three, Sports Direct has been formally relegated from the London Stock Exchange FTSE 100. Every quarter, a review takes place on the 100 most valuable listed firms and at close of business on Tuesday [1 March 2016], *The Guardian* reported that Sports Direct was ranked at 142.

In December, a *Guardian* investigation revealed thousands of temporary Sports Direct warehouse workers as being underpaid, receiving hourly rates effectively below the minimum wage. Undercover reporters employed inside the retailer's warehouse in Shirebrook, Derbyshire, discovered thousands of workers were subject to unorthodox searches and surveillance, and that staff were terrified to take time off work.

In riposte, the sporting goods retailer announced a pay rise for staff, as well as a review of agency staff terms and conditions, which was to be overseen personally by its founder Mike Ashley.

It has denied that minimum wage law isn't being met, but Ashley's review in the treatment of his employees is not expected to emerge for several weeks. Meanwhile, local MPs are to visit the company's warehouse on 21 March.

'This should be a cautionary tale for companies who treat their workers badly', said Frances O'Grady, General Secretary of the TUC. 'The reputational and financial damage Sports Direct has suffered is of its own making. Subjecting staff to workhouse conditions is not the way to build a successful business. Shareholders must demand root and branch changes or Sports Direct's name will continue to be dragged through the mud.'

'It is hardly surprising that Sports Direct has fallen out of the FTSE 100', added Ashley Hamilton Claxton, Corporate Governance manager at Sports Direct shareholder, Royal London Asset Management. 'Over the long term, shareholder value is intrinsically linked to corporate governance and companies ignore this at their peril. The long list of corporate governance failings at Sports Direct is a contributing factor in its fall from the FTSE 100 in our view.'

Source: Sabharwal, V. (2016) 'Sports Direct falls out of FTSE 100', www.retailgazette.co.uk, 2 March.

Wealth maximisation in practice

There is some evidence that businesses pursue shareholder wealth maximisation as their main goal, or at least claim to do so. These claims often adorn their annual reports and websites. **Real World 1.4** provides five examples of businesses that seek to maximise shareholder wealth (or shareholder value, as it is often called).

Real World 1.4

Something of value

Ferguson plc, a distributer of plumbing and heating products, states:

The Board is committed to maximising shareholder value.

Permanent TSB Group Holdings plc, an Irish retail bank, claims:

The bank's governing objective is to maximise shareholder value over the long term.

Imperial Minerals plc, a mining business, states:

In the longer term, the Group aims to maximise shareholder value through the allocation of its resources towards the sourcing, vetting and securing of one or more natural resources exploration, development or production assets in order to develop the Group into a self-sustained natural resources business.

The chairman of Just Group plc, a financial services group, states:

My focus is on maximising shareholder value, with no options excluded.

Diamond Corp plc is a diamond producer that is focused on:

Maximising shareholder value through the development of high-margin diamond production assets.

Sources: Ferguson plc, Annual Report and Accounts 2018, p.13; Permanent TSB Group Holdings plc, www. permanenttsbgroup.com, accessed 26 November 2018; Imperial Minerals plc, *Corporate Governance*, www. imperialminerals.com, accessed 26 November 2018; Diamond Corporation plc, www.diamondcorpplc.uk, accessed 26 November 2018.

The stakeholder approach

Those who are uncomfortable with the idea that a business should be run for the principal benefit of shareholders often propose a **stakeholder approach** as an alternative. This approach is not very clearly defined and varying views exist as to what it is and what it entails. In broad terms, however, it embodies the idea that a business should serve those groups who may benefit from, or who may be harmed by, its operations.

Activity 1.5

Which groups might be regarded as stakeholders in a business? Try to think of at least five groups. (*Hint*: We have already mentioned a few in earlier sections.)

Those regarded as stakeholders may include:

- employees
- suppliers
- customers
- lenders
- shareholders
- the community
- government.

This is not an exhaustive list. You may have thought of others.

According to the stakeholder approach, each group with a legitimate stake in the business should have its interests reflected in the objectives that the business pursues. Thus, managers should not simply serve the interests of shareholders but should promote the interests of, and mediate between, various stakeholder groups.

This alternative approach acknowledges the interest of the shareholders in a business but does not accept that this particular interest should dominate. This may seem strange given the fact that shareholders are effectively the owners of a business. Supporters of the stakeholder approach, however, tend to view things from a different perspective. They argue that a business corporation is a separate legal entity, which no one really owns. They also argue that the business is essentially a web of contracts. That is, contracts exist between the business, which is at the centre of the web, and its various stakeholder groups such as suppliers, employees, managers, lenders and so on. The contract between the business and its shareholders forms just one part of this web.

Other arguments can be used to diminish the relative importance of shareholders within a business. These are often based on the view that shareholders are more remote and less engaged than other stakeholders. Thus, it is claimed that shareholders can, by having a diversified share portfolio, diversify away risks associated with their investment in the business whereas employees, for example, cannot diversify away their employment risks. Furthermore, shareholders can sell their shares within seconds whereas other stakeholder groups, such as employees, suppliers and lenders, cannot usually exit from the business so easily.

Activity 1.6

Is it always possible for shareholders to exit from a business easily? Can you think of an example where it may be difficult for a shareholder to sell shares in a business?

One important example is a shareholder wishing to sell shares in a small business that does not have its shares traded on a stock exchange. Many family-owned businesses would fit into this category. It may be difficult to find a buyer and there may also be restrictions on the right to sell shares. It is worth pointing out that small businesses are far more numerous than large businesses that have shares listed on a stock exchange.

Problems with the stakeholder approach

A major difficulty with the stakeholder approach is that it does not offer a simple, clear-cut objective for managers to pursue and for which to account. Considering the needs of the various stakeholder groups will inevitably lead a business to having multiple objectives. It has been pointed out, however, that this means no objectives at all. To implement this approach, the managers must consider the competing needs of all the various stakeholder groups and then carefully weigh these before embarking on any course of action. An obvious question that arises is, 'How is this done?' In the absence of a well-reasoned method of doing this, there really is no effective objective to pursue.

Adopting this approach will add to the problems of accountability for two reasons. The first is that there is no clear way in which we can determine whether there has been an improvement or deterioration in performance during a particular period. The fact that, say, profit is lower than in previous periods may be caused by the pursuit of other legitimate objectives. The second reason is that multiple objectives can be used by managers as a convenient smokescreen behind which they can pursue their own objectives. It can, therefore, provide an incentive for them to promote the stakeholder approach at the expense of shareholder wealth maximisation.

A final problem with the stakeholder approach is that it raises many thorny questions concerning the identification and treatment of the various stakeholder groups. Who are the stakeholders? Should a broad view be taken so that many stakeholder groups are included or should a narrow view be taken so as to include only those with close links to the business? Are competitors considered to be stakeholders of the business? Should all stakeholder groups benefit equally from the business or should those that contribute more receive more? If it is the latter, how will the benefits attributable to each group be determined? Should stakeholder groups that contribute nothing to the business, but are affected by its actions, receive any benefits and, if so, how will these benefits be determined? Although such questions may create endless happy hours of debate for academics, there seems little chance that they will be resolved in a way that provides clear decision rules for managing a business.

Shareholders versus stakeholders

When comparing the shareholder and stakeholder approaches, a few points are worth making. First, the gulf between the two may not be as wide as is sometimes portrayed. We saw earlier that, in pursuit of shareholder wealth maximisation, managers must take account of the needs of other stakeholders. Factors such as customer satisfaction, employee morale and status within the community will determine the degree of success in achieving their ultimate objective. Balancing the needs of the various stakeholder groups must feature, therefore, in management decisions.

A second point is that shareholders are not an exclusive group. Other stakeholders may become shareholders if they so wish. They may acquire shares directly through the market or indirectly through, for example, membership of an employee share purchase scheme. Thus, by widening share ownership, the potential for conflict between shareholders and other stakeholders may be reduced.

Perhaps we can sum up the discussion concerning the two approaches by saying that, within a competitive market economy, the shareholder approach has more to commend it. The quest for shareholder wealth maximisation provides a convincing business objective.

It is, however, by no means perfect. The potential for conflict between shareholders and other stakeholders undoubtedly exists.

A paradox

Let us now turn our attention to how a business should go about maximising shareholder wealth. It is often argued that this involves concentrating on controlling costs, increasing revenues and ensuring that only opportunities offering clear, wealth-maximising outcomes are undertaken. An interesting counterargument, however, is that such a narrow focus may prove to be self-defeating and that shareholder wealth maximisation is more likely to be achieved when pursued indirectly. It has been claimed that those who are most successful in generating wealth are often seized by a passion to develop the best possible product or to provide the best possible service for their customers. If a business concentrates its efforts on the challenges that this entails, financial rewards usually follow. To maximise shareholder wealth, therefore, it may be best for a business to concentrate on something else.

Real World 1.5 is an extract from an article written by John Kay in which he points out that the world's richest individuals are often not driven by cravings for wealth or material gain.

Real World 1.5

How to make real money

Sam Walton, founder and principal shareholder of Wal-Mart, the world's largest retailer, drove himself around in a pick-up truck. 'I have concentrated all along on building the finest retailing company that we possibly could. Period. Creating a huge personal fortune was never particularly a goal of mine,' Walton said. Still, five of the top ten places in the Forbes rich list are occupied by members of the Walton family . . .

Warren Buffett, the most successful investor in history, still lives in the Omaha bungalow he bought almost fifty years ago and continues to take pleasure in a Nebraskan steak washed down with cherry Coke. For Buffett, 'It's not that I want money. It's the fun of making money and watching it grow.'

The individuals who are most successful in making money are not those who are most interested in making money. This is not surprising: the principal route to great wealth is the creation of a successful business, and building a successful business demands exceptional talents and hard work. There is no reason to think that these characteristics are associated with greed and materialism: rather the opposite. People who are obsessively interested in money are drawn to get-rich-quick schemes rather than to business opportunities, and when these schemes come off, as occasionally they do, they retire to their villas in the sun . . .

FT *Source*: Kay, J. (2012) Forget how the crow flies, *Financial Times*, 17 January, p. 21.
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BALANCING RISK AND RETURN

All decisions attempt to influence future outcomes and financial decisions are no exception. The only thing certain about the future, however, is that we cannot be sure what is going to happen. There is a risk that things will not turn out as planned, and this should be taken into account when making financial decisions.

As in other aspects of life, risk and return tend to be related. Evidence shows that returns often relate to risk in the way shown in Figure 1.3.

Even at zero risk a certain level of return will be required. This will increase as the level of risk increases.
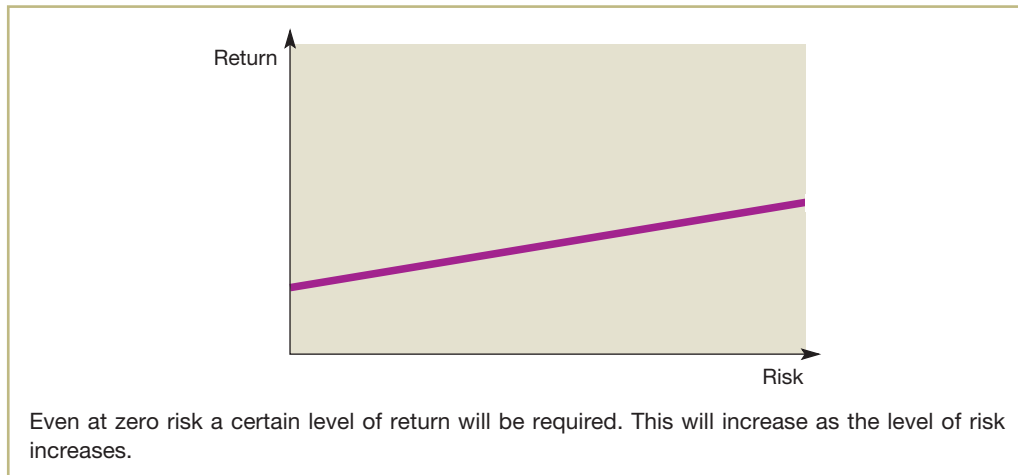
Figure 1.3 Relationship between risk and return

Activity 1.7

Look at Figure 1.3 and state, in broad terms, where an investment in:

(a) a government savings account, and
(b) shares in an oil exploration business

should be placed on the risk–return line.

A government savings account is normally a very safe investment. Even if a government is in financial difficulties, it can always print more money to repay investors. Returns from this form of investment, however, are normally very low.

Investing in shares in a commercial business runs a risk of losing part or, possibly, the entire amount invested. Moreover, oil exploration carries more risk than many types of business activity. It can, however, produce very high, positive returns.

Thus, the government savings account should be placed towards the far left of the risk–return line and the oil business shares towards the far right.

This relationship between risk and return has important implications for the shareholders of a business. They will require a minimum return to induce them to invest at all, but will require an additional return to compensate for taking risks; the higher the risk, the higher the required return. Thus, future returns from an investment must be assessed in relation to the likely risks involved. As stated earlier, managers who pursue the shareholder wealth maximisation objective should choose investments that provide the highest returns in relation to the risks involved.

The turmoil in the banking industry has shown that the right balance between risk and return is not always struck. Some banks have taken excessive risks in pursuit of higher returns, with disastrous consequences. **Real World 1.6** discusses the implications of this for the future of banking.

Banking on change

The taxpayer has become the majority shareholder in the Royal Bank of Scotland (RBS). This change in ownership, resulting from the huge losses sustained by the bank, will shape the future decisions made by its managers. This does not simply mean that it will affect the amount that the bank lends to homeowners and businesses; rather, it is about the amount of risk that it will be prepared to take in pursuit of higher returns.

In the past, those managing banks such as RBS saw themselves as producers of financial products that enabled banks to grow faster than the economy as a whole. They didn't want to be seen as simply part of the infrastructure of the economy. It was too dull. It was far more exciting to be seen as creators of financial products that generated huge profits and, at the same time, benefited us all through unlimited credit at low rates of interest. These financial products, with exotic names such as 'collateralised debt obligations' and 'credit default swaps', ultimately led to huge losses that taxpayers had to absorb in order to prevent the banks from collapse.

Now that many banks throughout the world are in taxpayers' hands, they are destined to lead a much quieter life. They will have to focus more on the basics such as taking deposits, transferring funds and making simple loans to customers. Is that such a bad thing?

The history of banking has reflected a tension between carrying out their core functions and the quest for high returns through high-risk strategies. It seems, however, that for some time to come they will have to concentrate on the former and will be unable to speculate with depositors' cash.

Source: Based on information in Peston, R. (2008) 'We own Royal Bank', *BBC News*, www.bbc.co.uk, 28 November.

BEHAVING ETHICALLY

The pursuit of shareholder wealth maximisation has gained impetus in recent years. One of the effects of the global deregulation of markets and of technological change has been to provide investors with greater opportunities to increase their returns. They are now able to move their funds around the world with comparative ease. This has increased competition among businesses for investment funds and has put managers under greater pressure to produce returns that are attractive in international, rather than merely national, terms.

Given these pressures, there is a risk that shareholder wealth maximisation may be pursued by managers using methods that are generally regarded as unethical. Examples of such behaviour were considered earlier in the chapter. Nevertheless, some managers may feel that even unethical behaviour can be justified because 'all is fair in business'. Professor Rose, however, points out that responsibility to maximise the wealth of shareholders 'does not mean that managers are being asked to act in a manner which absolves them from the considerations of morality and simple decency that they would readily acknowledge in other walks of life' (see reference 1 at the end of the chapter). When considering a particular course of action, managers should therefore ask themselves whether it conforms to accepted moral standards, whether it treats people unfairly and whether it has the potential for harm.

Despite the examples of unethical acts that have attracted publicity over recent years, it would be unfair to conclude that most businesses are involved in unethical activities. Nevertheless, revelations of unethical practice can be damaging to the entire business community. Lying, stealing and fraudulent behaviour can lead to a loss of confidence in business and the imposition of tighter regulatory burdens. In response to this threat, businesses often seek to demonstrate their commitment to acting in an honest and ethical way.

One way of doing this is to develop, and adhere to, a code of ethics concerning business behaviour. **Real World 1.7** provides an example of one such code.

Ethical behaviour and the pursuit of shareholder wealth maximisation need not conflict. Indeed, some believe that high ethical standards may be a necessary condition for wealth maximisation.

Activity 1.8

Can you think why this may be the case?

When customers, suppliers and employees are treated fairly and with integrity, a business is more likely to flourish over the longer term. Stakeholders will demonstrate a greater sense of commitment and loyalty towards the business, which can be vitally important during difficult periods.

In recent years, attempts have been made to demonstrate a link between high ethical standards and superior financial performance over time. **Real World 1.8** describes one of these.

Real World 1.8

Does fame lead to gain?

The Ethisphere Institute is a well-known organisation that promotes ethical business practices. Each year it produces a list of the World's Most Ethical Companies. The criteria used for evaluating businesses cover various aspects, including corporate governance, compliance programmes, culture of ethics, reputation and corporate citizenship.

To see whether investing in ethical businesses led to superior investor returns, one study created an investment portfolio of businesses that were included in the list of the World's Most Ethical Companies as well as being listed on a US stock market. For the period 2007–2011, returns from this portfolio were then compared to the market returns, as measured by a market index (S&P 500). After adjusting for differences in risk, the study found that the portfolio of ethical businesses consistently outperformed the market. Investing in the portfolio

→

generated returns up to 8% higher than expected during periods when the market was rising as well as when it was falling. The authors of the study argued that this latter finding suggested that ethical businesses benefit from special protection in times of crises.

Source: Carvalho, A. and Areal, N. (2016) 'Great Places to Work®: resilience in times of crisis', *Human Resource Management*, vol. 55, no. 3, pp. 479–98.

While the above findings are interesting, we should be cautious in drawing conclusions. Perhaps ethical practices do not drive superior performance but rather well-managed, high performing businesses tend to adopt ethical practices.

Ethics and the finance function

Integrity and ethical behaviour are particularly important within the finance function, where many opportunities for sharp practice exist. To demonstrate their commitment to integrity and ethical behaviour, some businesses provide a code of standards for their finance staff. **Real World 1.9** provides an example of one such code.

Real World 1.9

Code calling

Vodafone plc, the telecommunications business, has a code of ethics for its chief executive and senior finance and accounting staff. The code states that they to have a duty to:

. . . act with integrity. Integrity requires, among other things, being honest and candid. Deceit, dishonesty and subordination of principle are inconsistent with integrity. Service to the Company should never be subordinated to personal gain and advantage.
The code specifically states that they must:

- act with integrity, including being honest and candid while still maintaining the confidentiality of Company information where required or in the Company's interests;
- observe, fully, applicable governmental laws, rules and regulations;
- comply with the requirements of applicable accounting and auditing standards and Company policies in the maintenance of a high standard of accuracy and completeness in the Company's financial records;
- adhere to a high standard of business ethics and not seek competitive advantage through unlawful or unethical business practices; and
- avoid conflicts of interest wherever possible. Anything that would be a conflict for a Relevant Officer will also be a conflict if it is related to a member of his or her family or a close relative.

Source: Vodafone plc, *Code of Ethics*, accessed 13 February 2019 www.vodafone.com

Although there may be rules in place to try to prevent sharp practice, these will provide only a partial answer. The finance staff themselves must appreciate the importance of fair play in building long-term relationships for the benefit of all those connected with the business.

PROTECTING SHAREHOLDERS' INTERESTS

In recent years, the issue of **corporate governance** has generated much debate. The term is used to describe the ways in which businesses are directed and controlled. Corporate governance is important because in businesses of any size, those who own the company (that is, the shareholders) are usually divorced from the day-to-day control of the business. The shareholders

employ professional managers (known as directors) to manage the business for them. These directors may, therefore, be viewed as *agents* of the shareholders (who are the *principals*).

Given this agent–principal relationship, it may seem reasonable to assume that the best interests of shareholders will guide the directors' decisions. In other words, the directors will seek to maximise the wealth of the shareholders. However, in practice this does not always occur. Directors may be more concerned with pursuing their own interests and so a conflict can occur between their interests and those of the shareholders.

Activity 1.9

What sort of interests might the directors pursue that would benefit themselves, but which may conflict with the interests of shareholders? Try to think of at least two.

These interests may include:

■ increasing their pay and bonuses,
■ negotiating perquisites (perks), such as expensive cars, overseas visits and lavish offices,
■ improving their job security, and
■ increasing their status and power within the business.

It can be argued that in a competitive market economy, this **agency problem**, as it is termed, should not persist over time. The competition for the funds provided by shareholders, and competition for directors' jobs, should ensure that the interests of the shareholders will prevail. However, if competitive forces are weak, or if information concerning the directors' activities is not available to shareholders, the risk of agency problems will be increased. Shareholders must be alert to such risks and should take steps to ensure that the directors operate the business in a way that is consistent with shareholder needs.

Protecting through rules

Where directors pursue their own interests at the expense of the shareholders, it is clearly a problem for the shareholders. However, it may also be a problem for society as a whole.

Activity 1.10

Can you think why directors pursuing their own interests, rather than those of shareholders, may be a problem for society as a whole?

If shareholders believe that their funds will be mismanaged, they will be reluctant to invest. A shortage of funds will lead to businesses making fewer investments. Furthermore, the costs of finance will increase as businesses compete for what limited funds are available. A lack of concern for shareholders can therefore have a profound effect on the performance of individual businesses and, with this, the health of the economy.

To avoid these problems, most competitive market economies have a framework of rules to help monitor and control the behaviour of directors. These rules are usually based around three guiding principles:

■ *Disclosure.* This lies at the heart of good corporate governance. Adequate and timely disclosure can help shareholders to judge the performance of the directors. Where performance is considered unsatisfactory this will be reflected in the price of shares. Changes should then be made to ensure the directors regain the confidence of shareholders.

- *Accountability.* This involves defining the roles and duties of the directors and establishing an adequate monitoring process. In the UK, the law requires that the directors of a business act in the best interests of the shareholders. This means, among other things, that they must not try to use their position and knowledge to make gains at the expense of the shareholders. The law also requires larger businesses to have their annual financial statements independently audited. The purpose of an independent audit is to lend credibility to the financial statements prepared by the directors.
- *Fairness.* Directors should not be able to benefit from access to 'inside' information that is not available to shareholders. As a result, both the law and the London Stock Exchange place restrictions on the ability of directors to buy and sell the shares of the business. One example of these restrictions is that the directors cannot buy or sell shares immediately before the announcement of the annual trading results of the business or before the announcement of a significant event, such as a planned merger or the loss of the chief executive.

Activity 1.11

What consequences for stock markets may arise from a failure to ensure that directors do not benefit from inside information?

Buying and selling shares must be seen as a 'fair game' where all investors have access to the same information. Where investors feel that the dice is loaded and directors can benefit from inside information, they are unlikely to invest.

The guiding principles are set out in Figure 1.4.

The three principles should guide rule makers in their work.
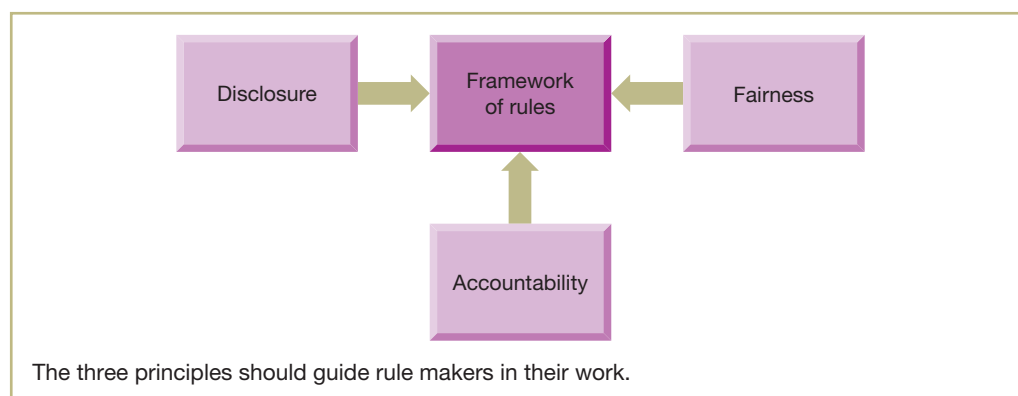
Figure 1.4 Principles underpinning a framework of rules

Strengthening the framework of rules

The number of rules designed to safeguard shareholders has increased considerably over the years. This has been in response to weaknesses in corporate governance procedures that have been exposed, through well-publicised business failures and frauds, excessive pay increases to directors, and evidence that financial reports were being 'massaged' so as to mislead shareholders.

The most important development has been the introduction of the **UK Corporate Governance Code**, which sets out best practice on corporate governance for large businesses listed on the London Stock Exchange. It is produced by the Financial Reporting Council, an independent regulator that seeks to promote high quality corporate governance and

accountability. The UK Code deals with such matters as the role and remuneration of directors, their relations with shareholders, and their accountability. In **Real World 1.10**, the key principles underpinning the code are described.

The UK Corporate Governance Code

The UK Code takes the view that good corporate governance is of vital importance to the long-term success of a business. It sets out a number of key principles rather than rigid rules. These principles, which are grouped into five main areas, are summarised below.

Board leadership and company purpose

The Code states that the board of directors should be committed to the long-term sustainability of the business. Furthermore, it should seek to generate shareholder value and to contribute to society more generally. The board is responsible for setting out the objectives and strategy of the business and for promoting a culture that aligns with these. It is also responsible for ensuring that the business has the resources needed to pursue its objectives. Finally, the board is expected to engage with shareholders and stakeholders and to ensure workforce policies and practices mirror the values of the business.

Division of responsibilities

This area concerns the roles and responsibilities of board members. The Code states that there should be a chair to provide leadership for the board. This will involve fostering good relations among board members and encouraging open, constructive debate. To facilitate debate, board members should receive all necessary information in a timely manner. Board composition should reflect a suitable mix of executive and non-executive directors. The role of the latter is to offer advice and guidance and to constructively challenge the plans and policies of the executive directors. To ensure that no single individual has unfettered power, the Code states that leadership of the board should be separate from leadership of the day-to-day management of the business. Finally, the board should have everything it needs in order to operate effectively.

Composition, succession and evaluation

This area is concerned with the effectiveness of the board. The Code states that procedures for appointing board members and for succession planning should be in place and these should be both transparent and rigorous. Board appointments should be based on merit and should promote diversity. Furthermore, the board should contain a suitable combination of skills, knowledge and experience. To maintain a vibrant board, its membership should be renewed regularly. As a check on its effectiveness, the board, along with individual members, should be subject to annual evaluation.

Audit, risk and internal control

This area focuses on the issue of risk. The Code states that the board should ensure that suitable controls are in place to manage risk. Furthermore, it should ensure the internal and external audit functions within the business operate effectively. This is of vital importance in protecting the reliability of financial and other statements provided by the business. The board should also identify the key risks the business is prepared to take in pursuit of its objectives. To enhance accountability, the board should provide a fair and impartial evaluation of the business's position and prospects.

Remuneration

This final area deals with the thorny issue of executive remuneration. The Code states that remuneration policies should be attuned to the need for long-term sustainable success and should be consistent with the long-term plans of the business. It further states that executive remuneration should be clearly related to the achievement of the business's objectives. When developing remuneration policies, account should be taken of business and individual performance, along with any wider issues. Finally, procedures for developing the remuneration package of directors and other senior executives should be transparent and should ensure that individual directors are prevented from setting their own remuneration.

The above principles are accompanied by more detailed provisions and supporting guidance.

Source: Based on information in *The UK Corporate Governance Code*, July 2018, Financial Reporting Council. www.frc.org.uk

Businesses listed on the London Stock Exchange are expected to comply with the requirements of the UK Code or must give their shareholders good reason why they do not. Failure to do one of these can lead to the company's shares being suspended from listing.

Activity 1.12

Why might this be an important sanction against a non-compliant business?

A major advantage of a Stock Exchange listing is that it enables investors to sell their shares whenever they wish. A business that is suspended from listing would find it harder and, therefore, more expensive to raise funds from investors because there would be no ready market for the shares.

Listed businesses usually comply with the provisions of the Code. A recent survey found that more than 95 per cent of the largest 350 listed businesses adhere to all, or all but one or two, of its provisions (see reference 2 at the end of the chapter).

It is generally believed that the Code has improved the quality of information available to shareholders. It has also resulted in better checks on the powers of directors, and provided greater transparency in corporate affairs. However, rules can only be a partial answer. Ultimately, good corporate governance behaviour depends on a healthy **corporate culture**. By this we mean the values, attitudes and behaviour displayed towards the various stakeholders, as discussed earlier. Thus, effective governance rules rely on managers adhering to high standards of integrity and accountability.

Rulemaking is a tricky business. Where corporate governance rules are too tightly drawn, entrepreneurial spirit may be stifled and risk taking may be discouraged. However, problems can also arise where rules are too loosely drawn.

Activity 1.13

Can you think of a possible problem with corporate governance rules that are too loosely drawn?

In this case, it would be easier for unscrupulous directors to find ways around them.

Thus, when creating corporate governance rules, a balance must somehow be struck between the need to protect shareholders and other stakeholders and the need to encourage entrepreneurial behaviour.

SHAREHOLDER INVOLVEMENT

Improving corporate governance has focused mainly on developing a framework of rules for managing businesses listed on the London Stock Exchange. While rules are important, it is also important for the shareholders who own the businesses to play their part by actively monitoring and controlling the behaviour of directors. In this section, we identify the main shareholders of listed businesses and discuss their role in establishing good corporate governance. We also consider why there has been greater shareholder activism in recent years.

Who are the main shareholders?

Real World 1.11 provides an analysis of the ownership of shares in UK-listed businesses at the end of 2016.

Real World 1.11

Going overseas

The breakdown of ownership of UK listed shares as at 31 December 2016 is as shown in Figure 1.5.

A large portion of the shares in UK listed businesses are held by those outside the UK. Shares held by those within the UK are concentrated in the hands of financial institutions.
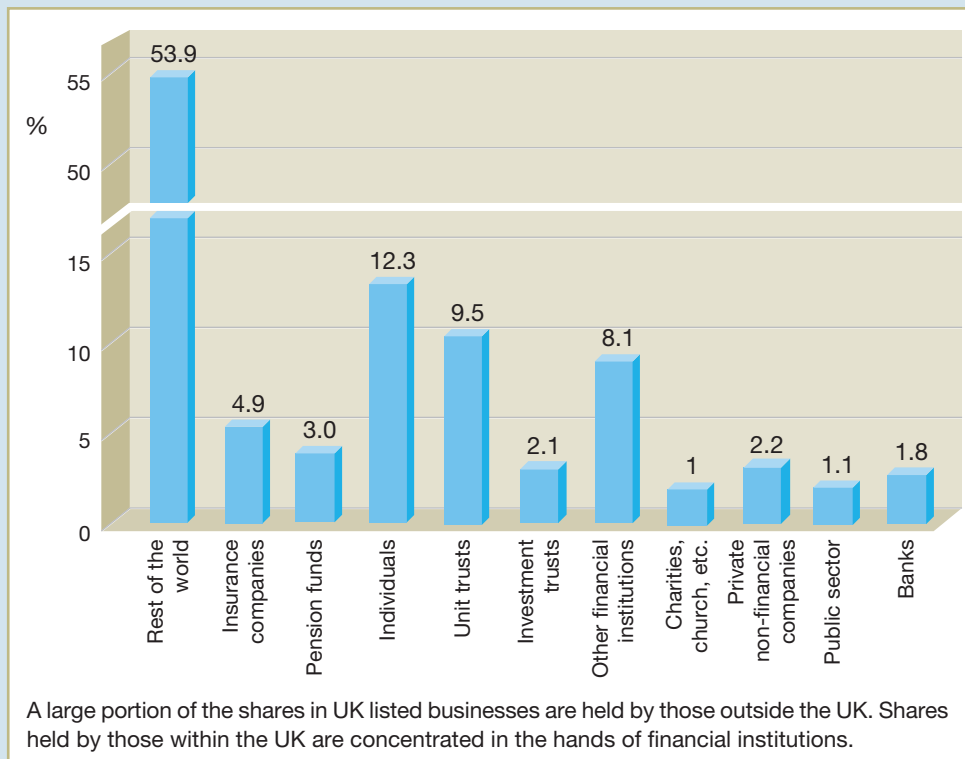
Figure 1.5 Ownership of UK listed shares, end of 2016

Looking at the changes in the ownership of listed shares over the years shows two striking features:

1 The value of listed shares owned by overseas residents has gone up progressively from 30.7 per cent in 1998 to 53.9 per cent in 2016.
2 The value of listed shares held by UK individuals has fallen from 16.7 per cent in 1998 to 12.3 per cent in 2016.

However, the percentage of shares held by each group appears to have stabilised in the past few years.

Source: *Ownership of UK Quoted Shares 2016*, Table 4, Office for National Statistics, 29 November 2017. Office for National Statistics licensed under the Open Government Licence v3.0.

Activity 1.14

The rise of financial institutions means that private individuals have less direct investment in listed shares than in the past. Does that mean they have less financial interest in listed shares?

No. It means that individuals are tending to invest through the institutions, for example by making pension contributions rather than buying shares directly. Ultimately, all of the investment finance must come from individuals.

The concentration of ownership of listed shares means that financial institutions have enormous voting power. Thus, they can exert significant influence over the way in which stock exchange listed businesses are directed and controlled. In the past, however, they have been reluctant to exercise their powers. They have been criticised for being too passive and for allowing the directors of businesses too much independence.

What can shareholders do?

There are two main ways in which shareholders can try to control the behaviour of directors. These are by:

■ introducing incentive plans for directors that link their remuneration to the share performance of the business. In this way, the interests of directors and shareholders should become more closely aligned; and
■ closely monitoring the actions of the directors and exerting influence over the way in which they use business resources.

The first issue will be picked up in Chapter 10. It is the second issue to which we now turn.

Getting active

In the past, financial institutions have chosen to take a non-interventionist approach to the affairs of a business. Instead, they have preferred to confine their investment activities to deciding whether to buy, hold or sell shares in a particular business. They appear to have taken the view that the costs of actively engaging with directors and trying to influence their decisions are too high in relation to the likely benefits. It is worth pointing out that these costs are borne by the particular financial institution that becomes actively involved, whereas the

benefits are spread across all shareholders. (This phenomenon is often referred to as the 'free-rider' problem.)

Waking the sleeping giants

In recent years, financial institutions have begun to play a more active role in corporate governance. More time is being invested in monitoring the actions of directors and in engaging with the directors over key decisions. This change of heart has occurred for a variety of reasons. One important reason is that the increasing concentration of share ownership has made it more difficult for financial institutions to simply walk away from an investment in a poorly performing business by selling its shares.

Activity 1.15

Why might it be a problem for a financial institution that holds a substantial number of shares in a poorly performing business to simply sell the shares?

Where a substantial number of shares are held, a decision to sell can have a significant impact on the market price, perhaps leading to heavy losses.

A further reason why it may be difficult to disinvest is that a business's shares may be included in a stock market index (such as the FTSE 100 or FTSE 250). Certain types of financial institution, such as investment trusts or unit trusts, may offer investments that are designed to 'track' the particular index and so they become locked into a business's shares in order to reflect the index. In both situations outlined, therefore, a financial institution may have little choice but to stick with the shares held and try to improve performance by seeking to influence the actions and decisions of the directors.

It is also worth mentioning that financial institutions have experienced much greater competitive pressures in recent years. There have been increasing demands from clients for them to demonstrate their investment skills, and thereby justify their fees, by either outperforming benchmarks or beating the performance of similar financial institutions. These increased competitive pressures may be due, at least in part, to the fact that economic conditions have not favoured investors. In the not-too-distant past, they have experienced periods of relatively low stock market returns. Whatever the reason, the increased pressure to enhance the wealth of their clients has led financial institutions, in turn, to become less tolerant towards underperforming boards of directors.

The regulatory environment has also favoured greater activism on the part of financial institutions. This point will be considered in more detail a little later.

Forms of activism

It is important to be clear about what is meant by the term 'shareholder activism' as it can take various forms. In its simplest form, it involves taking a more active role in voting for or against the resolutions put before the annual general meeting or any extraordinary general meeting of the business. This form of activism is seen by the UK government as being vital to good corporate governance. The government expects higher levels of participation and would like institutional shareholders to exercise their right to vote. In the past, financial institutions have often indicated their dissent by abstaining from a vote rather than by outright opposition to a

resolution. However, they are now more prepared to use their vote to oppose resolutions of the board of directors.

A particularly rich source of contention between shareholders and directors, concerns directors pay and this has led to several shareholder revolts. **Real World 1.12** provides evidence of recent discontent.

Revolting shareholders

Shareholder rebellions over high executive pay at the UK's largest companies have doubled this year, with companies from AstraZeneca to BT and Shell suffering big protest votes at their annual meetings. High pay has risen up the agenda for investors in the face of sustained public anger and criticism from politicians over big payouts for corporate bosses.

Some signs have been evident that companies have taken steps towards reform in recent years, either by restructuring or simply cutting remuneration. However, the number of pay resolutions at FTSE 100 companies where at least 20 per cent of votes were against management was 18 by the end of July, compared with nine during the same period in 2017, according to a public register that tracks shareholder rebellions. Chris Cummings, chief executive of the Investment Association, the asset management trade body that compiles the register, said shareholders 'clearly remain unimpressed' with executive pay and were 'frustrated the message is not getting through to some boardrooms'. 'FTSE 100 companies must do more to ensure the pay packets of their top team align with company performance and remain at levels that shareholders find acceptable,' he added.

Some companies, including AstraZeneca, Old Mutual and WPP, have had protests over high pay for two consecutive years or more. One senior figure at a large UK asset manager said the 2018 annual meeting season was 'a lot louder than I thought it would be'. 'I can't remember as many high-profile votes against.' There was a much greater emphasis on 'fairness', looking at factors such as the ratios between the highest and lowest paid, he said. 'A company can have a reasonable [remuneration] structure and pay linked to performance. But investors can say that it is too high.'

The IA public register data also revealed a large rise in opposition to re-electing individual directors, with investors increasingly holding them responsible for issues including excessive pay. A corporate governance specialist at a big UK investor added that investors were more willing than ever to target individuals who agree to high pay packages. 'We have been having these discussions about pay with people for a long time, and it is not changing fast enough,' he said. The number of resolutions on director re-election where at least 20 per cent of investors voted against rose to 80 in 2018 from 38 last year across the FTSE All-Share index of all quoted companies.

The latest version of the UK Code seeks to defuse some of the tensions relating to this issue by laying down various principles concerning how directors' remuneration should be calculated and managed. It also requires boards to be sensitive to shareholder dissatisfaction, which includes dissatisfaction over directors' remuneration. Procedures must now be followed by the board where 20 per cent or more of shareholders' votes have been cast against a board resolution. It is too early to say, however, whether these recent changes will make a significant contribution towards dealing with the problem.

Shareholder revolts are widely reported and often catch the newspaper headlines. As a result, the benefits for shareholders of flexing their muscles and voting against resolutions put

forward by the directors may go beyond their immediate, intended objective. Other boards of directors may become more alert to shareholder dissatisfaction. This may decide to adjust their decisions to avoid the risk of bad publicity. The cost of voting need not be high as there are specialist agencies that offer research and advice to financial institutions on how their votes should be cast.

Another form of activism involves meetings and discussions between representatives of a particular financial institution and the board of directors of a business. At such meetings, a wide range of issues affecting the business may be discussed.

Activity 1.16

What might financial institutions wish to discuss with the directors of a business? Try to think of at least two financial and two non-financial aspects of the business.

Some of the more important aspects include:

- objectives and strategies adopted
- trading performance
- internal controls
- policies regarding mergers and acquisitions
- major investments and disinvestments
- adherence to the recommendations of the UK Corporate Governance Code
- corporate social responsibility
- directors' incentive schemes and remuneration.

This is not an exhaustive list. As shareholders, and therefore owners, of a business, anything that might have an impact on their wealth should be a matter of concern.

This form of activism requires a fairly high degree of involvement with the business and some of the larger financial institutions have dedicated teams for this purpose. It can, therefore be a costly exercise.

Meetings between financial institutions and the managers of investee companies can be a useful mechanism for exchanging views and for gaining a greater understanding of the needs and motivations of each party. This may help to pre-empt public arguments between the board of directors and financial institutions, which is rarely the best way to resolve issues.

The final form of activism involves intervention in the affairs of the business. This can be very costly, however, depending on the nature of the problem. Where strategic and operational issues raise concerns, intervention can be very costly indeed. Identifying the weaknesses and problems relating to these issues requires a detailed understanding of the nature of the business. This implies close monitoring by relevant experts who are able to analyse the issues and then propose feasible solutions. The costs associated with such an exercise would normally be prohibitive, although the costs may be mitigated through some kind of collective action by financial institutions.

Not all forms of intervention in the affairs of a business need be costly, however. Where there are corporate governance issues to be addressed, for example, such as a failure to adhere to the recommendations of the UK Corporate Governance Code, a financial institution may nominate individuals for appointment as non-executive directors who can be relied upon to ensure that necessary changes are made. This should involve relatively little cost for the financial institution.

The main forms of shareholder activism are summarised in Figure 1.6.

There are three main forms of shareholder activism, as explained above.
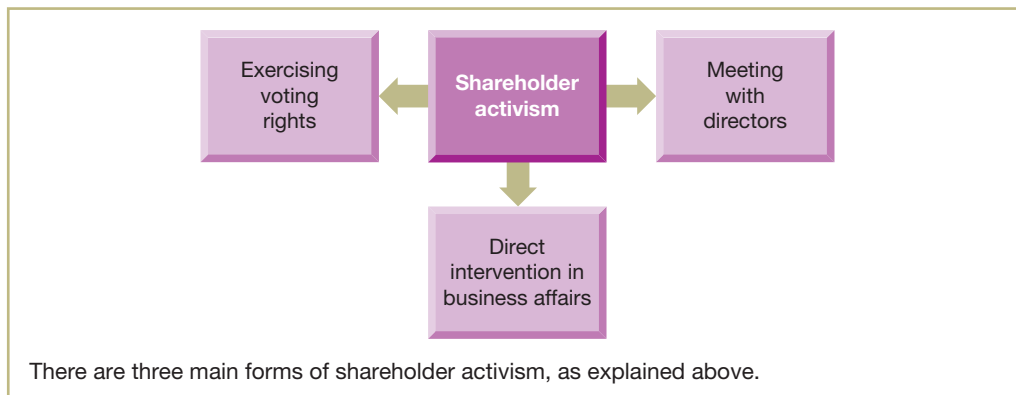
Figure 1.6 The main forms of shareholder activism

UK Stewardship Code

To improve the quality of engagement between financial institutions and investee businesses, the Financial Reporting Council (FRC) has published the **UK Stewardship Code**. This sets out key principles concerning the way in which financial institutions should engage with investee businesses. They relate to financial institutions:

■ establishing policies relating to stewardship and voting procedures, along with periodic reporting of how these policies were actioned
■ checking on investee businesses
■ establishing the circumstances under which stewardship activities are intensified and accepting the need, at times, to act in concert with other shareholders
■ disclosing conflicts of interest arising from stewardship activities and how they are resolved.

The Code also offers guidance on how these principles should be enacted.

The UK Stewardship Code, like the UK Corporate Governance Code, operates on a 'comply or explain' basis. It is designed to provide principles and guidance rather than rigid rules. Financial institutions that are signatories to the code are graded, or tiered, by the FRC according to the quality and transparency of the information provided.

Real World 1.13 describes how Fidelity International, the large investment advisers, engages with investee businesses.

Real World 1.13

Getting engaged

As a general policy, we aim to support the management of the companies in which we invest but our dialogue with companies is a robust one and we will form our own views on the strategy and governance of a business. On occasion our views may differ from those of management or the Board and this may give rise to an escalation in our engagement. Factors taken into account prior to an escalation include an assessment of the materiality of the matter in dispute, the size of our shareholding, the timeframe of the investment thesis and the ownership profile of the business in question. Escalation can also occur when we become aware of differences between directors. Our specific response will always be determined on a case by case basis and there will be instances when we choose to sell our shares.

When escalation is deemed appropriate our first step is often to make contact with other significant shareholders to determine whether they share our views or concerns. Following these conversations, we will speak to the company's advisers and/or independent directors for a further exchange of views. Our strong preference is to achieve our objectives in a consensual and confidential manner but when differences with a company remain we may consider joint engagement with other shareholders, escalating concerns if necessary to regulators and more public forms of dissent, although as a general policy we do not favour using the media to help achieve our objectives. If differences with a company remain unresolved we may vote against the Board in a general meeting or even requisition an extraordinary general meeting to enable all investors to vote on the matter in dispute. We would not normally intervene on an operational matter but topics which have given rise to escalation in the past include the need for management and/or Board change, strategy, capital structure, M&A, protection of shareholder rights, remuneration and other ESG-related issues.

Source: Extract from (2018) *Responsible Investment Policy Fidelity International*, February, p. 4.

Shareholder activism and short-term behaviour

Shareholder activism is generally regarded as a force for good. There are times, however, when this may not be the case. Some shareholders engage with businesses simply to extract short-term gains. **Real World 1.14** warns of the problems this can create.

Real World 1.14

Ignoring the long term

Terry Smith, a successful fund manager, has warned against activist shareholders who seek only short-term gains. He has argued:

When an activist shareholder becomes involved in a company, the modus operandi is often something like this.

1   Acquire a stake in the company, usually via on-market purchases;
2   Campaign noisily for change, which can entail the company trying to sell itself to an acquirer, splitting itself into a number of listed entities for each of its activities, taking on more debt, buying back its own shares, or some combination of these;
3   The share price rises as a result of excitement about this activity, which it is claimed will 'create shareholder value' and benefit all investors;
4   Sell the shares at a profit.

Nothing wrong with that, you might think, and certainly not from the point of view of the activist. But there is plenty wrong for those of us who are long-term investors and actually want to own the shares to gain from their ability to compound in value over time. We are often left trying to make sense of fragmented businesses, new management teams, higher gearing, the costs of separation or integration and financial statements which are rendered incomprehensible by many adjustments.

This particular problem of activism comes from confusing creating shareholder value with making the share price go up. One should lead to the other, but when short-term share price movements become the main objective, as they clearly are with many activists, the inevitable by-product is future problems for the business and its long-term shareholders.

FT   *Source*: Smith, T. (2015) 'Shareholder value is an outcome not an objective', *Financial Times*, 6 February.

The future of shareholder activism

Shareholder activism appears to be taken an increasing hold. In a study of 400 activist campaigns in the US, McKinsey and Co found that shareholder activism is becoming more frequent and target businesses are becoming larger in size. Perhaps unsurprisingly, the study also found that activism is often provoked by the underperformance of a business in relation to industry peers. While three quarters of activist campaigns began by taking a collaborative approach, almost half of these eventually turned hostile (see reference 3 at the end of the chapter).

A key question to be answered is whether shareholder activism makes any real difference to financial performance. Early research in the US was not encouraging for those who urge large investing institutions to take a more active approach. However, a more recent study of 2,000 active interventions found that the operating performance of US businesses was improved for a five-year period following the interventions (see reference 4 at the end of the chapter).

The McKinsey study mentioned above also found a positive effect from activist interventions. The study states:

> Our analysis of 400 activist campaigns (out of 1,400 launched against US companies over the past decade) finds that, among large companies for which data are available, the median activist campaign reverses a downward trajectory in target-company performance and generates excess shareholder returns that persist for at least 36 months. (p. 1)

This suggests that shareholder activism is unlikely to be simply a passing phase.

SUMMARY

The main points of this chapter may be summarised as follows:

The finance function

- Helps managers in carrying out their tasks of strategic management, operations management and risk management.
- Helps managers in each of these tasks through financial planning, investment appraisal, financing decisions, capital market operations and financial control.

Modern financial management

- Is influenced by economic theory.
- Has been described as the economics of time and risk.

Shareholders

- Are assumed to be the most important stakeholder group because they effectively own the business and bear the residual risk.

Shareholder wealth maximisation

- Is assumed to be the primary objective of a business.
- Is a long-term rather than a short-term objective.

- Takes account of both risk and the long-term returns that shareholders expect to receive.
- Must take account of the needs of other stakeholders.
- May be best achieved indirectly through a commitment to developing the best possible product or service.

Profit maximisation

- Does not automatically lead to shareholder wealth maximisation.
- Is a vague concept that can be interpreted in different ways.
- Cannot be objectively measured and may be manipulated by managers.
- Fails to take account of risk and the opportunity cost of shareholders' funds.

The stakeholder approach

- Reflects the idea that a business should serve those groups that benefit from, or are harmed by, its operations.
- Will lead to a business having multiple objectives, which adds to the problems of accountability.
- Raises many questions about the identification and treatment of stakeholder groups.

Risk and return

- Are related.
- Shareholders normally require additional return to compensate for additional risk.
- Shareholder wealth maximisation involves selecting investments that provide the highest returns in relation to the risks involved.

Behaving ethically

- May be vital for the achievement of shareholder wealth maximisation.
- May be set out in policies and codes.
- Is particularly important in the finance function.

Protecting shareholders

- An agency problem may exist between shareholders and directors.
- This has led to rules, set out in the UK Corporate Governance Code, to help monitor and control the behaviour of directors.

Shareholder involvement

- Financial institutions are now the most important group of UK shareholders in London Stock Exchange listed businesses.
- Shareholder involvement may take the form of providing incentives for directors and/or monitoring and controlling their actions.
- Shareholder activism may involve taking a more active role in voting, meetings and discussions with directors and direct intervention in the affairs of the business.

REFERENCES

1 Rose, H. (1995) *Tasks of the Finance Function*, Financial Times Mastering Management Series, supplement issue no. 1, p. 11.

2 Grant Thornton (2017) *Corporate Governance Review*, p. 26, www.grant-thornton.co.uk.

3 Criac, J., De Backer, R. and Sanders, J. (2014) *Preparing for Bigger, Bolder, Shareholder Activists*, www.mckinsey.com, March.

4 Bebchuk, L., Brav, A. and Jiang, W. (2013) 'The long-term effect of hedge fund activism', Working paper, ssrn.com.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Lumby, S. and Jones, C. (2019) *Corporate Finance: Theory and Practice*, 10th edn, Cengage Learning, Chapters 1 and 2.

Mallin, C. (2019) *Corporate Governance*, 6th edn, Oxford University Press, Chapters 2, 3, 4 and 6.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapter 1.

The Open University (2016) *Influences on Corporate Governance*, Open University.

Reading the *Financial Times* and *Investors Chronicle* on a regular basis can help you to keep up to date on financial management topics.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on p. 649.

1.1 'One effect of the recent globalisation of business is that it is now easier for owners and managers to escape their ethical obligations than in previous eras.' Can you think of any reasons in support of this viewpoint?

1.2 A large listed business has become the target of a shareholder activist. What steps should the board of directors take in response to this event?

1.3 Some managers, if asked what the main objective of their business is, may simply state: 'To survive!' What do you think of this as a primary objective?

1.4 What are the main drawbacks of adopting the stakeholder approach as the basis for setting the objectives of a business?

FINANCIAL PLANNING

INTRODUCTION

In this chapter, we take a look at various aspects of financial planning. We begin by considering the role that projected (or forecast) financial statements play in the planning process. We shall see how these statements help managers assess the likely impact of their decisions on the financial performance and position of a business. We shall also examine the way in which these statements are prepared and the issues involved in their preparation.

Risk, the likelihood that what is forecast to occur will not actually occur, should be taken into account when using projected financial statements. We shall explore two approaches to dealing with the forecast risk inherent in these statements. Both approaches discussed are designed to give managers a better 'feel' for likely future outcomes.

When making financial plans, managers must be aware of the effects of gearing. We shall discuss both financial and operating gearing and see how each can affect the risks and returns associated with a business.

This chapter and the one that follows assume some understanding of the three major financial statements: the cash flow statement, the income statement and the statement of financial position (balance sheet). If you need to brush up on these statements, please take a look at Chapters 2–6 of *Financial Accounting for Decision Makers* by Atrill and McLaney (9th edition, Pearson, 2019).

Learning outcomes

When you have completed this chapter, you should be able to:

■ Explain how business plans are developed and the role that projected financial statements play in this process.

■ Prepare projected financial statements for a business and interpret their significance for decision-making purposes.

■ Describe the manner in which projected financial statements may take account of risk and uncertainty.

■ Explain the effect of financial and operating gearing on the risks and returns associated with a business.

PLANNING FOR THE FUTURE

It is vital that a business develops plans for the future. Whatever a business is trying to achieve, it is unlikely to succeed unless the future is mapped out in a systematic way. Finance lies at the heart of the planning process. To ensure that the limited resources of a business are used as effectively as possible, managers must carefully evaluate the financial implications of each possible course of action.

Developing plans for a business involves the following key steps:

1 *Set the aims and objectives of the business.* The starting point is to establish the long-term aims and objectives of the business. These will set out what the business is trying to achieve and should provide managers with a clear sense of direction. We saw in Chapter 1 that the primary objective of a business is assumed to be the maximisation of shareholder wealth.

2 *Identify the options available.* To achieve the long-term aims and objectives that are set, a number of possible options (strategies) may be available to the business. Each option must be clearly identified, which will involve collecting a wide range of information. This can be extremely time-consuming, particularly when the business is considering entering new markets or investing in new technology.

3 *Select an option and develop long-term plans.* Each option (strategy) must be examined within the context of the long-term aims and objectives that have been set. In selecting an option, the resource capabilities of the business must also be taken into account. Ideally, the final choice will play to the strengths of the business rather than expose its weaknesses. This option choice will become the long-term (strategic) plan for the business and will usually cover a period of 3–5 years.

4 *Develop short-term plans.* Within the framework of the long-term (strategic) plan, detailed short-term (tactical) plans will normally be prepared for the forthcoming year. These help to ensure that day-to-day management decisions and actions are consistent with the long-term plans.

Figure 2.1 sets out this process diagrammatically.

The figure shows that there are four main steps in the planning process, as described in this chapter.
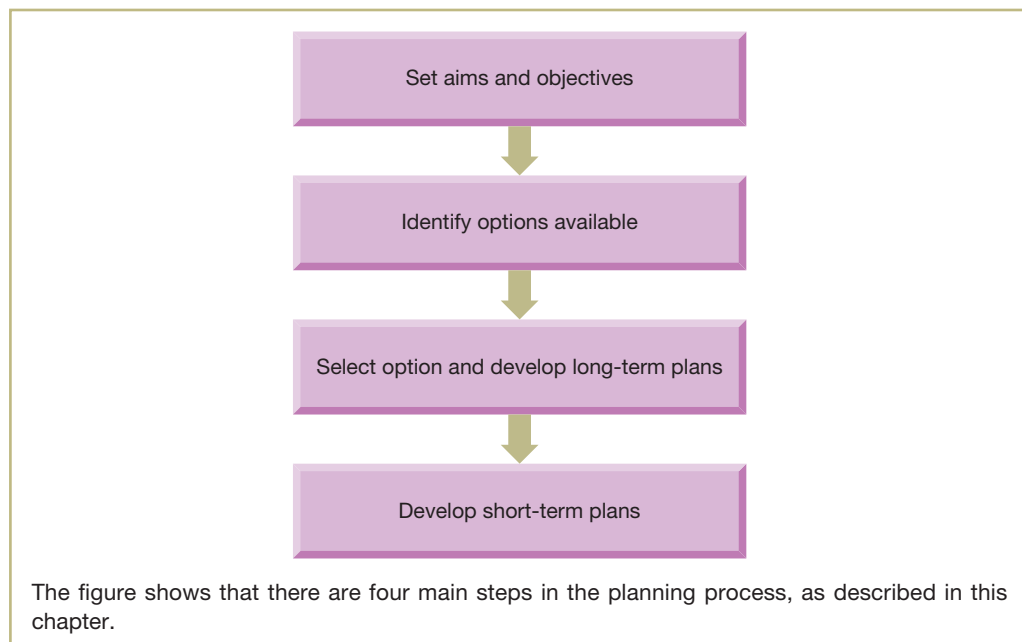
Figure 2.1 Steps in the planning process

THE ROLE OF PROJECTED FINANCIAL STATEMENTS

Projected (forecast) financial statements can play a vital role in the final two steps of the planning process – that is, the evaluation of long-term strategic options and the development of short-term plans. Both will require forecasts of future financial performance and position. This means that projected financial statements must be prepared for both long and short time horizons. The length of the time horizon, however, will influence the level of detail that can be provided. As we shall see later, the longer the time horizon, the more we must rely on simplifying assumptions when preparing these statements.

The main financial statements used for planning purposes are:

- a projected cash flow statement
- a projected income statement
- a projected statement of financial position (balance sheet).

When taken together, they provide a comprehensive picture of likely future performance and position. Where different options are being considered, they enable comparisons to be made of the impact of each option on future profitability, liquidity and financial position. This should help managers in identifying the most suitable way forward.

Activity 2.1

Assume that the managers of a business are considering only one option. Could projected financial statements still help them?

Where only one course of action is being considered, a comparison can still be made with the option to do nothing. Once the course of action has been adopted, projected financial statements can also provide targets against which to compare actual performance.

We mentioned earlier that, for long-term planning, projected financial statements for each year may be prepared to cover a period of 3–5 years. For short-term planning, they may be prepared for a period of one year. However, quarterly, monthly or weekly projections may also be prepared to help assess likely progress towards achieving the short-term plan.

Real World 2.1 describes the projected, or forecast, financial statements prepared for one large business on a routine basis.

Real World 2.1

Read all about it!

Trinity Mirror plc, which owns a number of newspapers, websites and digital products describes its short-term financial planning as follows:

> Weekly revenue and profit forecasts are received from all operating units followed by monthly management accounts, which are prepared promptly and reported against the approved budget (that is, short-term financial plan). Profit and cash flow forecasts for the current year together with a treasury report were prepared and submitted to the Board twice during the year.

Source: Adapted from *Audit and risk committee report*, Trinity Mirror plc, Annual Report 2017, p. 44.

Preparing projected financial statements usually means collecting and processing large amounts of information. This can be a costly and time-consuming exercise, which must be weighed against likely benefits. To help strike the right balance, a trade-off may be made between the reliability of the forecast information produced and the cost and time involved. Sometimes, this trade-off is achieved by employing simplifying assumptions in the preparation process. We shall see a little later how this may be done.

PREPARING PROJECTED FINANCIAL STATEMENTS

To prepare projected financial statements, the key variables affecting performance and position must be identified. These variables fall into two broad categories: external and internal.

External variables usually relate to government policies and to economic conditions, and include:

- rates of taxation
- interest rates for borrowings
- rates of inflation.

There is often a great deal of published information available to help identify future rates for each of the variables mentioned. Care must be taken, however, to ensure that their particular impact on the business is properly assessed. When estimating the likely rate of inflation, for example, each major category of item affected by inflation should be considered separately. Using an average rate of inflation for all items is often inappropriate as levels of inflation can vary significantly between items.

Internal variables cover the policies and agreements to which the business is committed. Examples include:

- capital expenditure commitments
- financing agreements
- inventories' holding policies
- credit period allowed to customers
- payment policies for trade payables
- accounting policies (for example, depreciation rates and methods)
- dividend policy.

The last item may require some clarification. For large businesses at least, a target level of dividends is often established and managers are usually reluctant to deviate from this target. The target is often linked to the level of profits for the particular year or to dividends paid in previous years. (This issue is discussed in more detail in Chapter 9.)

THE SALES FORECAST

Once the key variables influencing future performance and position have been identified, we can begin to forecast the items included in the projected financial statements. We have to make a start somewhere and the usual starting point is to forecast sales. It is sales that normally sets a limit to business growth and determines the level of operating activity. The influence of sales

on other items appearing in the financial statements, such as cost of goods sold, overheads, inventories, trade receivables and so on, makes a reliable sales forecast essential. If this forecast is wrong, other forecasts will also be wrong. When producing a sales forecast account is normally taken of key factors such as general economic conditions, industry conditions and the threat posed by major competitors.

Two main approaches to forecasting sales can be found in practice. The first is a *qualitative approach.* This approach produces a forecast based on subjective judgement and relies on one, or more, of the following sources:

- sales force polling
- managers' opinions
- consumer surveys
- opinions of a panel of experts.

The second is a *quantitative approach.* This approach will undertake a numerical analysis of past sales in order to discern future trends. Techniques that may be employed include:

- trend analysis
- exponential smoothing
- regression analysis
- econometric models
- neural networks.

Qualitative sales forecasting may be favoured where past sales data are not available or where future sales are expected to be quite different from sales in past periods. Quantitative sales forecasting may be favoured where past sales data are available and where past sales patterns are expected to be repeated in the future. There are, however, no hard and fast rules concerning which approach to use. Managers must assess the benefits of each approach in terms of reliability and then weigh these benefits against the associated costs.

Activity 2.2

Managers may decide to use both approaches rather than only one. Why might they do this?

They may wish to carry out a cross-check on the reliability of forecast figures. By using both of the two approaches, this can be done.

PREPARING THE PROJECTED STATEMENTS: A WORKED EXAMPLE

We shall now take a look at how projected financial statements are put together. It was mentioned earlier that these financial statements consist of a:

- projected cash flow statement
- projected income statement
- projected statement of financial position (balance sheet).

For short forecast horizons, these statements are usually prepared in some detail. Where the forecast horizon is fairly long, however, or the costs of preparation are prohibitive, simpler, less

detailed statements are often provided. We shall look first at how to prepare detailed projected financial statements, and then look at simpler statements a little later.

If you already have some background in accounting, the following sections, which deal with the detailed approach, should pose few problems. This is because projected financial statements employ the same methods and principles as those for conventional financial statements. The key difference is that projected financial statements rely on forecast, rather than actual, information.

To illustrate the preparation of projected financial statements, let us consider Example 2.1.

Example 2.1

Designer Dresses Ltd is a small business to be formed by James and William Clark to sell an exclusive range of dresses from a small boutique. On 1 January, they plan to invest £50,000 cash to acquire 25,000 £1 shares each in the business. Of this, £30,000 is to be invested in new fittings in January. These fittings are to be depreciated over three years on the straight-line basis – their scrap value is assumed to be zero at the end of their lives. (The straight-line basis of depreciation allocates the total amount to be depreciated evenly over the life of the asset.) In this case, a half-year's depreciation is to be charged in the first six months. The sales and purchases projections for the business are as follows:

	Jan	Feb	Mar	Apr	May	June	Total
Sales revenue (£000)	10.2	30.6	30.6	40.8	40.8	51.0	204.0
Purchases (£000)	20.0	30.0	25.0	25.0	30.0	30.0	160.0
Other costs* (£000)	9.0	9.0	9.0	9.0	9.0	9.0	54.0

*'Other costs' includes wages but excludes depreciation.

The sales will all be made by credit card. The credit card business will take one month to pay and will deduct its fee of 2 per cent of gross sales before paying amounts due to Designer Dresses. One month's credit is allowed by suppliers. Other costs shown above do not include rent and rates of £10,000 per quarter, payable on 1 January and 1 April. All other costs will be paid in cash. The value of closing inventories at the end of June is expected to be £58,000.

Having set up the example, we shall now go on to prepare a projected cash flow statement and income statement for the six months to 30 June, and a projected statement of financial position as at that date (ignoring taxation and working to the nearest thousand pounds).

PROJECTED CASH FLOW STATEMENT

The projected cash flow statement monitors future changes in liquidity and helps managers to assess the impact of expected future events on the cash balance. Cash has been described as the 'lifeblood' of a business and so managers keep a close eye on forecast cash flows.

Can you think why cash is so important to a business?

To survive, a business must have sufficient cash resources to meet its maturing obligations. Ultimately, all businesses that fail do so because they do not have the cash to pay for the goods and services needed to continue operations.

The projected cash flow statement helps to identify when cash surpluses and cash deficits are likely to occur. Managers can then plan for these events. Where there is a cash surplus, they should consider the profitable investment of the cash. Where there is a cash deficit, they should consider ways in which it can be financed.

The cash flow statement is fairly easy to prepare. It simply records the cash inflows and outflows of the business. The main sources of cash inflows and outflows are:

- issue and redemption of long-term funds (for example, shares and loans)
- purchase and sale of non-current assets
- operating activities (sales revenue and operating expenses)
- tax and dividends.

These are set out in Figure 2.2.

The figure sets out the main inflows and outflows of cash. The direction of the arrows indicates that both inflows and outflows arise for three of the four main sources. However, tax and dividends are usually cash outflows only.
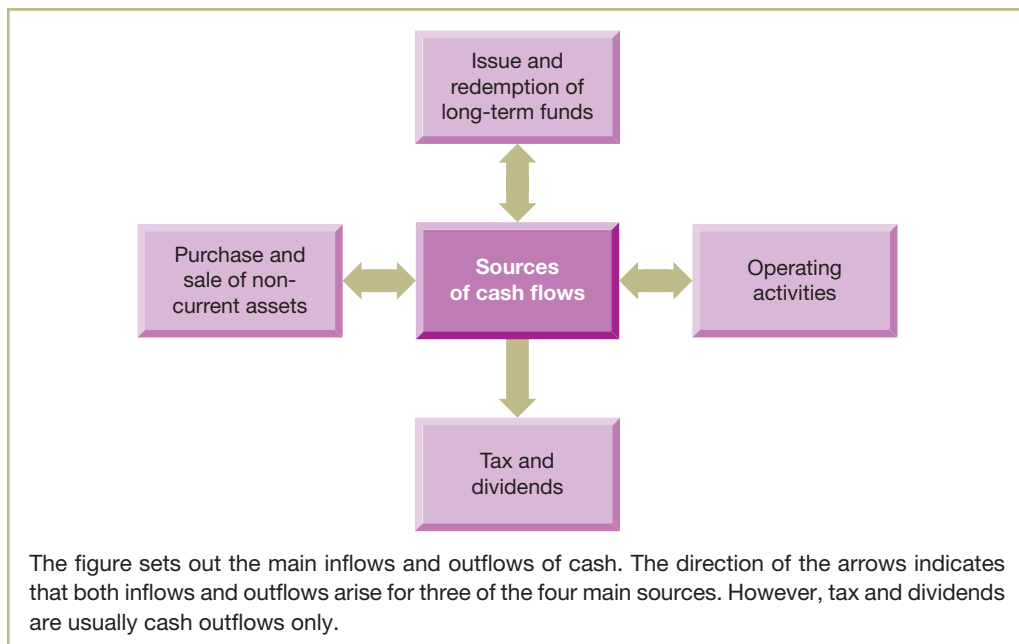
Figure 2.2 Sources of cash inflows and outflows

When preparing the cash flow statement for a short period, such as six months or a year, it is often useful to provide a monthly breakdown of all cash inflows and outflows. This helps managers to monitor closely changes in the cash position of the business. There is no set format for this statement as it is normally used for internal purposes only. Managers are free to decide on the form of presentation that best suits their needs.

Set out below is an outline projected cash flow statement for Designer Dresses Ltd for the six months to 30 June. This format seems to be widely used and we shall use it throughout the chapter.

Projected cash flow statement for the six months to 30 June

	Jan £000	Feb £000	Mar £000	Apr £000	May £000	June £000
Cash inflows						
Issue of shares						
Credit sales	___	___	___	___	___	___
	___	___	___	___	___	___
Cash outflows						
Credit purchases						
Other costs						
Rent and rates	___	___	___	___	___	___
	___	___	___	___	___	___
Net cash flow						
Opening balance	___	___	___	___	___	___
Closing balance	___	___	___	___	___	___

We can see from this outline that:

- each column represents a monthly period
- at the top of each column the cash inflows are set out and a total for each month's inflows is shown
- immediately below the monthly total for cash inflows, the cash outflows are set out and a monthly total for these is also shown
- the difference between the monthly totals of cash inflows and outflows is the net cash flow for the month
- if we add this net cash flow to the opening cash balance, which has been brought forward from the previous month, we derive the closing cash balance. (This will become the opening cash balance in the next month.)

In preparing a projected cash flow statement, we should ask two questions when examining a particular item of financial information. The first question is: *Does it involve a cash inflow or cash outflow?* If the answer is no, then it should be ignored when preparing the statement. Various items of information relating to a financial period, such as depreciation charges and bad debts, do not involve cash movements. If the answer is yes, we must ask the second question: *When did the cash inflow or outflow take place?* Where there is a monthly breakdown of cash flows, it is important to identify the particular month in which the cash movement occurred. Where sales and purchases are made on credit, the cash movement will often take place a month or two after the sale or purchase. (We return to this point later when discussing the projected income statement.)

Problems in preparing cash flow statements usually arise because the two questions above have not been properly addressed.

Activity 2.4

Fill in the outline cash flow statement provided earlier for Designer Dresses Ltd for the six months to 30 June using the information contained in Example 2.1.

The completed statement will be as follows:

Projected cash flow statement for the six months to 30 June

	Jan £000	Feb £000	Mar £000	Apr £000	May £000	June £000
Cash inflows						
Issue of shares	50	–	–	–	–	–
Credit sales	–	10	30	30	40	40
	50	10	30	30	40	40
Cash outflows						
Credit purchases	–	20	30	25	25	30
Other costs	9	9	9	9	9	9
Rent and rates	10	–	–	10	–	–
Fittings	30	–	–	–	–	–
	49	29	39	44	34	39
Net cash flow	1	(19)	(9)	(14)	6	1
Opening balance	–	1	(18)	(27)	(41)	(35)
Closing balance	1	(18)	(27)	(41)	(35)	(34)

Notes:

1 The receipts from credit sales will arise one month after the sale has taken place. Hence, January's sales will be received in February, and so on. Similarly, trade payables are paid one month after the goods have been purchased.
2 The closing cash balance for each month is deduced by adding to (or subtracting from) the opening balance, the cash flow for the month.

Some further points

In the above example, the projected cash flow statement is broken down into monthly periods. Some businesses, however, carry out a weekly, or even daily, breakdown of future cash flows. Feasibility and cost/benefit considerations will determine whether more detailed analysis should be carried out.

Cash flow projections are normally prepared for a particular period and towards the end of that period, a new cash flow projection is prepared. This means that, as time passes, the forecast horizon becomes shorter and shorter. To overcome this problem, it is possible to produce a **rolling cash flow projection**. Let us use the information in Example 2.1 to explain how this works. To begin with, a cash flow projection for the six months to 30 June will be prepared as before. At the end of January, however, a cash flow projection is prepared for the month of July. As a result, a full six months' forecast horizon is then restored. At the end of February, a cash flow projection is prepared for the month of August – and so on.

Let us round off this section by looking at **Real World 2.2**. It is taken from an article by Luke Johnson who is a 'serial entrepreneur'. Among other things, he was closely involved with taking Pizza Express from a business that owned just 12 restaurants to over 250 and, at the same time, increasing its share price from 40 pence to over £9. In this article, he highlights the importance of cash flow in managing a business.

Real World 2.2

Cash flow is king

Wise entrepreneurs learn that profits are not necessarily cash. But many founders never understand this essential accounting truth. A cash flow projection is a much more important document than a profit and loss [income] statement. A lack of liquidity can kill you; whereas a company can make paper losses for years and still survive if it has sufficient cash. It is amazing how financial journalists, fund managers, analysts, bankers and company directors can still focus on the wrong numbers in the accounts – despite so many high-profile disasters over the years.

PROJECTED INCOME STATEMENT

A projected income statement provides an insight into likely future profits (or losses), which represent the difference between the predicted level of revenue and expenses for a period. Revenue is reported when control of the goods, or services has been transferred to the customer. Thus, revenue from a sale will normally be recorded *before* the cash is actually received. This is because, in most industries, sales are made on credit. Expenses are matched to the revenues they help to generate and so are included within the same income statement. This means that expenses may be reported in an income statement covering a period before, or after, they are actually paid. This may seem odd at first sight. We should bear in mind, however, that the purpose of the income statement is to measure productive effort. This takes the form of profits (or losses) made during a particular period and will be the difference between revenue and expenses. The timing of cash inflows from revenues generated, as well as cash outflows for expenses incurred, is irrelevant for this purpose.

The format of the projected income statement for Designer Dresses Ltd is as follows:

Projected income statement for the six months to 30 June

	£000	£000
Credit sales revenue		
Less Cost of sales		
Opening inventories		
Add Purchases	—	
Less Closing inventories	—	—
Gross profit		
Less		
Credit card discounts		
Rent and rates		
Other costs		
Depreciation of fittings		—
Profit for the period		—

Activity 2.6

Fill in the outline projected income statement for Designer Dresses Ltd above for the six months to 30 June, using the information contained in Example 2.1.

The statement will be as follows:

Projected income statement for the six months to 30 June

	£000	£000
Credit sales revenue		204
Cost of sales		
Opening inventories	–	
Purchases	160	
	160	
Closing inventories	(58)	(102)
Gross profit		102
Credit card discounts		(4)
Rent and rates		(20)
Other costs		(54)
Depreciation of fittings		(5)
Profit for the period		19

Notes:
1 There were no opening inventories in this case.
2 The credit card discount is shown as a separate expense and not deducted from the sales figure. This approach is more informative than simply netting off the amount of the discount against sales.

PROJECTED STATEMENT OF FINANCIAL POSITION (BALANCE SHEET)

The projected statement of financial position (or *balance sheet*) reveals the end-of-period balances for assets, liabilities and equity. It is the last statement to be prepared as the other two statements produce information needed for this statement.

- The projected cash flow statement provides the end-of-period cash balance for inclusion under 'current assets' (or where there is a negative balance, for inclusion under 'current liabilities').
- The projected income statement provides the projected profit (or loss) for the period for inclusion under the 'equity' section of the statement of financial position (after adjustment for dividends). This statement also provides the depreciation charge for the period, which is used to adjust non-current assets.

The format of the projected statement of financial position for Designer Dresses Ltd will be as follows:

Projected statement of financial position as at 30 June

	£000
ASSETS	
Non-current assets	
Fittings	
Less Accumulated depreciation	___
	___
Current assets	
Inventories	
Trade receivables	___
	___
Total assets	___
EQUITY AND LIABILITIES	
Equity	
Share capital	
Retained earnings	___
	___
Current liabilities	
Trade payables	
Bank overdraft	___
	___
Total equity and liabilities	___

Activity 2.7

Fill in the outline projected statement of financial position for Designer Dresses Ltd as at 30 June. When doing so, use the information contained in Example 2.1 and in the answers to Activities 2.4 and 2.5.

The completed statement will be as follows:

Projected statement of financial position as at 30 June

	£000
ASSETS	
Non-current assets	
Fittings	30
Less Accumulated depreciation	(5)
	25
Current assets	
Inventories	58
Trade receivables	50
	108
Total assets	133
EQUITY AND LIABILITIES	
Equity	
Share capital	50
Retained earnings	19
	69
Current liabilities	
Trade payables	30
Bank overdraft	34
	64
Total equity and liabilities	133

Note: The trade receivables figure represents June credit sales (less the credit card discount). Similarly, the trade payables figure represents June purchases.

Activity 2.8

Evaluate the performance and position of Designer Dresses Ltd as set out in the projected financial statements. Pay particular attention to the projected profitability and liquidity of the business.

The projected cash flow statement reveals that the business will have a bank overdraft throughout most of the period under review. The maximum overdraft requirement will be £41,000 in April. Although the business will be heavily dependent on bank finance in the early months, this situation should not last for too long. This is providing the business achieves, and then maintains, the level of projected profit and providing it does not invest heavily in further assets.

The business is expected to generate a profit of 9.3p for every £1 of sales (that is, £19,000/£204,000). The profit of £19,000 on the original outlay of £50,000 by the owners seems high. However, the business may be of a high-risk nature and therefore the owners will be looking to make high returns. It is not clear from the question whether the wages (under 'other costs' in the income statement) include any remuneration for James and William Clark. If no remuneration for their efforts has been included, the level of returns (after wages) may not be so attractive.

When evaluating the performance and position of Designer Dresses Ltd, two points are worth making. First, this is a new business and so it may be very difficult to project into the future with any accuracy. The bases upon which the projections have been made must, therefore, be carefully investigated. Second, we must avoid the temptation to make a simple

extrapolation of projected revenues and expenses for the six-month period in order to obtain a projected profit for the year. It is unlikely, for example, to be double the profit for the first six months.

Activity 2.9

Can you think why it would be unlikely to be double the profit for the first six months?

Two possible reasons are:

- the business is seasonal in nature
- a clear pattern of revenue is unlikely to emerge until the business becomes more established.

    You may have thought of others.

Real World 2.3 reveals the results of a survey of businesses in three European countries concerning the level of detail forecasts contain in practice.

Real World 2.3

Looking at the detail

KPMG, the auditing, tax and advisory business, conducts an annual survey of businesses in Germany, Austria and Switzerland. The 2018 survey enquired about various financial practices. One question posed concerned the level of detail of the financial forecasts being prepared.

    Figure 2.3 below reveals the responses from the 276 businesses surveyed.
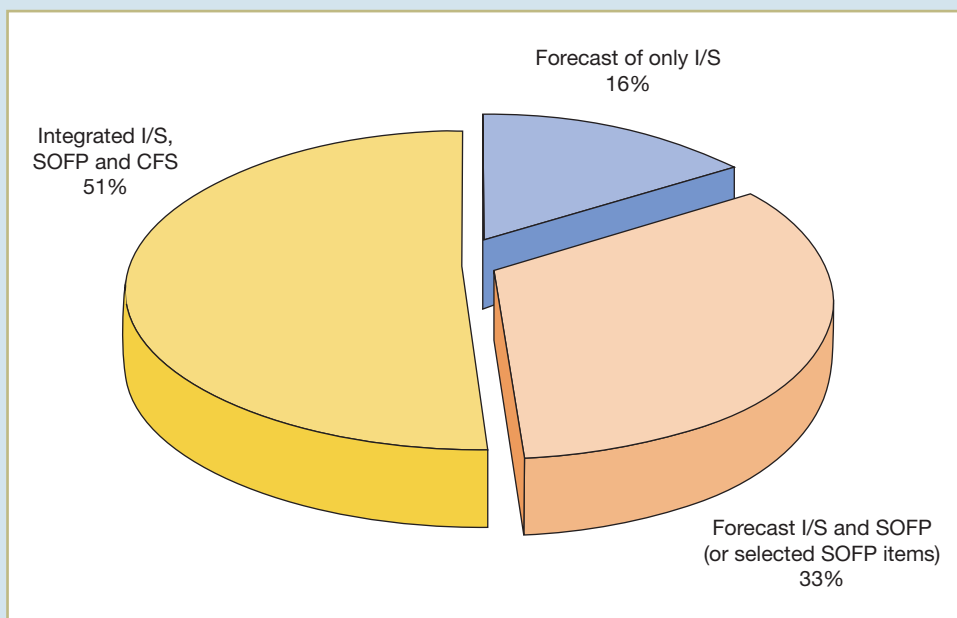
Figure 2.3 Degree of detail of the financial forecasts

PER-CENT-OF-SALES METHOD

An alternative approach to preparing a projected income statement and statement of financial position is the **per-cent-of-sales method**. This is a simpler approach to forecasting, which assumes that most items appearing in the income statement and statement of financial position vary with the level of sales. Hence, these statements can be prepared by expressing most items as a percentage of the sales revenue that has been forecast for the period.

To use this method, an examination of past records should be undertaken to see by how much items vary with sales. It may be found, for example, that inventories levels have been around 30 per cent of sales in previous periods. Thus, if the sales for the forecast period are, say, £10 million, the level of inventories will be forecast as £3 million (that is, 30% × £10 million). The same approach will be used for other items.

Below is a summary of how key items appearing in the income statement and statement of financial position are usually derived using the per-cent-of-sales-method.

Income statement

The following income statement items are normally expressed as a percentage of sales:

■ expenses
■ profit before tax, which is the difference between sales revenues and expenses.

Tax will vary with the level of profit before tax and so is expressed as a percentage of that figure. It has, therefore, an indirect relationship with sales.

Statement of financial position

The following items in the statement of financial position are expressed as a percentage of sales:

■ current assets that increase 'spontaneously' with sales, such as inventories and trade receivables
■ current liabilities that increase spontaneously with sales, such as trade payables and accrued expenses
■ cash (as a projected cash flow statement is not prepared to provide a more accurate measure of cash).

However:

■ non-current assets will be expressed as a percentage of sales only if they are already operating at full capacity – otherwise they will not usually change

- non-current liabilities and equity will not be expressed as a percentage of sales but will be based on figures at the beginning of the forecast period (unless changes are made as a result of management decisions)
- dividends, which will affect the retained earnings figure for the year, may be expressed as a percentage of profit for the year (unless an alternative dividend policy is in operation).

Identifying the financing gap

Where sales revenue is increasing over time, a business may outgrow the amount of finance committed. The additional assets required to sustain the increased sales may exceed the combined increase in equity (in the form of retained earnings) and liabilities. Where this occurs, there will be a financing gap. This future financing gap is easily identified under the per-cent-of-sales method because the projected statement of financial position will not balance: total assets will exceed total equity plus liabilities. Thus, the additional finance required will be the amount that will make the statement of financial position balance.

The way in which a business decides to fill the financing gap is referred to as the **plug**. Various forms of finance may be used as a plug, including borrowings and injections of equity share capital. These will be discussed in detail in Chapter 6.

A worked example

Let us go through a simple example to show how the per-cent-of-sales method works.

Example 2.2

The financial statements of Burrator plc for the year that has just ended are as follows:

Income statement for Year 8

	£000
Credit sales revenue	800
Cost of sales	(600)
Gross profit	200
Selling expenses	(80)
Distribution expenses	(20)
Other expenses	(20)
Profit before taxation	80
Tax (25%)	(20)
Profit for the year	60

Statement of financial position as at the end of Year 8

	£000
ASSETS	
Non-current assets	160
Current assets	
Inventories	320
Trade receivables	200
Cash	20
	540
Total assets	700

	£000
EQUITY AND LIABILITIES	
Equity	
Share capital – 25p ordinary shares	60
Retained earnings	<u>380</u>
	<u>440</u>
Current liabilities	
Trade payables	240
Tax due	<u>20</u>
	<u>260</u>
Total equity and liabilities	<u>700</u>

In line with previous years, a dividend of 50 per cent of the profit for the year was proposed and paid during the year.

The following information is relevant for Year 9:

1 Sales revenue is expected to be 10 per cent higher than in Year 8.
2 The non-current assets of the business are currently operating at full capacity.
3 The tax rate will be the same as in Year 8 and 50 per cent of the tax due will be outstanding at the year-end.
4 The business intends to maintain the same dividend policy as for Year 8.
5 Half of the tax relating to Year 9 will be outstanding at the year-end. Tax due at the end of Year 8 will be paid during Year 9.
6 Any financing gap will be filled by an issue of long-term loan notes.

We shall prepare a projected income statement and statement of financial position for Year 9 using the per-cent-of-sales method (assuming that Year 8 provides a useful guide to past experience).

To prepare the projected income statement, we calculate each expense as a percentage of sales for Year 8 and then use this percentage to forecast the equivalent expense in Year 9. Tax is calculated as a percentage of the profit before tax for Year 9, using percentages from Year 8.

The statement is therefore as follows:

Projected income statement for the year ended 31 December Year 9

	£000
Credit sales revenue (800 + (10% × 800))	880
Cost of sales (75% of sales)	(660)
Gross profit (25% of sales)	220
Selling expenses (10% of sales)	(88)
Distribution expenses (2.5% of sales)	(22)
Other expenses (2.5% of sales)	(22)
Profit before taxation (10% of sales)	88
Tax (25% of profit before tax)	(22)
Profit for the year	<u>66</u>

We apply the same broad principles when preparing the projected statement of financial position for Year 9.

Evaluating the per-cent-of-sales method

The main advantage of the per-cent-of-sales method is that the task of preparing the projected financial statements becomes much more manageable. It can provide an approximate figure for future financing requirements without the need to prepare a projected cash flow statement. It can also reduce the time and cost of forecasting every single item appearing in the projected income statement and statement of financial position. This can be of particular benefit for large businesses.

This method suffers from two main drawbacks, however. First, it employs relationships between individual items and sales that are based on the past. These relationships may change over time because of changes in strategic direction (for example, launching completely new products) or because of changes in management policies (for example, allowing longer credit periods to customers). Second, it fails to recognise that many expenses are fixed in relation to time and do not vary with the level of sales.

Activity 2.11

Can you think of *three* examples of fixed expenses that a business may incur?

They may include:

- salaries
- rent payable
- insurance
- depreciation of equipment.

You may have thought of others.

Where sales are increasing, the per-cent-of-sales method will increase fixed expenses in line with the increase in sales. The effect will be to overstate expenses and to understate profits for the period. Where sales are decreasing, the opposite will be true. The higher the level of fixed expenses incurred by the business, the greater will be the resulting overstatement or understatement when the level of sales changes.

Activity 2.12

The above suggests that the per-cent-of-sales method is best suited to a business with at least one of two possible characteristics. Try to identify at least one of these.

It is probably best suited to a business where:

- sales remain stable over time, and/or
- expenses are not fixed but vary directly with sales.

The second characteristic mentioned, however, would be a very rare occurrence. For most businesses, fixed expenses account for the greater part of total expenses incurred.

LONG-TERM CASH FLOW PROJECTIONS

The projected cash flow statement prepared in Activity 2.4 required a detailed analysis of each element of the cash flows of the business. This approach may be fine when dealing with a short forecast horizon. However, as the forecasting horizon increases, forecasting difficulties start to mount. A point will be reached where it is simply not possible to undertake such detailed analysis.

To prepare projected cash flow statements for the longer term, a method that uses simplifying assumptions rather than detailed analysis may be used. The starting point is normally to identify the sales revenue for each year of the planning horizon. The operating profit (that is, profit before interest and taxation) for each year is then calculated as a percentage of the sales revenue figure. (The particular percentage is often determined by reference to past experience.) A few simple adjustments can then be made to the annual operating profits in order to derive annual operating cash flows.

These adjustments rely on the fact that, broadly, sales revenue gives rise to cash inflows and expenses give rise to outflows. As a result, operating profit will be closely linked to the operating cash flows. This does not mean that operating profit for the year will be equal to operating

cash flows. An important reason for this is timing differences. When sales are made on credit, the cash receipt occurs some time after the sale. Thus, sales revenue made towards the end of a particular year will be included in that year's income statement. Most of the cash from those sales, however, will flow into the business and should be included in the cash flows for the following year. Fortunately, it is easy to deduce the cash received, as we see in Example 2.3.

Example 2.3

The sales revenue figure for a business for the year was £34 million. The trade receivables totalled £4 million at the beginning of the year, but had increased to £5 million by the end of the year.

Basically, the trade receivables figure is dictated by sales revenue and cash receipts. It is increased when a sale is made and decreased when cash is received from a credit customer. If, over the year, the sales revenue and the cash receipts had been equal, the beginning-of-year and end-of-year trade receivables figures would have been equal. Since the trade receivables figure increased, it must mean that less cash was received than sales revenues were made. This means that the cash receipts from sales must be £33 million (that is, $34 - (5 - 4)$).

Put slightly differently, we can say that as a result of sales, assets of £34 million flowed into the business during the year. If £1 million of this went to increasing the asset of trade receivables, this leaves only £33 million that went to increase cash.

Other important adjustments for timing differences relate to cash payments for purchases (by adjusting for opening and closing trade payables) and cost of goods sold (by adjusting for opening and closing inventories). The same general point, however, is true in respect of most other items that are taken into account in deducing the operating profit figure. An important exception is depreciation, which is not normally associated with any movement in cash. It is simply an accounting entry.

All of this means that we can take the operating profit (profit before interest and taxation) for the year, add back the depreciation charged in arriving at that profit, and adjust this total amount for movements in trade (and other) receivables and payables and for inventories. This will provide us with a measure of the operating cash flows. If we then go on to deduct payments made during the year for taxation, interest on borrowings and dividends, we have the net cash flows from operations.

When preparing long-term cash flow projections, however, detailed adjustments to each element of **working capital** (that is, inventories, trade receivables and trade payables) can be avoided. A simplifying assumption can be adopted that takes working capital investment as a fixed percentage of sales revenue. Changes in the working capital investment are then calculated according to changes in sales revenue.

Activity 2.13

Why might calculating working capital as a fixed percentage of sales provide a reasonable simplifying assumption?

Key elements of working capital, such as trade receivables, inventories and trade payables, tend to increase, or decrease, in line with increases, or decreases, in sales revenue.

Let us now look at a worked example to see how a projected cash flow statement, using the approach outlined, is prepared.

Example 2.4

Santos Engineering Ltd started operations on 1 January Year 1 and has produced the following forecasts for annual sales revenue:

Year to 31 December	Year 1	Year 2	Year 3	Year 4
Forecast sales revenue (£)	500,000	560,000	640,000	700,000

The following additional information has been provided:

1 The operating profit of the business is expected to be 20 per cent of the sales revenue throughout the four-year period.
2 The business has issued £400,000 5 per cent loan notes, which are redeemable at the end of Year 4.
3 The tax rate is expected to be 25 per cent throughout the four-year period. Tax is paid in the year following the year in which the relevant profits were made.
4 An initial investment in working capital of £50,000 is required. Thereafter, investment in working capital is expected to represent 10 per cent of sales revenue for the relevant year.
5 Depreciation of £40,000 per year must be charged for the non-current assets currently held.
6 Land costing £490,000 will be acquired during Year 2. This will not be depreciated as it has an infinite life.
7 Dividends of £30,000 per year will be announced for Year 1. Thereafter, dividends will rise by £6,000 each year. Dividends are paid in the year following the period to which they relate.
8 The business has a current cash balance of £85,000.

We shall now prepare projected cash flow statements showing the financing requirements of the business for each of the next four years. The starting point is to calculate the projected operating profit for the period and then to make the depreciation and the working capital adjustments as described earlier. This will provide us with a figure of operating cash flows. We then simply adjust for the interest, tax and dividends to deduce the net cash flows from operations each year.

The financing requirements for Santos Engineering Ltd are calculated as follows:

Projected cash flow statements

	Year 1 £	Year 2 £	Year 3 £	Year 4 £
Sales revenue	500,000	560,000	640,000	700,000
Operating profit (20%)	100,000	112,000	128,000	140,000
Depreciation	40,000	40,000	40,000	40,000
Working capital*	(50,000)	(6,000)	(8,000)	(6,000)
Operating cash flows	90,000	146,000	160,000	174,000

	Year 1 £	Year 2 £	Year 3 £	Year 4 £
Interest	(20,000)	(20,000)	(20,000)	(20,000)
Tax**		(20,000)	(23,000)	(27,000)
Dividends		(30,000)	(36,000)	(42,000)
Non-current assets		(490,000)		
Loan repayment				(400,000)
Net cash flows from operations	70,000	(414,000)	81,000	(315,000)
Opening balance	85,000	155,000	(259,000)	(178,000)
Closing balance	155,000	(259,000)	(178,000)	(493,000)

* The initial investment in working capital will be charged in the first year. Thereafter only increases (or decreases) in the level of working capital will be shown as an adjustment.
** The tax charge for each year is shown below.

	Year 1 £	Year 2 £	Year 3 £	Year 4 £
Operating profit (as above)	100,000	112,000	128,000	140,000
Interest	(20,000)	(20,000)	(20,000)	(20,000)
Profit before tax	80,000	92,000	108,000	120,000
Tax (25%)	(20,000)	(23,000)	(27,000)	(30,000)

Note: Tax will be paid in the year after the relevant profit is made. (Note 3)

PROJECTED FINANCIAL STATEMENTS AND DECISION MAKING

The performance and position revealed by projected financial statements should be examined with a critical eye. There is always a danger that the figures will be too readily accepted. Forecast figures are rarely completely accurate and some assessment must be made of the extent to which they can be relied upon. Thus, managers should ask questions such as:

- How were the projections developed?
- What underlying assumptions have been made and are they valid?
- Have all relevant items been included?

Only when satisfactory answers to these questions have been received should the statements be used for making decisions.

Real World 2.4 below confirms the need to adopt a questioning attitude.

Real World 2.4

Reality check

KPMG, the auditing, tax and advisory business, produced a report based on a worldwide survey of 544 senior executives in a variety of different industries. The executives, all of whom were involved in financial forecasting, were asked to assess the reliability of the forecasts produced. Specifically, they were asked to estimate the approximate variance occurring between forecast and actual performance within their business over the preceding three years. The survey results are shown in Figure 2.4 below.
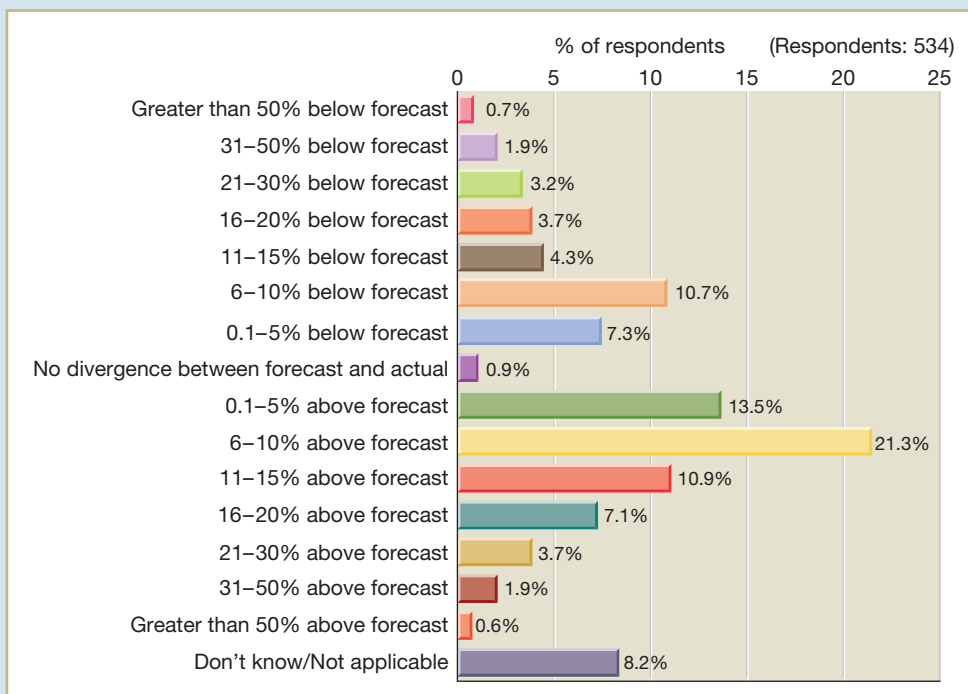
Figure 2.4 Variance between actual performance and forecast performance

We can see from the figure that there is a bias towards forecasts being lower than actual results.

Source: KPMG (2016) Forecasting with confidence, KPMG, p. 41.

Projected financial statements do not come with clear decision rules to indicate whether a proposed course of action should go ahead. Managers must use their judgement when examining the information before them. To help form a judgement, the following questions may be asked:

- Are the cash flows satisfactory? Can they be improved by changing policies or plans (for example, delaying capital expenditure decisions, requiring receivables to pay more quickly and so on)?
- Is there a need for additional financing? Is it feasible to obtain the amount required?
- Can any surplus funds be profitably reinvested?
- Is the level of projected profit satisfactory in relation to the risks involved? If not, what could be done to improve matters?
- Are the sales and individual expense items at a satisfactory level?
- Is the financial position at the end of the period acceptable?
- Is the level of borrowing acceptable? Is the business too dependent on borrowing?

TAKING ACCOUNT OF RISK

We have just seen in **Real World 2.4** above that, when making estimates concerning the future, things may not turn out as expected. The likelihood that what is estimated to occur will not actually occur is referred to as **risk** and this will be considered in some detail in Chapter 5. However, it is worth taking a little time at this point to consider the ways in which managers may deal with the problem of risk in the context of projected financial statements. In practice, there are various methods available to help managers deal with any uncertainty surrounding the reliability of the projected financial statements. Below we consider two popular methods.

Sensitivity analysis

Sensitivity analysis is a useful technique to employ when evaluating the contents of projected financial statements. This involves taking a single variable (for example, volume of sales) and examining the effect of changes in the chosen variable on the likely performance and position of the business. By examining the shifts that occur, it is possible to arrive at some assessment of how sensitive changes are for the projected outcomes. Although only one variable is examined at a time, a number of variables that are considered to be important to the performance of a business may be examined consecutively.

One form of sensitivity analysis is to pose a series of 'what if?' questions. If we take sales as an example, the following 'what if?' questions may be asked:

- What if sales volume is 5 per cent higher than expected?
- What if sales volume is 10 per cent lower than expected?
- What if sales price is reduced by 15 per cent?
- What if sales price could be increased by 20 per cent?

In answering these questions, it is possible to develop a better 'feel' for the effect of forecast inaccuracies and possible changes on the final outcomes. However, this technique does not assign probabilities to each possible change, nor does it consider the effect on projected outcomes of more than one variable at a time.

Real World 2.5 looks at how one large business uses sensitivity analysis.

Real World 2.5

A sensitive subject

Kindred Group plc is an online gambling operator that owns various brands such as 32Red, Unibet and iGame. The business undertakes sensitivity analysis to identify those factors where changes are likely to have the greatest effect on its profitability. The following is taken from the company's website:

> The Kindred Group's performance is affected by a number of factors. The sensitivity analysis below only takes into account direct changes.
>
> It is likely that actual changes in a specific factor will also affect other factors and that estimates made by the Group and other parties on the basis of a change of circumstance would also affect other factors.
>
> Kindred Group considers movements in the factors below to have the most impact on profit before tax (PBT).

Factor	% change	PBT impact GBPm
Gross winnings revenue	+/−1	+/−5.441
Administrative expenses	+/−1	+/−1.214
Marketing expenses	+/−1	+/−1.445

Source: Kindred Group plc, www.kindredgroup.com/investors, accessed 16 November 2018.

Scenario analysis

Another approach to helping managers gain a feel for the effect of forecast inaccuracies is to prepare projected financial statements according to different possible 'states of the world'. For example, managers may wish to examine projected financial statements prepared on the following bases:

- an optimistic view of likely future events
- a pessimistic view of likely future events
- a 'most likely' view of future events.

This approach is referred to as **scenario analysis** and, unlike sensitivity analysis, it will involve changing a number of variables simultaneously in order to portray a possible state of the world. It does not, however, identify the likelihood of each state of the world occurring. This information would also be useful in assessing the level of risk involved.

Real World 2.6 describes a pessimistic scenario created by a large retailer to evaluate the downside risk arising from increasing online competition.

Real World 2.6

Creating a scene

Next plc, a leading UK retailer, looked at the worst-case scenario for cash generated by its portfolio of stores over a forecast period of fifteen years. It did so to see whether the stores would remain a valuable asset to the business given the shift in consumer behaviour towards online sales. The following is an extract from its 2018 annual report

Store portfolio stress test
A more pessimistic longer term scenario

Whilst there is much we can do to make our stores more profitable and relevant in an online world, we also need to model a worst-case scenario for our stores. In our last report, we projected what would happen to the economics of our store portfolio in the event of ten years of -6% negative like-for-like (LFL) sales. With last year's like-for-like sales of -9.1%, we have tested what would happen to our stores at -10% over a longer period of time.

It is important to emphasise that the scenario we set out below is only a scenario. It is not what we actually think will happen. The purpose of this scenario is not to plan the future; rather it is to test whether our store portfolio is an asset or a liability in extreme circumstances.

Our verdict is that it remains an asset, albeit one that is declining in value, and not a liability.

Stress test assumptions

The following stress test is based on the following assumptions:

- We shut unprofitable stores at their lease expiry.
- When profitable stores reach the end of their lease we are able to continue trading, paying the same rent on a short-term lease ("holding over").

- We take on no new space, are unable to reduce any rents and take on no concession income.
- Fixed costs that are shared between the Retail and Online businesses are absorbed as the Online business grows. For the purpose of this model, it is assumed that Online sales growth matches the Retail sales decline.

Base scenario: like-for-like sales at -10% for fifteen years

In this scenario, the cumulative cash generated by our stores over fifteen years is £86m and in year 15 there is a £19m cash loss from the remaining portfolio.
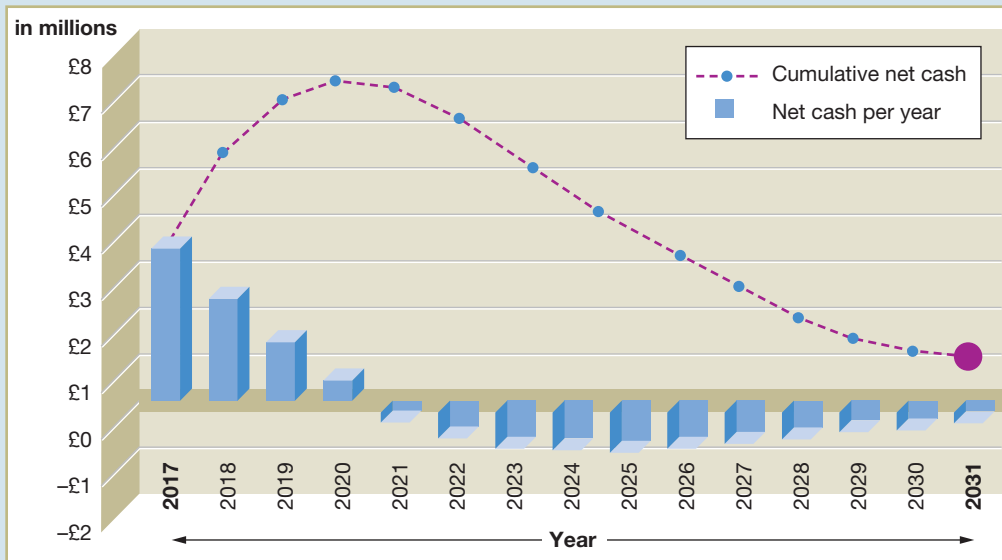
Note: Next plc produced a further scenario showing how certain factors, such as rent reduction would, if taken into account, significantly boost the likely future performance of its stores.

Source: Adapted from Next plc, *Annual Report and Accounts*, January 2018, Pp 33-34.

FINANCIAL PLANNING AND GEARING

When making financial plans, managers must take account of the effect of gearing. It is important because gearing can exert a powerful influence on the risks and returns associated with a business. In this final part of the chapter, we consider both financial and operating gearing.

FINANCIAL GEARING

Financial gearing (also known as *financial leverage*) occurs when a business is financed, at least in part, by borrowing (or by other funds with a fixed rate of return). The higher the proportion of borrowing, in relation to finance provided by ordinary shareholders, the higher is the level of financial gearing. The term 'financial gearing' is applied because using borrowed funds will accentuate any changes in operating profit on returns to ordinary shareholders. The effect is similar to two intermeshing cog wheels of unequal size (see Figure 2.5). The movement in the larger cog wheel (operating profit) causes a more than proportionate movement in the smaller cog wheel (returns to ordinary shareholders).

Borrowing increases risk. This is because it normally involves an obligation to pay interest charges and to make capital repayments, which can place a strain on cash flows. We shall also see later that the commitment to pay interest charges increases the volatility of returns to ordinary shareholders. It is the case, nevertheless, that most businesses take on borrowing. Given the risks involved, we may wonder why. Sometimes, ordinary shareholders may not be able to raise all the finance needed and so borrowing is used to fill the gap. Often, however, it is because the risks of borrowing are outweighed by the increased returns to ordinary shareholders. This occurs where the returns generated from borrowed funds exceed the cost of paying interest charges.

The gearing effect is similar to the effect of two intermeshing cog wheels of unequal size. A movement in the larger cog (operating profit) brings about a disproportionately large movement in the smaller cog (returns to ordinary shareholders).
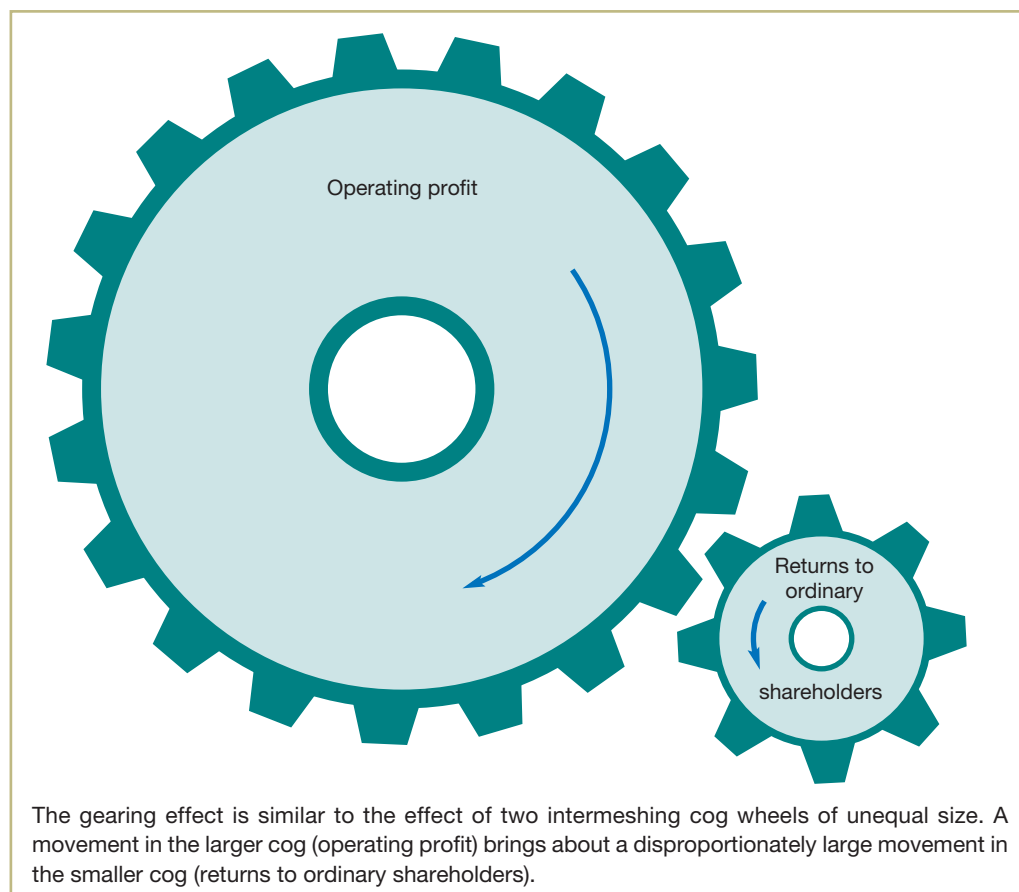
Figure 2.5 The effect of financial gearing

Example 2.5 considers the relationship between returns to shareholders and the level of borrowing.

Example 2.5

Hidalgo plc has recently been formed to manufacture washing machines. The new business will require £400 million in long-term finance and the directors are currently deciding how to raise the funds required. Three options are being considered:

- all £400 million from £1 ordinary shares (the 'all-share option'); or
- £300 million from £1 ordinary shares and £100 million from the issue of secured loan notes paying interest at 10 per cent a year (the 'low-geared option'); or

■ £100 million from £1 ordinary shares and £300 million from the issue of secured loan notes paying interest at 10 per cent a year (the 'high-geared option').

Operating profit (that is, profit before interest and taxation) is expected to fall within the range of £30 million to £70 million per year. However, the most likely figure is £50 million per year. The rate of corporation tax is 20 per cent.

To evaluate the three options, we can calculate future returns to ordinary shareholders over the range of possible operating profits. These will be measured using the following formula:

$$\text{Earnings per share (EPS)} = \frac{\text{Profit available to ordinary shareholders}}{\text{No. of ordinary shares in issue}}$$

As we shall see in the following chapter, this is a widely-used measure that relates the profit after tax to the number of ordinary shares in issue.

Let us now consider each financing option under different profit scenarios.

All-share option

	£m	£m	£m	£m	£m
Operating profit	30.00	40.00	50.00	60.00	70.00
Interest (10%)	–	–	–	–	–
Profit before taxation	30.00	40.00	50.00	60.00	70.00
Taxation (20%)	(6.00)	(8.00)	(10.00)	(12.00)	(14.00)
Profit for the year	24.00	32.00	40.00	48.00	56.00
EPS*	6.0p	8.0p	10.0p	12.0p	14.0p

* At £30m operating profit EPS = £24m/400m = 6.0p and so on.

Low-geared option

	£m	£m	£m	£m	£m
Operating profit	30.00	40.00	50.00	60.00	70.00
Interest (10%)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)
Profit before taxation	20.00	30.00	40.00	50.00	60.00
Taxation (20%)	(4.00)	(6.00)	(8.00)	(10.00)	(12.00)
Profit for the year	16.00	24.00	32.00	40.00	48.00
EPS*	5.3p	8.0p	10.7p	13.3p	16.0p

* At £30m operating profit EPS = £16m/300m = 5.3p and so on.

High-geared option

	£m	£m	£m	£m	£m
Operating profit	30.00	40.00	50.00	60.00	70.00
Interest (10%)	(30.00)	(30.00)	(30.00)	(30.00)	(30.00)
Profit before taxation	—	10.00	20.00	30.00	40.00

	£m	£m	£m	£m	£m
Taxation (20%)	—	(2.00)	(4.00)	(6.00)	(8.00)
Profit for the year	—	8.00	16.00	24.00	32.00

* At £30m operating profit, EPS = £0m/100m = 0.0p and so on.

Activity 2.14

Comment on the earnings per share results, under each of the three financing options, for the different levels of operating profit.

Both geared options produce higher earnings per share than the all-share option for the most likely level of operating profit of £50 million, as well as for operating profits of £60 million and £70 million. However, both geared options produce lower earnings per share when the operating profit is £30 million. At an operating profit of £40 million, all options provide the same return to shareholders (that is 8.0p).

For both geared options, earnings per share will be more sensitive to changes in the level of operating profit. Thus, an increase in £10 million from the most likely operating profit of £50 million will increase earnings per share for the low-geared option from 10.7p to 13.3p (that is, a 24 per cent increase). For the high-geared option, the increase is from 16.0p to 24.0p (that is, a 50 per cent increase). These increases are higher than for the all-share option, which increases from10p to 12p (that is, a 20 per cent increase).

The low-geared option and all-share option produce a positive return on earnings per share for all levels of operating profit considered. This is not the case, however, for the high-geared option.

We saw in Example 2.5 that, at an operating profit of £40 million, earnings per share is the same for all financing options (8.0p). This is not a coincidence. It is because the overall rate of return on total long-term funds employed (operating profit/long-term investment) is 10.0 per cent. This is the same as the interest rate for the loan notes.

Where a business is able to generate a rate of return greater than the interest rate on the borrowings, the effect of financial gearing is to magnify returns to ordinary shareholders (that is, EPS). Where a business is unable to generate a rate of return greater than the interest rate on the borrowings, however, financial gearing has the opposite effect. In other words, gearing operates in both directions.

Activity 2.15

Given the most likely operating profit is £50 million, which financing option in Example 2.5 above would you choose and why?

At £50 million operating profit, the high-geared option provides considerably higher earnings per share than the other two options. Providing the managers are confident that this level of operating profit can be consistently achieved, the high-geared option should be chosen. If, however, operating profits are expected to fluctuate significantly over time, one of the other two options may be preferred. The greater the degree of fluctuation, the more attractive the all-share option becomes.

Real World 2.7 provides an example of how an investment trust (a business that invests in securities, such as shares) used financial gearing to boost returns to its shareholders.

Trust in gearing

The use of gearing offset a weaker investment performance to boost the returns for the Schroder Income Growth Trust. Data from FE Analytics showed the trust returned 6.8 per cent in the year to 31 August, compared with 4 per cent for the AIC UK Equity Income sector average.

Gearing, when money is borrowed by trusts to buy more investments, can boost performance because the borrowed cash is put into the market it means each shareholder effectively has more capital invested in the trust than they actually put in. This means if an investment goes up in value the investor makes more, but if an investment falls in value those losses are amplified for the end investor.

In the results statement for the year to the end of August, the trust's manager, Sue Noffke, said: 'The company's outperformance against the index reflected the twin benefits of positive sector allocation and the use of gearing in a rising market, offset to some degree by negative stock selection.'

Constructing an indifference chart

Earnings per share under different financing options, and at varying levels of operating profit, can be displayed in graphical form. To illustrate how this is done, let us use the information contained in Example 2.5. A chart based on this information is set out in Figure 2.6. We can see that the vertical axis of the chart plots earnings per share and the horizontal axis plots operating profits.

The chart reveals the returns to shareholders for different levels of operating profit of three financing options. The point at which the three lines intersect represents the level of operating profit (profit before interest and tax) at which all three financing options provide the same rate of return to shareholders. This is referred to as the indifference point.
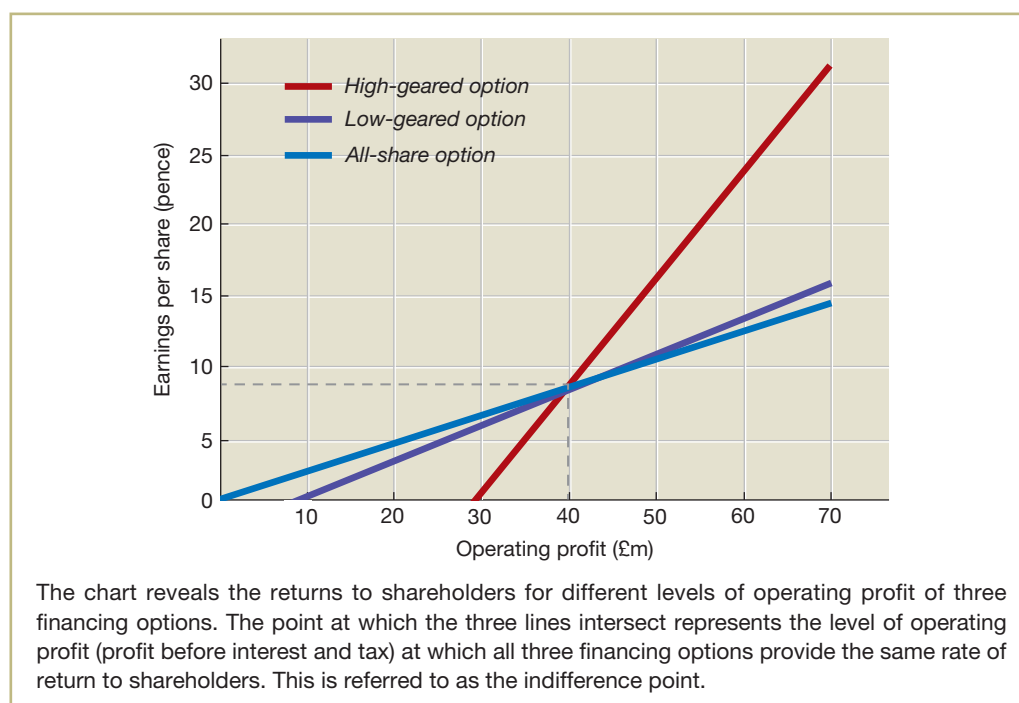
Figure 2.6 Financial gearing indifference chart for two possible financing options

To construct the above chart, we need two coordinates for each financing option. The first of these will be the operating profit needed to cover the interest charges. For the all-share option, this is zero as there are no interest charges. For the low-geared option it is £10 million and for the high-geared option it is £30 million. (These amounts are, of course the relevant interest charges under each option.) These points can be plotted on the horizontal axis.

The second coordinate for each financing option will be the earnings per share at the highest expected operating profit (although an arbitrarily determined level of operating profit could also be used). These have already been calculated in Example 2.5 and, to save you referring back, are:

	All-share option	Low-geared option	High-geared option
Earnings per share	14.0p	16.0p	32.0p

By joining the two coordinates relating to each financing option, we have a straight line that reveals earnings per share at different levels of operating profit.

We can see from the chart that, at lower levels of operating profit, the all-share option provides higher earnings per share to shareholders. However, the lines for the geared options have a steeper slope than the all-share option and so earnings per share rise more quickly. Beyond an operating profit of £40 million, ordinary shareholders begin to reap the benefits of financial gearing and earnings per share become higher under this alternative. The operating profit of £40.0 million is referred to as the **indifference point** (that is, the point at which the three financing schemes provide the same level of earnings per share).

The distance between the indifference point and the most likely operating profit provides an indication of the *margin of safety* for the geared options when compared with the ungeared (all share) option. It signifies the amount by which the operating profit must fall before the ungeared option becomes more attractive.

Activity 2.16

Take a look at the indifference chart in Figure 2.6. Comment on the margin of safety for the two geared options.

The chart reveals a reasonable margin of safety for both geared options. For the most likely level of operating profit, a fall of more than 20 per cent would need to occur before the all-share option becomes more attractive.

Calculating the indifference point

The indifference point between any two financing options can also be derived by using a simple mathematical approach. Example 2.6 illustrates the process.

Example 2.6

The information used in Example 2.5 above will be used to demonstrate how the indifference point is calculated. We shall consider the indifference point between the all-share option and the high-geared financing option.

Let x be the operating profit at which the two financing options provide the same returns to shareholders.

→

	All-share option	High-geared option
	£m	£m
Operating profit	x	x
Interest payable	−	(30.0)
Profit before taxation	x	$(x - 30.0)$
Tax (20%)	$0.2x$	$0.2(x - 30.0)$
Profit after tax	$0.8x$	$0.8(x - 30.0)$
Earnings per share	$\dfrac{0.8x}{400.0m}$	$\dfrac{0.8(x - £30.0m)}{100.0m}$

Thus, earnings per share under each financing option will be equal when:

$$\frac{0.8x}{400.0m} = \frac{0.8(x - £30.0m)}{100.0m}$$

The above equation can be solved as follows:

$$80x = 320x - £9,600m$$

$$x = £40.0m$$

This answer is, of course the same as that displayed on the graph. It is also the same figure as calculated in Example 2.5, where earnings per share under each option is identical (8.0p) at £40 million operating profit.

The advantage of producing an indifference chart, rather than adopting the mathematical approach just described, is that it reveals earnings per share over a range of operating profits rather than at a single point. It provides a visual display of information that is easy to understand and which can be particularly helpful for non-financial managers.

Activity 2.17

Calculate the indifference point between the low-geared and the high-geared financing options.

Once again, let x be the operating profit at which the two financing options provide the same earnings per share.

	Low-geared option	High-geared option
	£m	£m
Operating profit	x	x
Interest payable	(10.0)	(30.0)
Profit before taxation	$(x - 10.0)$	$(x - 30.0)$
Tax (20%)	$0.2(x - 10.0)$	$0.2(x - 30.0)$
Profit after tax	$0.8(x - 10.0)$	$0.8(x - 30.0)$
Earnings per share	$\dfrac{0.8(x - £10.0m)}{300.0m}$	$\dfrac{0.8(x - £30.0m)}{100.0m}$

Thus, earnings per share under each financing option will be equal when:

$$\frac{0.8(x - £10.0m)}{300.0m} = \frac{0.8(x - £30.0m)}{100.0m}$$

The above equation can be solved as follows:

$$80x - £800m = 240x - £7,200m$$
$$x = \underline{£40.0m}$$

Degree of financial gearing

We have now seen that, for a financially geared business, earnings per share will be sensitive to changes in operating profit (that is, profit before interest and taxation). The higher the level of financial gearing, the more sensitive earnings per share will become. The **degree of financial gearing** measures the sensitivity of earnings per share to changes in the level of operating profit. It can be calculated in various ways, including the following:

$$\text{Degree of financial gearing} = \frac{\text{Operating profit}}{\text{Operating profit} - \text{Interest payable}}$$

Thus, at the most likely operating profit for Hidalgo plc (Example 2.5) the degree of financial gearing for the high-geared option is:

$$\text{Degree of financial gearing} = \frac{£50m}{£50m - £30m}$$
$$= \underline{2.5}$$

We shall interpret this ratio in a moment. Before doing so, however, try Activity 2.18.

Activity 2.18

Calculate the degree of financial gearing at the most likely operating profit for Hidalgo plc for both the low-geared option and the all-share option.

For the low-geared option, it is:

$$\text{Degree of financial gearing} = \frac{£50m}{£50m - £10m}$$
$$= \underline{1.25}$$

For the all-share option, it is:

$$\text{Degree of financial gearing} = \frac{£50m}{£50m}$$
$$= \underline{1.0}$$

The ratios that we have calculated above indicate that a 1.0 per cent increase in operating profit, from the most-likely level of £50 million, will result in an increase in earnings per share of:

- 2.5 per cent for the high-geared option,
- 1.25 per cent for the low geared option, and
- 1.0 per cent for the all-share option.

Note that the degree of financial gearing for each of the geared options is greater than 1. This indicates the presence of financial gearing. The higher the figure, the higher the level of gearing and the greater the sensitivity of earnings per share to changes in operating profit.

The impact of financial gearing becomes less pronounced as the level of operating profit increases in relation to interest charges. Where operating profit barely covers interest charges, even small changes in the former figure can have a significant impact on earnings per share. Thus, the degree of financial gearing will be high. However, as operating profit increases in relation to interest charges, earnings per share become less sensitive to changes. As a result, the degree of financial gearing measure starts to decrease.

Activity 2.19

Calculate the degree of financial gearing under both the low-geared and the high-geared option when operating profits are:

(a) £60m, and
(b) £70m.

Your answer should be as follows:

Low-geared option

		£60m	£70m
Operating profit		£60m	£70m

Degree of financial gearing

$$= \frac{\text{Operating profit}}{\text{Operating profit} - \text{Interest payable}} \qquad \frac{£60m}{£60m - £10m} \qquad \frac{£70m}{£70m - £10m}$$

$$\underline{1.2} \qquad \underline{1.17}$$

High-geared option

		£60m	£70m
Operating profit		£60m	£70m

Degree of financial gearing

$$= \frac{\text{Operating profit}}{\text{Operating profit} - \text{Interest payable}} \qquad \frac{£60m}{£60m - £30m} \qquad \frac{£70m}{£70m - £30m}$$

$$\underline{2.0} \qquad \underline{1.75}$$

In each case, we can see that the impact of financial gearing becomes less pronounced as the level of operating profit increases.

In the context of financial planning, calculating the degree of financial gearing can be useful when determining the likely effect of changes in interest rates and/or changes to the level of borrowing on earnings per share.

Let us end this section by striking a note of caution. **Real World 2.8** sets out the views of Warren Buffett, the legendary investor and chairman of Berkshire Hathaway Inc. He warns that we should not be beguiled by the seemingly magical properties of financial gearing.

OPERATING GEARING

To understand the nature of **operating gearing** (also known as *operating leverage*), we first need to consider the nature of costs. One way of classifying operating costs incurred by a business is according to how they behave in relation to changes in the volume of activity. Thus, costs may be classified according to whether they:

- remain constant when changes occur to the volume of activity, or
- vary according to the volume of activity.

These are known as **fixed costs** and **variable costs**, respectively.

We saw earlier, when discussing projected financial statements, that examples of fixed costs included rent, insurance, staff salaries and depreciation of equipment. Variable costs may include such things as commission to sales staff.

Activity 2.20

Can you think of at least three other examples of operating costs that are likely to be variable for a manufacturing business?

They may include:

- raw materials and components used in producing the goods sold
- royalties paid under a patent agreement
- power used for equipment and machinery
- packaging costs
- transportation costs to customers
- amounts paid to employees based on work completed
- credit card fees (based on a percentage of sales).

You may have thought of others.

The relationship between fixed costs and variable costs is known as operating gearing. An activity with relatively high fixed costs compared with its total variable costs, at its normal level of activity, is said to have high operating gearing. The term *gearing* is used in a similar way to that used earlier when we discussed financial gearing. As with intermeshing gear wheels of different circumferences, a movement in one of the factors (sales output) causes a more-than-proportionate movement in the other (operating profit). This is illustrated by Figure 2.7.

The gearing effect is similar to the effect of two intermeshing cog wheels of unequal size. A movement in the larger cog (sales output) immediately brings about a disproportionately large movement in the smaller cog (operating profit).
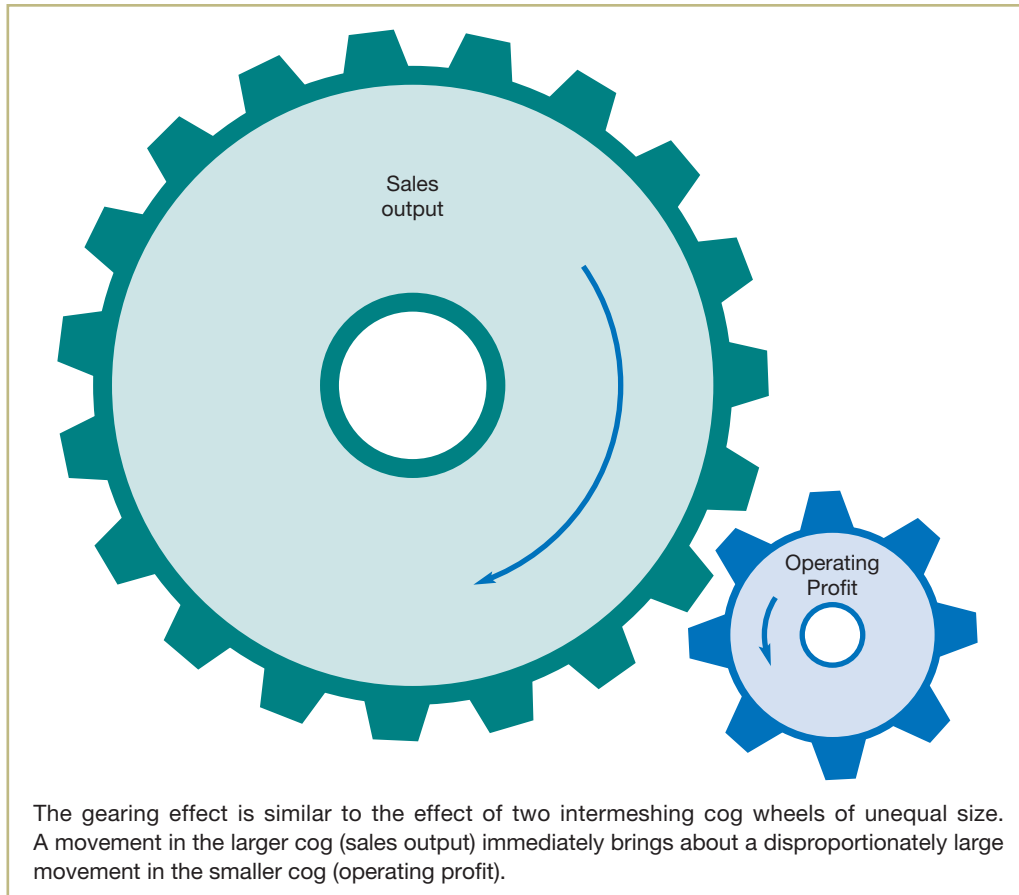
Figure 2.7 The effect of operating gearing

Activity 2.21

Which industries are likely to have high operating gearing? Try to think of at least three.

Industries that are capital intensive tend to have high operating gearing. This is because renting, or owning, capital equipment gives rise to additional fixed cost. It may also give rise to lower variable cost. Examples of capital-intensive industries include:

- oil refining
- car manufacturing
- airlines
- steel production

- telecommunication and
- chemical manufacturing.

Industries with high R&D costs also tend to have high operating gearing. Developing a new product can involve huge outlays and lead to additional fixed costs. Once developed, however, variable costs of supplying the new product may be very low. Examples of industries with high R&D costs include:

- pharmaceuticals and
- software development.

A high level of operating gearing makes operating profits more sensitive to changes in sales output. Example 2.7 demonstrates the effect of using operating gearing within a business.

Example 2.7

Lethargo plc has recently been formed to produce vacuum cleaners. The business is now considering which one of two possible strategies should be adopted:

- *Strategy 1*: outsource production of all the parts and components needed for the vacuum cleaners and focus on assembling the parts and distributing the assembled cleaners. Under this strategy, variable operating costs would be 70 per cent of the total sales output. Fixed costs would be £3 million per year.
- *Strategy 2*: make all of the parts and components needed for the vacuum cleaners and simply buy in the raw materials needed. Under this strategy, variable operating costs would be 40 per cent of the total sales output. Fixed costs would be £18 million per year.

The most likely level of sales under both strategies is £60 million. However, the range of sales is forecast to be between £30 million and £70 million.

We can see that Strategy 1 has a much higher level of operating gearing than Strategy 2. Let us now consider the effect of these different levels of gearing on operating profit for different levels of sales output.

Strategy 1 (low-geared option)

	£m	£m	£m	£m	£m
Sales	30.00	40.00	50.00	60.00	70.00
Variable costs (70%)	(21.00)	(28.00)	(35.00)	(42.00)	(49.00)
Fixed costs	(3.00)	(3.00)	(3.00)	(3.00)	(3.00)
Operating profit/(loss)	6.00	9.00	12.00	15.00	18.00

Strategy 2 (high-geared option)

	£m	£m	£m	£m	£m
Sales	30.00	40.00	50.00	60.00	70.00
Variable costs (40%)	(12.00)	(16.00)	(20.00)	(24.00)	(28.00)
Fixed costs	(18.00)	(18.00)	(18.00)	(18.00)	(18.00)
Operating profit/(loss)	0.00	6.00	12.00	18.00	24.00

We can see that Strategy 2 is a riskier option than Strategy 1. If the sales output is low, operating profits will be more badly affected than under Strategy 1. This is because fixed costs, which are incurred irrespective of the level of sales output, are much higher. We can also see, however, that Strategy 2 has the potential to generate higher operating profits.

Constructing an indifference chart

It is possible to display operating profits at different levels of sales output for the low-operating gearing and high-operating gearing strategies. The information contained in Example 2.7 can be used to show how this is done. A chart based on this information is set out in Figure 2.8. We can see that the vertical axis of the chart plots operating profits and the horizontal axis plots sales output.

The chart reveals the operating profit for different levels of sales output for two possible cost structures. The point at which the two lines intersect represents the level of sales at which both cost structures provide the same operating profit. This is referred to as the indifference point.
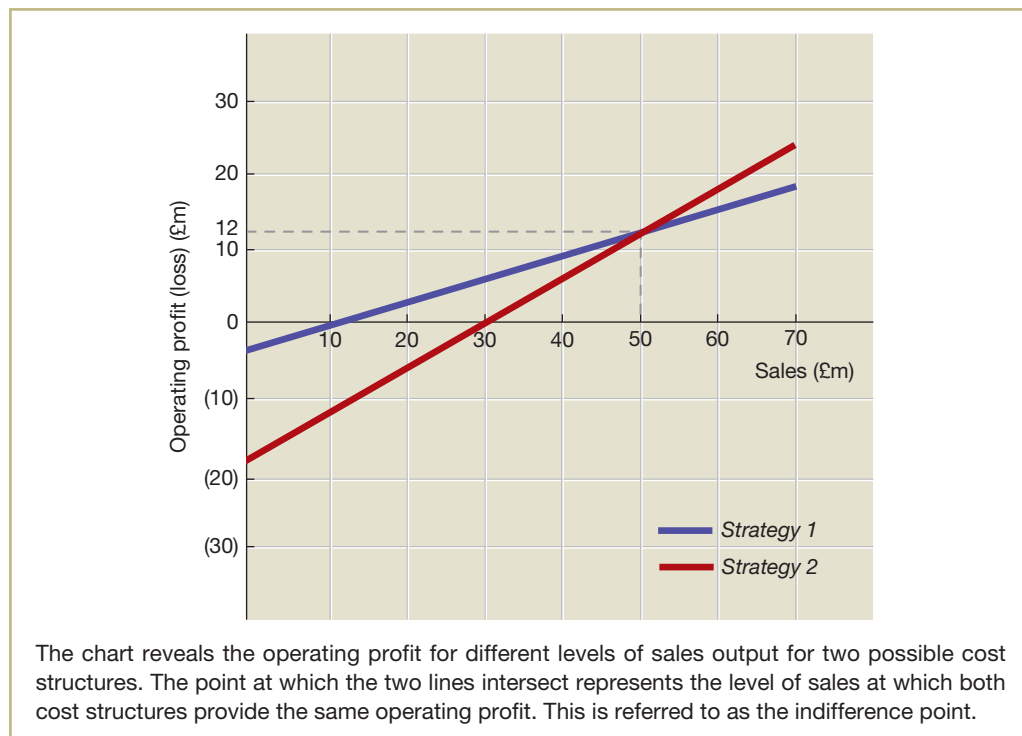
Figure 2.8 Operating gearing indifference chart for two possible cost structures

Once again, to produce the above chart we need two coordinates for each strategy. The first can be the operating loss incurred when sales output is zero. This is £3 million for Strategy 1 and £18 million for Strategy 2. (These amounts, of course, represent the fixed costs incurred under each strategy.) The second coordinate can be the operating profit when sales output is at the maximum £70 million (or some arbitrarily determined figure). This is £18 million for Strategy 1 and £24 million for Strategy 2. By joining the two coordinates relevant to each strategy we have a straight line that reveals operating profits for different levels of sales output.

We can see from the chart that, at low levels of sales output, Strategy 1 (the low-geared option) provides higher operating profits, or lower losses. However, the line for Strategy 2 (the high-geared option) has a steeper slope than for Strategy 1. This means that as operating

profits rise, or losses reduce, more quickly. Beyond an operating profit of £50 million, the benefits of high operating gearing begin to kick in.

The sales output of £50.0 million represents the indifference point (that is, the point at which sales outputs for both strategies provide the same operating profit). The distance between this indifference point and the most likely sales output provides a 'margin of safety' for the higher geared option.

Activity 2.22

Calculate the margin of safety for the higher geared option and interpret its significance.

The margin of safety is £10 million [£60 million − £50 million] which means that sales output would have to fall by more than 16 per cent (£10m/£60m) before Strategy 1 (the low-geared option) becomes the more attractive option. Thus, the higher geared option has a reasonable cushion against unforeseen circumstances.

Before a final decision is made, however, the stability of sales over time must be considered. The greater the level of sales fluctuation, the more attractive the low geared strategy becomes.

Calculating the indifference point

The level of sales at which both strategies yield the same operating profit can be derived by adopting a simple mathematical approach.

Activity 2.23

See if you can calculate the indifference point for sales output between the two strategies set out in Example 2.7. (*Hint:* Use a similar approach to that used in Example 2.5 above when calculating the indifference point between two financing options. In this case let *x* = the sales output at which the two strategies provide the same operating profits).

Your answer should be as follows:

	Strategy 1	Strategy 2
	£m	£m
Sales	x	x
Variable costs	(0.7x)	(0.4x)
Fixed costs	(3.0)	(18.0)
Operating profit	$(x - 0.7x) - 3.0$	$(x - 0.4x) - 18.0$

This means that the sales output under both strategies will be equal when:

$$(x - 0.7x) - £3.0m = (x - 0.4x) - £18.0m$$

We can solve the equation as follows:

$$0.3x - £3.0m = 0.6x - £18.0m$$

$$0.3x = £15m$$

$$x = \underline{£50.0m}$$

This figure is, of course the same as that displayed on the chart. It is also the same as that shown in Example 2.7 above, where the sales output for each strategy is £50 million and the operating profit is £12.0 million.

Degree of operating gearing

We have now seen that, for a business with operating gearing, any change in sales output will result in a disproportionate change in operating profit. The higher the level of operating gearing, the more sensitive operating profit becomes to changes in sales volume. The **degree of operating gearing** measures the sensitivity of operating profit to changes in the level of sales volume. One way in which this can be calculated is as follows:

$$\text{Degree of operating gearing} = \frac{\text{Sales} - \text{Variable costs}}{\text{Operating profit}}$$

Thus, for Strategy 1, the degree of operating gearing at the different levels of sales output mentioned in Example 2.7 is as follows:

STRATEGY 1

	£m	£m	£m	£m	£m
Sales	30.00	40.00	50.00	60.00	70.00
Less Variable cost (70%)	(21.00)	(28.00)	(35.00)	(42.00)	(49.00)
	9.00	12.00	15.00	18.00	21.00
Operating profit/(loss)	6.00	9.00	12.00	15.00	18.00
Degree of operating gearing	1.5*	1.33	1.25	1.20	1.17

*At £30m sales, the degree of operating gearing is 9.0/6.0 = 1.5 and so on.

We shall interpret the significance of these ratios in a moment. First, however, try Activity 2.24.

Activity 2.24

Calculate the degree of operating gearing for Strategy 2 at the different levels of sales output mentioned in Example 2.7.

Strategy 2

	£m	£m	£m	£m	£m
Sales	30.00	40.00	50.00	60.00	70.00
Less Variable cost (40%)	(12.00)	(16.00)	(20.00)	(24.00)	(28.00)
	18.00	24.00	30.00	36.00	42.00
Operating profit/(loss)*	0.00	6.00	12.00	18.00	24.00
Degree of operating gearing	∞	4.00	2.50	2.00	1.75

* Per Example 2.7

The higher the degree of operating gearing, the greater will be the sensitivity of operating profits from changes in sales output. Thus, the calculations above indicate that a 1.0 per cent change in sales output, from the most-likely level of £60 million, will result in a change in operating profit of:

- 1.20 per cent for Strategy 1 (low-geared option), and
- 2.0 per cent for Strategy 2 (high-geared option).

Where the degree of operating gearing is greater than 1, it indicates the presence of fixed costs. The higher the figure calculated, the higher the gearing and the greater the sensitivity of operating profits to changes in sales output.

The impact of operating gearing becomes less pronounced the further away from the point at which sales (less variable costs) equal the fixed costs. Where they are almost equal, even small changes in the former can have a significant impact on operating profit. This high degree of sensitivity will be reflected in the degree of operating gearing measure. However, as sales (less variable costs) increase in relation to fixed costs, operating profits become less sensitive to change. As a result, the degree of operating gearing measure will decrease. Take a look again at the answer to Activity 2.24 above to see how the degree of operating gearing gradually decreases as the level of sales output increases.

Real World 2.9 shows how a well-known business has benefited from operating gearing.

Real World 2.9

Not down at heel

Jimmy Choo plc, the luxury brand specialising in shoes and accessories announced a 13.7 per cent increase in operating profits for the six-month period ending 30 June 2016. The business stated that this increase was partly due to the beneficial effect of operating gearing. During the six-month period, sales revenue increased by only 3.8 per cent.

Jimmy Choo plc, like most wholesale/retail businesses, has a high proportion of its costs that are fixed, such as premises occupancy costs, employee costs, plant depreciation, and motor vehicle running costs.

Source: Information from: Jimmy Choo plc, Preliminary results statement for the six months ended 30 June 2016, www.jimmychooplc.com, 25 August 2016.

COMBINED GEARING EFFECT

Most businesses have both financial gearing and operating gearing. The effect of combining the two on returns to shareholders can be measured by the **degree of combined gearing**. This measure may be calculated as follows:

Degree of combined gearing = Degree of financial gearing × Degree of operating gearing

Activity 2.25

We saw in the answer to Activity 2.24 above that, under Strategy 2, the degree of operating gearing for Lethargo plc at £60 million operating profit is 2.0. If the business also has a degree of financial gearing of 3.0 at this level of operating profit, what is the degree of combined gearing? How should this figure be interpreted in terms of the sensitivity of returns to shareholders?

→

The degree of combined gearing will be:

$$3.0 \times 2.0 = 6.0$$

This means a 1.0 per cent increase in sales will result in a 6.0 per cent increase in earnings per share. Thus, returns are highly sensitive to slight changes in sales.

As with the degree of operating and financial gearing measures, the degree of combined gearing does not remain constant: it will vary according to the level of sales output.

Let us conclude this section by taking a look at **Figure 2.9** below. It summarises the effect of each of the three forms of gearing discussed on the profit figures appearing in the income statement.
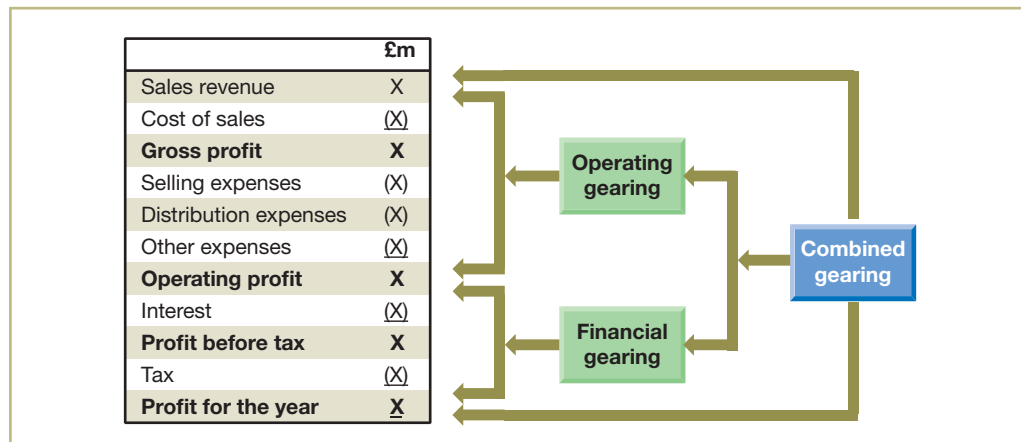
Figure 2.9 The effect of each form of gearing from an income statement perspective

Gearing and risk

The degree of financial gearing measures an aspect of *financial risk:* which arises from the financing methods employed. The degree of operating gearing measures an aspect of *business risk* which arises from the cost structure adopted. Both forms of risk are linked to volatility in returns to shareholders. The degree of combined gearing, of course, measures the combined effect of these risks. Thus, where the degree of combined gearing is high, shareholders may experience a high degree of volatility in their returns. This volatility will be reflected in share price movements.

Businesses with high operating gearing tend to shy away from high financial gearing in order to contain the overall level of risk. However, this is not always the case. It was mentioned earlier that high operating gearing is a feature of capital-intensive businesses. To finance the large investment needed in plant and equipment, these businesses may rely on borrowing. Where this occurs, the two types of gearing combine to create a high level of total risk.

Where the combined gearing of a business is judged to be too high, steps should be taken to reduce the degree of financial gearing, and/or the degree of operating gearing.

Activity 2.26

What steps might managers of a business take to reduce:

(a) the degree of financial gearing, and
(b) the degree of operating gearing

where each is considered to be too high? Try to think of at least two possible steps for each form of gearing.

To lower levels of financial gearing, it may be possible to:

- repay borrowings from future profits generated
- replace existing borrowings with new borrowings at a lower rate of interest.
- repay borrowings from the proceeds of an ordinary share issue
- convert borrowings into equity (ordinary) shares.

To lower levels of operating gearing, it may be possible to cut fixed costs by:

- sharing services with other businesses, such as payroll accounting or office space
- hiring temporary, rather than permanent, staff
- rewarding staff by increasing bonuses based on sales rather than increasing base salaries
- negotiating lower service costs, such as rent payable
- moving to smaller premises
- outsourcing services or processes.

You may have thought of other ways of reducing each form of gearing.

Self-assessment question 2.1

Quardis Ltd is a small business that imports high-quality laser printers. The most recent statement of financial position of the business is as follows:

Statement of financial position as at 31 May Year 8

	£000	£000
ASSETS		
Non-current assets		
Property	460	
Accumulated depreciation	(30)	430
Fixtures and fittings	35	
Accumulated depreciation	(10)	25
		455
Current assets		
Inventories		24
Trade receivables		34
Cash at bank		2
		60
Total assets		515
EQUITY AND LIABILITIES		
Equity		
£1 ordinary shares		200
Retained earnings		144
		344

→

	£000	£000
Non-current liabilities		
Borrowings – loan		125
Current liabilities		
Trade payables	22	
Tax due	24	
	46	
Total equity and liabilities		515

The following forecast information is available for the year ending 31 May Year 9:

1 Sales are expected to be £280,000 for the year. Sixty per cent of sales are on credit and it is expected that, at the year-end, three months' credit sales will be outstanding. Sales revenues accrue evenly over the year.

2 Purchases of inventories during the year will be £186,000 and will accrue evenly over the year. All purchases are on credit and at the year-end it is expected that two months' purchases will remain unpaid.

3 Fixtures and fittings costing £25,000 will be purchased and paid for during the year. Depreciation is charged at 10 per cent on the cost of fixtures and fittings held at the year-end.

4 Depreciation is charged on property at 2 per cent on cost.

5 On 1 June Year 8, £30,000 of the loan from the Highland Bank is to be repaid. Interest is at the rate of 13 per cent per year and all interest accrued to 31 May Year 9 will be paid on that day.

6 Inventories at the year-end are expected to be 25 per cent higher than at the beginning of the year.

7 Wages for the year will be £34,000. It is estimated that £4,000 of this total will remain unpaid at the year-end.

8 Other overhead expenses for the year (excluding those mentioned above) are expected to be £21,000. It is estimated that £3,000 of this total will still be unpaid at the year-end.

9 A dividend of 5p per share will be announced and paid during the year.

10 Tax is payable at the rate of 35 per cent. Tax outstanding at the beginning of the year will be paid during the year. Half of the tax relating to the year will also be paid during the year.

Required:

(a) Prepare a projected income statement for the year ending 31 May Year 9.
(b) Prepare a projected statement of financial position as at 31 May Year 9.
(c) Comment on the significant features revealed by these statements.

All workings should be shown to the nearest £000.

Note: A projected cash flow statement is not required. The cash figure in the projected statement of financial position will be a balancing figure.

The solution to this question can be found at the back of the book on pp. 635–36.

SUMMARY

The main points of this chapter may be summarised as follows:

Planning for the future

- Developing plans for a business involves:
    - setting aims and objectives
    - identifying the options available
    - selecting options and developing long-term plans and
    - developing short-term plans.

The role of projected financial statements

- They help in evaluating the impact of plans on financial performance and position.
- They can be prepared for long or short time horizons.

Preparing projected financial statements

- Involves:
    - identifying the key variables that affect future financial performance
    - forecasting sales for the period, as many other items vary in relation to sales.
- Financial statements that can be prepared for planning purposes are:
    - a projected cash flow statement
    - a projected income statement and
    - a projected statement of financial position.

Per-cent-of-sales method

- Assumes that most items on the income statement and statement of financial position vary with sales.
- Calculates any financing gap by reference to the amount required to make the statement of financial position balance.
- Makes the preparation of projected statements easier and less costly.
- Assumes that past relationships between particular items and sales will also hold and that all expenses vary with sales.

Long-term cash projections

- When making long-term cash projections, a method using simplifying assumptions is often employed. It involves:
    - forecasting sales revenue and calculating operating profit as a percentage of this figure
    - adjusting operating profit for depreciation, and working capital to derive operating cash flows
    - deducting interest, dividends and tax paid from the operating cash flows to derive the net cash flow from operations.

Projected financial statements and decision making

- Projected statements should be checked for reliability before being used for decision making.
- They do not provide clear decision rules for managers, who must employ judgement.

Taking account of risk

- Two popular methods of dealing with risk associated with projected financial statements are:
  - sensitivity analysis
  - scenario analysis.
- These techniques can help managers gain a 'feel' for the risks involved.

Financial gearing

- Financial gearing arises where there is borrowing (or other fixed return capital) within the capital structure of a business.
- The effect of financial gearing is that changes in operating profit (profit before interest and taxation) result in disproportionate changes in earnings per share.
- The degree of financial gearing measures the sensitivity of changes in earnings per share for ordinary shareholders to changes in operating profit.
- An indifference chart can be constructed to reveal the returns to shareholders at different levels of operating profit for different financing options.

Operating gearing

- Operating gearing arises where there are fixed costs within the cost structure of a business.
- The effect of operating gearing is that changes in sales output result in disproportionate changes in operating profit.
- The degree of operating gearing measures the sensitivity of changes in operating profit to changes in sales output.
- An indifference chart can be constructed to reveal operating profits at varying levels of sales output under different cost structures.

Combined gearing

- Many businesses take on both financial gearing and operating gearing.
- The degree of combined gearing measures the sensitivity of earnings per share to changes in sales output.

KEY TERMS

Projected financial statements p. 35
Rolling cash flow projection p. 41
Per-cent-of-sales method p. 47
Plug p. 48
Working capital p. 52
Risk p. 56
Sensitivity analysis p. 56
Scenario analysis p. 57

Financial gearing p. 58
Indifference point p. 63
Degree of financial gearing p. 65
Operating gearing p. 67
Fixed costs p. 67
Variable costs p. 67
Degree of operating gearing p. 72
Degree of combined gearing p. 73

For definitions of these terms, see the Glossary, pp. 685–94.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Alexander, J. (2018) *Financial Analysis, and Planning and Performance Management*, Wiley, Chapters 12–14.

Brigham, E. and Ehrhardt, M. (2016) *Corporate Finance: A Focused Approach*, 6th edn, Cengage Learning Custom Publishing, Chapters 11 and 12.

Ross S., Westerfield R. and Jordan B. (2018) *Fundamentals of Corporate Finance*, 12th edn McGraw-Hill Higher Education, Chapter 18.

Samonas, M. (2015) *Financial Forecasting, Analysis and Modelling: A Framework for Long-Term Forecasting*, Wiley Finance Series, Chapters 3, 4, 6 and 7.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 649–650.

2.1 In what ways might projected financial statements help a business that is growing fast?

2.2 'The future is uncertain and so projected financial statements will almost certainly prove to be inaccurate. It is, therefore, a waste of time to prepare them.' Comment.

2.3 Why is the sales forecast normally critical to the preparation of projected financial statements?

2.4 Distinguish between financial gearing and operating gearing. Why do businesses often avoid having high levels of both financial and operating gearing?

Exercises 2.5 to 2.7 are more advanced than 2.1 to 2.4. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

2.1 Choice Designs Ltd operates a wholesale/retail carpet store. The statement of financial position of the business as at 31 May Year 8 is as follows:

Statement of financial position as at 31 May Year 8

	£000	£000
ASSETS		
Non-current assets		
Property, plant and equipment		
Property	600	
Accumulated depreciation	(100)	500
Fixtures and fittings	140	
Accumulated depreciation	(80)	60
		560
Current assets		
Inventories		240
Trade receivables		220
Bank		165
		625
Total assets		1,185
EQUITY AND LIABILITIES		
Equity		
£1 ordinary shares		500
Retained earnings		251
		751
Current liabilities		
Trade payables		268
Tax due		166
		434
Total equity and liabilities		1,185

As a result of falling profits the directors of the business would like to completely refurbish each store during June Year 8 at a total cost of £300,000. However, before making such a large capital expenditure commitment, they require projections of performance and position for the forthcoming year.

The following information is available concerning the year to 31 May Year 9:

■ The forecast sales for the year are £1,400,000 and the gross profit is expected to be 30 per cent of sales. Eighty per cent of all sales are on credit. At present the average credit period is six weeks, but it is likely that this will change to eight weeks in the forthcoming year.

- At the year-end, inventories are expected to be 25 per cent higher than at the beginning of the year.
- During the year, the directors intend to pay £40,000 for delivery vans.
- Administration expenses for the year are expected to be £225,000 (including £12,000 for depreciation of property and £38,000 for depreciation of fixtures and fittings). Selling expenses are expected to be £85,000 (including £10,000 for depreciation of motor vans).
- All purchases are on credit. It has been estimated that the average credit period taken will be 12 weeks during the forthcoming year.
- Tax for the year is expected to be £34,000. Half of this will be paid during the year and the remaining half will be outstanding at the year-end.
- Dividends proposed and paid for the year are expected to be 6.0p per share.

Required:

(a) Prepare a projected income statement for the year ending 31 May Year 9.
(b) Prepare a projected statement of financial position as at 31 May Year 9.
(c) Explain why an established business would find it easier than a new business to prepare accurate projected financial statements.

All workings should be made to the nearest £000.

Note: The cash balance will be the balancing figure.

2.2 Davis Travel Ltd specialises in the provision of cheap weekend winter breaks but also organises cheap weekend summer breaks. You are given the following information:

Statement of financial position as at 30 September Year 4

	£000
ASSETS	
Non-current assets	
Property, plant and equipment	560
Current assets	
Cash	30
Total assets	590
EQUITY AND LIABILITIES	
Equity	
Share capital	100
Retained earnings	200
	300
Non-current liabilities	
Borrowings – loans	110
Current liabilities	
Trade payables	180
Total equity and liabilities	590

Its sales estimates for the next six months are:

	Number of bookings received	Number of holidays taken	Promotion expenditure (£000)
October	1,000		100
November	3,000		150
December	3,000	1,000	150
January	3,000	4,000	50
February		3,000	
March		2,000	
Total	10,000	10,000	450

1 Weekend breaks sell for £300 each. Ten per cent is payable when the holiday is booked and the remainder after two months.
2 Travel agents are paid a commission of 10 per cent of the price of the holiday break one month after the booking is made.
3 The cost of a flight is £50 per holiday and that of a hotel £100 per holiday. Flights and hotels must be paid for in the month when the holiday breaks are taken.
4 Other variable costs are £20 per holiday and are paid in the month of the holiday break.
5 Administration costs, including depreciation of non-current assets of £42,000, amount to £402,000 for the six months. Administration costs can be spread evenly over the period.
6 Loan interest of £10,000 is payable on 31 March Year 5 and a loan repayment of £20,000 is due on that date. For your calculations, ignore any interest on the overdraft.
7 The trade payables of £180,000 at 30 September are to be paid in October.
8 A payment of £50,000 for non-current assets is to be made in March Year 5.
9 The airline and the hotel chain base their charges on Davis Travel's forecast requirements and hold capacity to meet those requirements. If Davis is unable to fill this reserved capacity, a charge of 50 per cent of those published above is made.

Required:

(a) Prepare:
   (i)   A projected cash flow statement for the six months to 31 March Year 5.
   (ii) A projected income statement for the six months ending on that date.
   (iii) A projected statement of financial position at 31 March Year 5.
(b) Discuss the main financial problems confronting Davis Travel Ltd. Ignore taxation in your calculations.

2.3 Fowler Ltd produces 'Vitex', a vitamin supplement drink that is sold for £1.20 per bottle. At present the business's bottling plant is operating at full capacity and it is not possible to expand sales beyond the current level unless there is further investment in plant and machinery. The most recent income statement for the business is as follows:

Income statement for the year ending 31 October Year 7

	£000
Sales revenue (1.5m bottles)	1,800
Variable expenses	(750)
Fixed expenses	(420)
Operating profit	630
Interest payable	(130)

	£000
Profit before taxation	500
Tax (30%)	(150)
Profit for the year	350

The statement of financial position of the business revealed that 2 million £1 ordinary shares are in issue as well as 10 per cent loan notes with a nominal value of £1.3 million. There are no reserves as all profits have been distributed as dividends.

It is believed that output can be increased by 20 per cent if the existing bottling line was replaced. The cost of the new line would be £2 million, which could be financed by the issue of 10 per cent loan notes at £80 per £100 nominal value. The new bottling line would reduce variable costs by £0.15 per bottle but would increase fixed costs by £150,000 per year. Installation of the new line can occur immediately after a decision is made.

Required:
Assume that the business decides to install the bottling line at the beginning of Year 8 and all the increased output can be sold.

(a) Prepare a projected income statement for the year to 31 October Year 8.
(b) Calculate for Year 7 and Year 8 the:
    (i)   earnings per share
    (ii) degree of operating gearing
    (iii) degree of financial gearing
    (iv) degree of combined gearing.
(c) Briefly evaluate the information produced in your answers to Parts (a) and (b) above.
(d) Calculate the sales revenue required in Year 8 to maintain existing earnings per share.

2.4 The financial statements of Danube Engineering plc for the year that has just ended are as follows:

Income statement for the year ending 31 March Year 5

	£m
Sales revenue	500
Cost of sales	(350)
Gross profit	150
Selling expenses	(30)
Distribution expenses	(40)
Other expenses	(25)
Profit before taxation	55
Tax (20%)	(11)
Profit for the year	44

Statement of financial position as at the end of Year 5

	£m
ASSETS	
Non-current assets	700
Current assets	
Inventories	175
Trade receivables	125
Cash	40
	340
Total assets	1,040
EQUITY AND LIABILITIES	
Equity	
Share capital – 50p ordinary shares	80
Retained earnings	249
	329
Non-current liabilities	
Loan notes	500
Current liabilities	
Trade payables	200
Tax due	11
	211
Total equity and liabilities	1,040

As in previous years, a dividend of 25 per cent of the profit for the year was proposed and paid during the year.

The following information is relevant for Year 6:

1 Sales revenue is expected to be 20 per cent higher than in Year 5.
2 All sales are on credit.
3 Non-current assets of the business have plenty of spare capacity.
4 The tax rate will be the same as in Year 5 and all of the tax due will be outstanding at the year-end.
5 The business intends to maintain the same dividend policy as for Year 5.
6 Tax due at the end of Year 5 will be paid during Year 6.
7 Half of the loan notes in issue will be redeemed at the end of Year 6.
8 Any financing gap will be filled by an issue of shares at nominal value. The new shares will not, however, rank for dividend during Year 6.

Required:
Prepare a projected income statement and statement of financial position for Year 6 using the per-cent-of-sales method. (All workings should be to the nearest £ million.)

2.5 Semplice Ltd manufactures catering equipment for restaurants and hotels. The statement of financial position of the business as at 31 May Year 4 is as follows:

Statement of financial position as at 31 May Year 4

	£m
ASSETS	
Non-current assets	
Property, plant and equipment	
Premises	40.2
Machinery and equipment	17.4
	57.6
Current assets	
Inventories	22.5
Trade receivables	27.6
Cash at bank	1.3
	51.4
Total assets	109.0
EQUITY AND LIABILITIES	
Equity	
£0.25 ordinary shares	15.0
Retained earnings	46.2
	61.2
Non-current liabilities	
12% loan notes	20.0
Current liabilities	
Trade payables	25.2
Tax due	2.6
	27.8
Total equity and liabilities	109.0

An abridged income statement for the year ended 31 May Year 4 is as follows:

Income statement for the year ended 31 May Year 4

	£m
Sales revenue	137.4
Operating profit (profit before interest and taxation)	23.2
Interest payable	(2.4)
Profit before taxation	20.8
Tax	(5.2)
Profit for the year	15.6

The board of directors of Semplice Ltd has decided to invest £20 million in new machinery and equipment to meet an expected increase in sales for the business's products. The expansion in production facilities is expected to result in an increase of £6 million in annual operating profit (profit before interest and taxation).

1 To finance the proposed investment, the board of directors is considering either:
    (i)   a rights issue of eight million ordinary shares at a premium of £2.25 per share, or
    (ii) the issue of £20 million 10 per cent loan notes at nominal value.
2 A dividend of £6.0 million was proposed and paid during the year.
3 The directors wish to increase the dividend per share by 10 per cent in the forthcoming year irrespective of the financing method chosen.

   Assume a tax rate of 25 per cent.

Required:

(a) Prepare a projected income statement (in abbreviated form) for the year to 31 May Year 5 under each financing option.
(b) Show the projected long-term capital structure of the business under each financing option as at 31 May Year 5.
(c) Using the information in your answer to (a) and (b) above, compute the earnings per share and degree of financial gearing for each financing option.
(d) Briefly evaluate the two financing options under consideration.

2.6 Newtake Records Ltd owns three shops selling rare jazz and classical recordings to serious collectors. At the beginning of June, the business had an overdraft of £35,000 and the bank has asked for this to be eliminated by the end of November of the same year. As a result, the directors of the business have recently decided to review their plans for the next six months in order to comply with this requirement.
    The following forecast information was prepared for the business some months earlier:

	May £000	June £000	July £000	Aug £000	Sept £000	Oct £000	Nov £000
Expected sales	180	230	320	250	140	120	110
Purchases	135	180	142	94	75	66	57
Admin. expenses	52	55	56	53	48	46	45
Selling expenses	22	24	28	26	21	19	18
Tax payment				22			
Finance payments	5	5	5	5	5	5	5
Shop refurbishment	–	–	14	18	6	–	–

Notes:

1 Inventories held at 1 June were £112,000. The business believes it is necessary to maintain a minimum inventories level of £40,000 over the period to 30 November of the same year.
2 Suppliers allow one month's credit. The first three months' purchases are subject to a contractual agreement that must be honoured.
3 The gross profit margin is 40 per cent.
4 All sales income is received in the month of sale. However, 50 per cent of customers pay with a credit card. The charge made by the credit card business to Newtake Records Ltd is 3 per cent of the sales value. These charges are in addition to the selling expenses identified above. The credit card business pays Newtake Records Ltd in the month of sale.
5 The business has a bank loan that it is paying off in instalments of £5,000 per month. The interest element represents 20 per cent of each instalment.

6 Administration expenses are paid when incurred. This item includes a charge of £15,000 each month in respect of depreciation.

7 Selling expenses are payable in the following month.

Required:

(a) Prepare a projected cash flow statement for the six months ending 30 November that shows the cash balance at the end of each month.

(b) Compute the projected inventories levels at the end of each month for the six months to 30 November.

(c) Prepare a projected income statement for the six months ending 30 November. (A monthly breakdown of profit is not required.)

(d) What problems is Newtake Records Ltd likely to face in the next six months? Can you suggest how the business might deal with these problems?

2.7 Eco-Energy Appliances Ltd started operations on 1 January and has produced the following forecasts for annual sales revenue:

Year to 31 December	Year 1	Year 2	Year 3	Year 4
Forecast sales revenue (£)	1,200,000	1,440,000	1,500,000	1,400,000

The following additional information is also available:

1 Operating profit is expected to be 15 per cent of sales revenue throughout the four-year period.

2 The company has an £800,000 10 per cent bank loan, half of which is redeemable at the end of Year 3.

3 The tax rate is expected to be 20 per cent throughout the four-year period. Tax is paid in the year following the year in which the relevant profits are made.

4 An initial investment in net working capital of £140,000 is required. Thereafter, investment in net working capital is expected to represent 10 per cent of sales revenue for the relevant year.

5 Depreciation of £70,000 per year must be charged for the non-current assets currently held.

6 Equipment costing £100,000 will be acquired at the beginning of Year 4. This will be depreciated at the rate of 10 per cent per year.

7 Dividends equal to 50 per cent of the profit for the year will be announced each year. These dividends are paid in the year following the period to which they relate.

8 The business has a current cash balance of £125,000.

Required:
Prepare projected cash flow statements of the business for each of the next four years. (*Note:* All workings should be to the nearest £000.)

Chapter 3

ANALYSING AND INTERPRETING FINANCIAL STATEMENTS

INTRODUCTION

In this chapter, we consider the analysis and interpretation of financial statements. We shall see how the use of financial (or accounting) ratios can help to assess the financial performance and position of a business. We also take a look at the problems encountered when applying these ratios.

Financial ratios can be used to examine various aspects of financial health and are widely used for planning and control purposes. They can be very helpful to managers in a wide variety of decision areas, such as profit planning, working capital management, financial structure and dividend policy.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Identify the major categories of ratios that can be used for analysing financial statements.

■ Calculate key ratios for assessing the financial performance and position of a business and explain their significance.

■ Discuss the use of ratios in helping to predict financial failure.

■ Discuss the limitations of ratios as a tool of financial analysis.

FINANCIAL RATIOS

Financial ratios provide a quick and relatively simple means of assessing the financial health of a business. A ratio simply relates one figure appearing in the financial statements to another figure appearing there (for example, operating profit in relation to sales revenue) or, perhaps, to some resource of the business (for example, operating profit per employee).

Ratios can be very helpful when comparing the financial health of different businesses. Differences may exist between businesses in the scale of operations. As a result, a direct comparison of, say, the operating profit generated by each business may be misleading. By expressing operating profit in relation to some other measure (for example, capital employed), the problem of scale is eliminated. This means that a business with an operating profit of £10,000 and capital employed of £100,000 can be compared with a much larger business with an operating profit of £80,000 and capital employed of £1,000,000 by the use of a simple ratio. The operating profit to capital employed ratio for the smaller business is 10 per cent (that is, $(10,000/100,000) \times 100\%$) and the same ratio for the larger business is 8 per cent (that is, $(80,000/1,000,000) \times 100\%$). These ratios can be directly compared whereas comparison of the absolute operating profit figures would be much less meaningful. The need to eliminate differences in scale through the use of ratios can also apply when comparing the performance of the same business from one time period to another.

By calculating a small number of ratios, it is often possible to build up a revealing picture of the position and performance of a business. It is not surprising, therefore, that ratios are widely used by those who have an interest in businesses and business performance. Ratios are not difficult to calculate; however, they can be difficult to interpret.

Ratios help us to identify which questions to ask rather than provide the answers. They help to highlight the financial strengths and weaknesses of a business, but cannot explain why those strengths and weaknesses exist or why certain changes have occurred. They provide a starting point for further analysis. Only a detailed investigation will reveal the underlying reasons.

Ratios can be expressed in various forms, for example as a percentage or as a proportion. The way that a particular ratio is presented will depend on the needs of those who will use the information. Although it is possible to calculate a large number of ratios, only a few, based on key relationships, may be helpful to a particular user. Many ratios that could be calculated from the financial statements (for example, rent payable in relation to current assets) may not be considered because there is not usually any clear or meaningful relationship between the two items.

There is no generally accepted list of ratios that can be applied to the financial statements, nor is there a standard method of calculating many ratios. Variations in both the choice of ratios and their calculation will be found in practice. It is important, therefore, to be consistent in the way in which ratios are calculated for comparison purposes. The ratios that we shall discuss are very popular – presumably because they are seen as useful for decision-making purposes.

FINANCIAL RATIO CLASSIFICATIONS

Ratios can be grouped into categories, with each category relating to a particular aspect of financial performance or position. The following five broad categories provide a useful basis for explaining the nature of the financial ratios to be dealt with.

- *Profitability.* Businesses generally exist with the primary purpose of creating wealth for their owners. Profitability ratios provide some indication of the degree of success in achieving this purpose. They normally express the profit made in relation to other key figures in the financial statements or to some business resource.
- *Efficiency.* Ratios may be used to measure the efficiency with which particular resources, such as inventories or employees, have been used within the business. These ratios are also referred to as *activity* ratios.
- *Liquidity.* It is vital to the survival of a business that there are sufficient liquid resources available to meet maturing obligations (that is, amounts due for payment in the near future). Liquidity ratios examine the relationship between the liquid resources held and amounts due for payment in the near future.
- *Financial gearing.* Gearing ratios are concerned with the relationship between the contribution to financing the business made by its owners and the contribution made by others, in the form of loans. They help to reveal the extent to which the business is reliant on loan finance. We saw in Chapter 2 that financial gearing is important because of its impact on the risk and returns associated with the business.
- *Investment.* These ratios are concerned with assessing the returns and performance of shares in a particular business from the perspective of shareholders who are not involved with the management of the business.

These five key aspects of financial health that ratios seek to examine are summarised in Figure 3.1.

Ratios can be used to examine each of the areas that we have discussed.
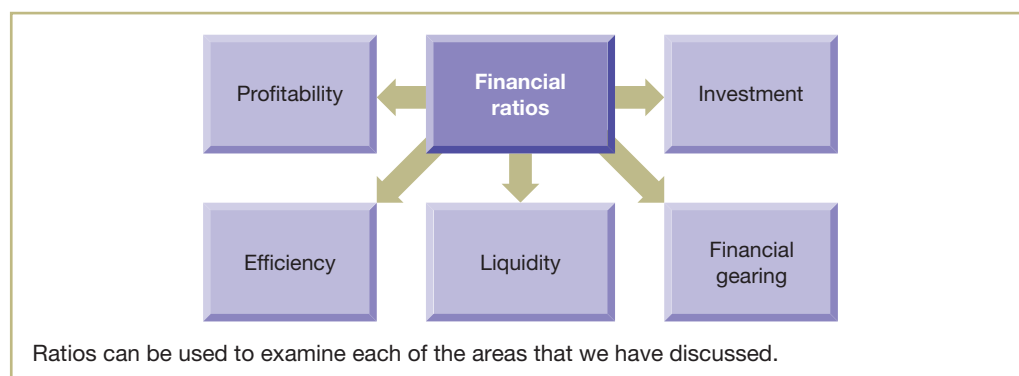
Figure 3.1 The key aspects of financial health

Before analysing the financial statements, we need to be clear *who* the target users are and *why* they need the information. Different users are likely to have different information needs. This, in turn, will determine the ratios that they find useful. Shareholders, for example, are likely to be interested in their returns in relation to the level of risk associated with their investment. Profitability, investment and gearing ratios should therefore be of particular interest. Long-term lenders are likely to be concerned with the long-term viability of the business and, to assess this, profitability and gearing ratios should, once again, be of interest. Short-term lenders, such as suppliers of goods and services on credit, are likely to be interested in the ability of the business to repay amounts owing in the short term.

THE NEED FOR COMPARISON

Merely calculating a ratio will not tell us very much about the position or performance of a business. If, for example, a ratio revealed that a retail business was generating £1,000 in sales revenue per square metre of floor space per month, it would not be possible to deduce from this information alone whether this particular level of performance was good, bad or indifferent. It is only when we compare this ratio with some 'benchmark' that the information can be interpreted and evaluated.

We shall now take a closer look at these three in turn.

Past periods

By comparing a particular ratio with the same ratio for a previous period, it is possible to see whether there has been an improvement or deterioration in performance. It is often useful to track particular ratios over time (say, five or ten years) to see whether any trends emerge. The comparison of ratios from different periods, however, brings certain problems. There is always the possibility that trading conditions were quite different in the periods being compared. Furthermore, when comparing the performance of a single business over time, operating inefficiencies may not be clearly exposed. The fact, for example, that sales revenue per employee has risen by 10 per cent over the previous period may seem satisfactory at first sight. This may not be the case, however, if similar businesses have shown an improvement of 30 per cent for the same period, or had much better sales revenue per employee ratios to begin with. Finally, there is the problem that inflation may have distorted the figures on which the ratios are based. Inflation can lead to an overstatement of profit and an understatement of asset values, as we will discuss later in the chapter.

Similar businesses

In a competitive environment, a business must consider its performance in relation to that of other businesses operating in the same industry. Survival may depend on its ability to achieve comparable levels of performance. A useful basis for comparing a particular ratio, therefore, is the ratio achieved by similar businesses during the same period. This basis is not without its problems, however. Competitors may have different year-ends and so trading conditions may not be identical. They may also have different accounting policies (for example, different methods of calculating depreciation or valuing inventories), which can have a significant effect on reported profits and asset values. Finally, it may be difficult to obtain the financial statements of competitor businesses. Sole proprietorships and partnerships, for example, are not obliged to make their financial statements available to the public. In the case of limited companies, there is a legal obligation to do so. However, a diversified business may not provide a sufficiently detailed breakdown of activities to enable comparisons with other businesses.

Planned performance

Planned performance often provides the most valuable benchmark against which managers may assess their own business. Ratios based on the actual results may be compared with targets that management developed before the start of the period under review. This comparison can be a useful way of assessing the level of achievement attained. However, planned performance must be based on realistic assumptions if it is to be worthwhile for comparison purposes.

Planned, or target, ratios may be prepared for each aspect of the business's activities. When developing these ratios, account should normally be taken of past performance and the performance of other businesses. This does not mean, however, that a business should seek to achieve either of these levels of performance. Neither may provide an appropriate target.

We should bear in mind that those outside the business do not normally have access to the business's plans. For them, past performance and the performances of other, similar, businesses may provide the only practical benchmarks.

The three most used bases of comparison for financial ratios are summarised in Figure 3.2.

Of the three commonly used bases of comparison, planned performance of the business concerned is usually seen as the most useful.
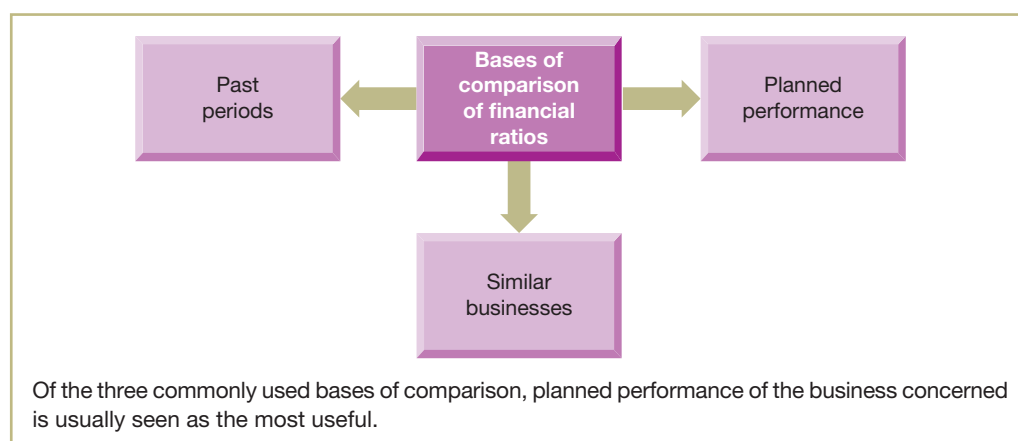
Figure 3.2 The commonly used bases of comparison for financial ratios

CALCULATING THE RATIOS

Probably the best way to explain financial ratios is through an example. Example 3.1 provides a set of financial statements from which we can calculate important ratios.

Example 3.1

The following financial statements relate to Alexis plc, which operates a wholesale carpet business.

Statements of financial position (balance sheets) as at 31 March

	2018 £m	2019 £m
ASSETS		
Non-current assets		
Property, plant and equipment (at cost less depreciation)		
Land and buildings	381	427
Fixtures and fittings	129	160
	510	587
Current assets		
Inventories	300	406
Trade receivables	240	273
Cash at bank	4	–
	544	679
Total assets	1,054	1,266
EQUITY AND LIABILITIES		
Equity		
£0.50 ordinary shares (Note 1)	300	300
Retained earnings	263	234
	563	534
Non-current liabilities		
Borrowings – 9% loan notes (secured)	200	300
Current liabilities		
Trade payables	261	354
Taxation	30	2
Short-term borrowings (all bank overdraft)	–	76
	291	432
Total equity and liabilities	1,054	1,266

Income statements for the year ended 31 March

	2018	2019
	£m	£m
Revenue (Note 2)	2,240	2,681
Cost of sales (Note 3)	(1,745)	(2,272)
Gross profit	495	409
Operating expenses	(252)	(362)
Operating profit	243	47
Interest payable	(18)	(32)
Profit before taxation	225	15
Taxation	(60)	(4)
Profit for the year	165	11

Notes:

1 The market value of the shares of the business at the end of the year was £2.50 for 2018 and £1.50 for 2019.
2 All sales and purchases are made on credit.
3 The cost of sales figure can be analysed as follows:

	2018	2019
	£m	£m
Opening inventories	241	300
Purchases (Note 2)	1,804	2,378
	2,045	2,678
Closing inventories	(300)	(406)
Cost of sales	1,745	2,272

4 At 31 March 2017, the trade receivables stood at £223 million and the trade payables at £183 million.
5 A dividend of £40 million had been paid to the shareholders in respect of each of the years.
6 The business employed 13,995 staff at 31 March 2018 and 18,623 at 31 March 2019.
7 The business expanded its capacity during the year to 31 March 2019 by setting up a new warehouse and distribution centre in the north of England.
8 At 1 April 2017, the total of equity stood at £438 million and the total of equity and non-current liabilities stood at £638 million.

A BRIEF OVERVIEW

Before we start our detailed look at the ratios for Alexis plc (see Example 3.1), it is helpful to take a quick look at what information is obvious from the financial statements. This will usually pick up some issues that ratios may not be able to identify. It may also highlight some points that could help us in our interpretation of the ratios. Starting at the top of the statement of financial position, the following points can be noted:

■ *Expansion of non-current assets.* These have increased by about 15 per cent (from £510 million to £587 million). Note 7 mentions a new warehouse and distribution centre, which may account for much of the additional investment in non-current assets. We are not told when this new facility was established, but it is quite possible that it was well into the year. This could mean that not much benefit was reflected in terms of additional sales revenue or cost saving during 2019. Sales revenue, in fact, expanded by about 20 per cent (from £2,240 million to £2,681 million): this is greater than the expansion in non-current assets.

- *Major expansion in the elements of working capital.* Inventories increased by about 35 per cent, trade receivables by about 14 per cent and trade payables by about 36 per cent between 2018 and 2019. These are major increases, particularly in inventories and payables (which are linked because the inventories are all bought on credit – see Note 2).
- *Reduction in the cash balance.* The cash balance fell from £4 million (in funds) to a £76 million overdraft between 2018 and 2019. The bank may be putting the business under pressure to reverse this, which could create difficulties.
- *Apparent debt capacity.* Comparing the non-current assets with the long-term borrowings indicates that the business may well be able to offer security on further borrowing. This is because potential lenders usually look at the value of assets that can be offered as security when assessing loan requests. Lenders seem particularly attracted to land and buildings as security. At 31 March 2019, for example, non-current assets had a carrying amount (the value at which they appeared in the statement of financial position) of £587 million, but long-term borrowing was only £300 million (although there was also an overdraft of £76 million). Carrying amounts do not normally reflect market values. Land and buildings are often shown in the statement of financial position below their market value. This is due to a general tendency to inflation in property values.
- *Lower operating profit.* Although sales revenue expanded by 20 per cent between 2018 and 2019, the cost of sales and operating expenses rose by a greater percentage, leaving both gross profit and operating profit massively reduced. The level of staffing, which increased by about 33 per cent (from 13,995 to 18,623 employees – see Note 6), may have greatly affected the operating expenses. (Without knowing when the additional employees were recruited during 2019, we cannot be sure of the effect on operating expenses.) Increasing staffing by 33 per cent must put an enormous strain on management, at least in the short term. It is not surprising, therefore, that 2019 was not successful for the business – at least, not in profit terms.

Having had a quick look at what is fairly obvious, without calculating any financial ratios, we shall now go on to calculate and interpret some.

PROFITABILITY

The following ratios may be used to evaluate the profitability of the business:

- return on ordinary shareholders' funds
- return on capital employed
- operating profit margin
- gross profit margin.

We shall look at each of these in turn.

Return on ordinary shareholders' funds

The **return on ordinary shareholders' funds ratio (ROSF)** compares the amount of profit for the period available to the owners with the owners' average stake in the business during that same period. The ratio (which is normally expressed in percentage terms) is as follows:

$$\text{ROSF} = \frac{\text{Profit for the year less any preference dividend}}{\text{Ordinary share capital} + \text{Reserves}} \times 100$$

The profit for the year (less any preference dividend) is used in the ratio, as it represents the profit attributable to the owners.

In the case of Alexis plc, the ratio for the year ended 31 March 2018 is:

$$\text{ROSF} = \frac{165}{(438 + 563)/2} \times 100 = 33.0\%$$

Note that, when calculating the ROSF, the average of the figures for ordinary shareholders' funds as at the beginning and at the end of the year has been used. This is because an average figure is normally more representative. The amount of shareholders' funds was not constant throughout the year, yet we want to compare it with the profit earned during the whole period. We know, from Note 8, that the amount of shareholders' funds at 1 April 2017 was £438 million. By a year later, however, it had risen to £563 million, according to the statement of financial position as at 31 March 2018.

The easiest approach to calculating the average amount of shareholders' funds is to take a simple average based on the opening and closing figures for the year. This is often the only information available, as is the case with Example 3.1. Averaging is normally appropriate for all ratios that combine a figure for a period (such as profit for the year) with one taken at a single point in time (such as shareholders' funds).

Where the beginning-of-year figure is not available, it will be necessary to rely on just the year-end figure. This is not ideal, but when this approach is applied consistently, it may still produce useful ratios.

Activity 3.3

Calculate the ROSF for Alexis plc for the year to 31 March 2019.

The ratio for 2019 is:

$$\text{ROSF} = \frac{11}{(563 + 534)/2} \times 100 = 2.0\%$$

Broadly, businesses seek to generate as high a value as possible for this ratio. This is provided that it is not achieved at the expense of potential future returns, for example by taking on more risky activities. The 2019 ratio is very poor by any standards; a bank deposit account will normally yield a better return. We need to try to find out why things went so badly wrong in 2019. As we look at other ratios, we should find some clues.

Return on capital employed

The **return on capital employed ratio (ROCE)** is a fundamental measure of business performance. This ratio expresses the relationship between the operating profit generated during a period and the average long-term capital invested in the business.

The ratio is expressed in percentage terms and is as follows:

$$\text{ROCE} = \frac{\text{Operating profit}}{\text{Share capital} + \text{Reserves} + \text{Non-current liabilities}} \times 100$$

Note that, in this case, the profit figure used is the operating profit (that is, the profit *before* interest and taxation). This is because the ratio attempts to measure the returns to all suppliers of long-term finance before any deductions for financing costs (interest payable on borrowings and payments of dividends to shareholders).

ROCE is considered by many to be a primary measure of profitability. It compares inputs (capital invested) with outputs (operating profit) so as to reveal the effectiveness with which

funds have been deployed. Once again, an average figure for capital employed should be used where the information is available.

For the year to 31 March 2018, the ratio for Alexis plc is:

$$\text{ROCE} = \frac{243}{(638 + 763)/2} \times 100 = 34.7\%$$

(The capital employed figure, which is the total equity + non-current liabilities, at 1 April 2017 is given in Note 8 to Example 3.1.)

Activity 3.4

Calculate the ROCE for Alexis plc for the year to 31 March 2019.

The ratio for 2019 is:

$$\text{ROCE} = \frac{47}{(763 + 834)/2} \times 100 = 5.9\%$$

This ratio tells much the same story as ROSF: a poor performance, with the return on the capital employed being less than the rate that the business has to pay for most of its borrowed funds (that is, 9 per cent for the loan notes).

Real World 3.1 shows how ROCE ratio is used by businesses as a basis for setting profitability targets.

Real World 3.1

Targeting profitability

The ROCE ratio is widely used by businesses when establishing targets for profitability. These targets are sometimes made public and here are some examples:

- Barratt Developments plc, the builder, has a target ROCE on all new land acquisitions of 25 per cent.
- Vattenfall, a Swedish power company, has a target ROCE of 8 per cent
- UDG Healthcare plc, a healthcare services provider, has a target ROCE of 15 per cent.
- Bovis Homes plc, the housebuilder, has a medium-term ROCE of 25 per cent.
- Tyman plc, a supplier of building products, has a medium-term target ROCE of 15 per cent
- Ramirent plc, the rental equipment business, has a target ROCE of 16 per cent to be achieved by the end of 2020
- Countryside Properties plc, the housebuilders, had a target ROCE of 28 per cent for 2018
- Smurfit Kappa Group plc, the packaging manufacturer, has a target ROCE of 17 per cent.

Sources: Information taken from Barratt Developments plc, 'Key performance indicator's, www.barrattdevelopments.com, accessed 16 November 2018; markets.ft.com, 'Company announcements: Vattenfall', 20 November 2017; markets.ft.com, 'Company announcements: UDG Healthcare plc', 3 July 2018; Vincent, M. (2018) 'Opening quote: Royal Mail – vote of little confidence', ft.com, 15 November; Tyman plc, 'Preliminary results for the year ended 31 December 2017, www.tymanplc.com; Ramirent plc, 'Interim Report Q3 January–September 2018'; https://assets.ctfassets.net, Countryside Properties plc, 'Annual report 2017', p.7; and Smurfit Kappa plc, 'Half year report 2018', www.businesswire.com.

Real World 3.2 provides some indication of the levels of ROCE achieved by businesses in different European countries.

Comparing profitability

Average ROCE ratios for non-financial businesses in different European countries for the five-year period ending in 2017 are shown in Figure 3.3.

The chart reveals that Spanish businesses enjoyed the highest ROCE over the five-year period.
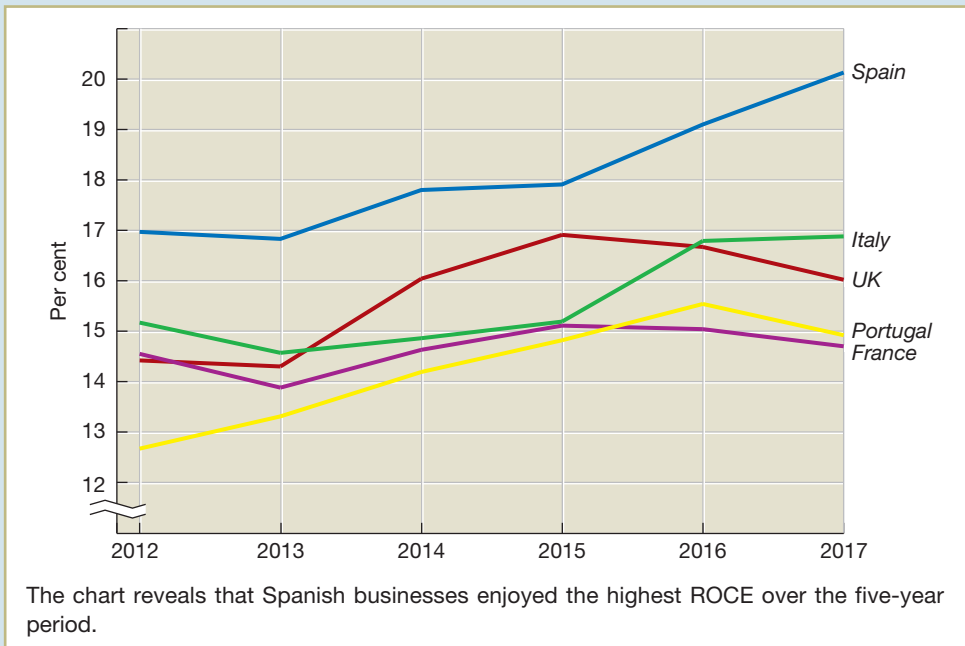
Figure 3.3 The average ROCE of companies in different European countries

Source: Figures taken from Eurostat database, 'Gross return on capital employed, before taxes, of non-financial corporations', http://ec.europa.eu/eurostat/ July 2019.

Operating profit margin

The **operating profit margin ratio** relates the operating profit for the period to the sales revenue. The ratio is expressed as follows:

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Sales revenue}} \times 100$$

Operating profit (that is, profit before interest and taxation) is used in this ratio as it represents the profit from trading operations before the interest payable expense is taken into account. It is normally the most appropriate measure of operational performance when making comparisons. This is because differences arising from the way in which the business is financed will not influence the measure.

For the year ended 31 March 2018, Alexis plc's operating profit margin ratio is:

$$\text{Operating profit margin} = \frac{243}{2{,}240} \times 100 = 10.8\%$$

This ratio compares one output of the business (operating profit) with another output (sales revenue). The ratio can vary considerably between different types of business. Supermarkets, for example, tend to operate on low prices and, therefore, low operating profit margins. This is done in an attempt to stimulate sales and thereby increase the total amount of operating profit generated. Jewellers, on the other hand, tend to have high operating profit margins but have much lower levels of sales volume. Factors such as the degree of competition, the type of customer, the economic climate and industry characteristics (such as the level of risk) will influence the operating profit margin of a business. This point is picked up again later in the chapter.

Activity 3.5

Calculate the operating profit margin for Alexis plc for the year to 31 March 2019.

The ratio for 2019 is:

$$\text{Operating profit margin} = \frac{47}{2,681} \times 100 = 1.8\%$$

Once again, this is a very weak performance compared with that of 2018. In 2018, for every £1 of sales revenue an average of 10.8p (that is, 10.8 per cent) was left as operating profit, after paying the cost of the carpets sold and other expenses of operating the business. By 2019, however, this had fallen to only 1.8p for every £1. The reason for the poor ROSF and ROCE ratios appears to have been partially, if not wholly, due to a high level of expenses relative to sales revenue. The next ratio should provide us with a clue as to how the sharp decline in this ratio occurred.

Before looking at this ratio, however, let us consider **Real World 3.3**. This sets out the target operating profit margins for some well-known car manufacturers.

Real World 3.3

Profit driven

- BMW has a target operating profit margin of between 8 and 10 per cent.
- Volvo has a target operating profit margin of 10 per cent over the business cycle.
- Nissan has a target operating profit margin of 8 per cent.
- Volkswagen has a target operating profit margin of between 6.5 and 7.5 per cent.
- Mercedes-Benz (Car division) has a target profit margin of 8–10 per cent.
- Renault has set a target operating profit margin of 7 per cent by 2022.
- Ford has a long-term target of achieving an operating profit margin of over 8 per cent.
- Audi has a target operating profit margin of 8–10 per cent.

We can see that, with the exception of Volkswagen and Renault, target operating profit margins fall within the 8 to 10 per cent range.

Sources: *BMW Motorcycle Magazine* (2018) 'BMW Earnings and profits hit record high in 2017', http://bmwmcmag.com, 12 March; Volvo Group website, www.volvogroup.com/investors, accessed 16 November 2018; Banjo, S. (2017) 'Nissan's moving targets', Bloomberg, www.bloomberg.com, 8 November; France24 (2018) 'Volkswagen profit nearly doubles in 2017', www.france24.com, 23 February; Fitch ratings (2018) 'Peer Comparisons: European Auto manufacturers – Fitch ratings', www.fitchratings.com, accessed 16 November 2018; Wadhwa, N. (2018) 'Daimler targets 9% return on sales across global markets', *Autocar Professional,* www.autocarpro.in, 5 April; Frost, L. and Guillaume, G. (2017) 'Renault pricing weakness overshadows record first half', europe.autonews.com, 28 July; Colias, M. (2018) 'Ford profit dented by swings in commodity prices', InvestorsHub, http://ih.advfn.com, 24 January; Holloway, H. (2018) 'Audi records 68% leap in profit as Dieselgate effect fades', www.autocar.uk, 15 March.

Gross profit margin

The **gross profit margin ratio** relates the gross profit of the business to the sales revenue generated for the same period. Gross profit represents the difference between sales revenue and the cost of sales. The ratio is therefore a measure of profitability in buying (or producing) and selling goods or services before any other expenses are taken into account. As cost of sales represents a major expense for many businesses, a change in this ratio can have a significant effect on the 'bottom line' (that is, the profit for the year). The gross profit margin ratio is calculated as follows:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Sales revenue}} \times 100$$

For the year to 31 March 2018, the ratio for Alexis plc is:

$$\text{Gross profit margin} = \frac{495}{2,240} \times 100 = 22.1\%$$

Activity 3.6

Calculate the gross profit margin for Alexis plc for the year to 31 March 2019.

The ratio for 2019 is:

$$\text{Gross profit margin} = \frac{409}{2,681} \times 100 = 15.3\%$$

The decline in this ratio means that gross profit was lower relative to sales revenue in 2019 than it had been in 2018. Bearing in mind that:

$$\text{Gross profit} = \text{Sales revenue} - \text{Cost of sales (or cost of goods sold)}$$

this means that cost of sales was higher relative to sales revenue in 2019 than in 2018. This could mean that sales prices were lower and/or that the purchase cost of carpets sold had increased. It is possible that both sales prices and purchase costs had reduced, but the former at a greater rate than the latter. Similarly, they may both have increased, but with sales prices having increased at a lesser rate than the cost of the carpets.

Clearly, part of the decline in the operating profit margin ratio is linked to the dramatic decline in the gross profit margin ratio. Whereas, after paying for the carpets sold, for each £1 of sales revenue 22.1p was left to cover other operating expenses in 2018, this was only 15.3p in 2019.

The profitability ratios for the business over the two years can be set out as follows:

	2018	2019
	%	%
ROSF	33.0	2.0
ROCE	34.7	5.9
Operating profit margin	10.8	1.8
Gross profit margin	22.1	15.3

What do you deduce from a comparison of the declines in the operating profit and gross profit margin ratios?

We can see that the decline in the operating profit margin was 9 percentage points (that is, from 10.8 per cent to 1.8 per cent), whereas that of the gross profit margin was only 6.8 percentage points (that is, from 22.1 per cent to 15.3 per cent). This can only mean that operating expenses were greater, compared with sales revenue in 2019, than they had been in 2018. The decline in both ROSF and ROCE was caused partly, therefore, by the business incurring higher inventories purchasing costs relative to sales revenue and partly through higher operating expenses compared with sales revenue. We need to compare each of these ratios with their planned level, however, before we can usefully assess the business's success.

An investigation is needed to discover what caused the increases in both cost of sales and operating expenses, relative to sales revenue, from 2018 to 2019. This will involve checking to see what happened with sales prices and inventories costs over the two years. It will also involve looking at each of the individual operating expenses to discover which were responsible for the increase, relative to sales revenue. Here, further ratios, such as employee expenses (wages and salaries) to sales revenue, should be calculated to isolate the cause of the change from 2018 to 2019. As mentioned earlier, the increase in employee numbers may well account for most of the increase in operating expenses.

Real World 3.4 shows how Next plc, the fashion and home furnishing retailer, analyses its operating profit margin to detect the cause of changes occurring over the year. This analysis takes account of the impact of movements in the gross profit margin.

Real World 3.4

Operating at the margin

For the year ended January 2018, the retail division of Next had an operating profit margin of 12.7% compared to the 15.3% for the previous year. The table below sets out the reasons for the fall in the margin.

Net operating margin on total sales last year – restated	15.3
Bought-in gross margin	
Improved underlying bought-in gross margin has added +0.1% to margin.	+0.1%
Markdown	
Stock for Sale was down −9% with markdown sales down −15.5%. Reduced clearance rates lowered margin by −0.3%.	−0.3%
Stock loss	
The Sterling value of branch stock loss was in line with last year, but as a result of falling sales, was a larger percentage of turnover.	−0.1%
Store payroll	
Productivity initiatives more than offset increases in rates of pay.	+0.2%

Store occupancy	
Falling sales increased fixed costs as a percentage of sales. Underlying rental inflation was negligible at 0.4%	−1.7%
Warehouse & distribution	
Falling sales increased fixed costs as a percentage of sales; this has been partially offset by cost saving initiatives in our distribution network.	−0.2%
Central overheads	
Central overheads increased as a percentage of sales.	−0.6%
Net operating margin on total sales this year	12.7%

Source: Next plc, 'Results for the year ended January 2018', p. 7, www.nextplc.co.uk.

The profitability ratios discussed above are summarised in Figure 3.4.
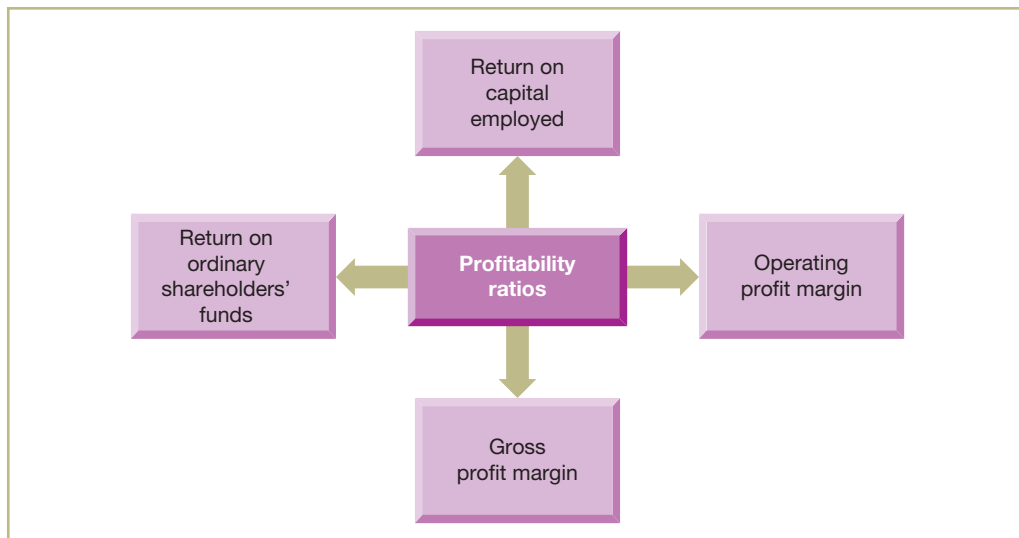
Figure 3.4 Profitability ratios

EFFICIENCY

Efficiency ratios are used to try to assess how successfully the various resources of the business are managed. The following ratios examine some of the more important aspects of resource management:

- average inventories turnover period
- average settlement period for trade receivables
- average settlement period for trade payables
- sales revenue to capital employed
- sales revenue per employee.

We shall now look at each of these in turn.

Average inventories turnover period

Inventories often represent a significant investment for a business. For some types of business (for example, manufacturers and certain retailers), inventories may account for a substantial proportion of the total assets held (see Real World 10.1, p. 444). The **average inventories turnover period ratio** measures the average period for which inventories are being held. The ratio is calculated as follows:

$$\text{Average inventories turnover period} = \frac{\text{Average inventories held}}{\text{Cost of sales}} \times 365$$

The average inventories for the period can be calculated as a simple average of the opening and closing inventories levels for the year. In the case of a highly seasonal business, however, where inventories levels may vary greatly over the year, a monthly average would be better. Such information may not, however, be available. This point concerning monthly averaging is equally relevant to any asset or claim that varies over the reporting period and would include trade receivables and trade payables.

In the case of Alexis plc, the average inventories turnover period for the year ending 31 March 2018 is:

$$\text{Average inventories turnover period} = \frac{(241 + 300)/2}{1,745} \times 365 = 56.6 \text{ days}$$

(The opening inventories figure was taken from Note 3 to the financial statements.)

This means that, on average, the inventories held are being 'turned over' every 56.6 days. So, a carpet bought by the business on a particular day would, on average, have been sold about eight weeks later. A business will normally prefer a short inventories turnover period to a long one, because holding inventories incurs costs, such as the opportunity cost of the funds tied up. When judging the amount of inventories to carry, the business must consider such things as likely sales demand, the possibility of supply shortages, the likelihood of price rises, the storage space available and their perishability and/or susceptibility to obsolescence.

This ratio is sometimes expressed in terms of weeks or months rather than days: multiplying by 52 or 12, rather than 365, will achieve this.

Activity 3.8

Calculate the average inventories turnover period for Alexis plc for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{Average inventories turnover period} = \frac{(300 + 406)/2}{2,272} \times 365 = 56.7 \text{ days}$$

We can see that the inventories turnover period is virtually the same in both years.

Average settlement period for trade receivables

Selling on credit is the norm for most businesses, except for retailers. Thus, trade receivables must be accepted as a necessary evil. A business will naturally be concerned with the amount of funds tied up in trade receivables and try to keep this to a minimum. The speed of payment

can have a significant effect on the business's cash flow. The **average settlement period for trade receivables ratio** calculates how long, on average, credit customers take to pay the amounts that they owe to the business. The ratio is as follows:

$$\text{Average settlement period for trade receivables} = \frac{\text{Average trade receivables}}{\text{Credit sales revenue}} \times 365$$

A business will normally prefer a shorter average settlement period to a longer one as, once again, funds are being tied up that may be used for more profitable purposes. Although this ratio can be useful, it is important to remember that it produces an *average* figure for the number of days for which debts are outstanding. This average may be badly distorted by, for example, a few large customers who are very slow or very fast payers.

Since all sales made by Alexis plc are on credit, the average settlement period for trade receivables for the year ended 31 March 2018 is:

$$\text{Average settlement period for trade receivables} = \frac{(223 + 240)/2}{2,240} \times 365 = 37.7 \text{ days}$$

(The opening trade receivables figure was taken from Note 4 to the financial statements.)

Activity 3.9

Calculate the average settlement period for Alexis plc's trade receivables for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{Average settlement period for trade receivables} = \frac{(240 + 273)/2}{2,681} \times 365 = 34.9 \text{ days}$$

On the face of it, this reduction in the settlement period is welcome. It means that less cash was tied up in trade receivables for each £1 of sales revenue in 2019 than in 2018. Only if the reduction were achieved at the expense of customer goodwill or through high out-of-pocket cost might its desirability be questioned. For example, the reduction may have been due to chasing customers too vigorously or to giving large discounts to customers for prompt payment.

Average settlement period for trade payables

The **average settlement period for trade payables ratio** measures how long, on average, the business takes to pay those who have supplied goods and services on credit. The ratio is calculated as follows:

$$\text{Average settlement period for trade payables} = \frac{\text{Average trade payables}}{\text{Credit purchases}} \times 365$$

This ratio provides an average figure, which, like the average settlement period for trade receivables ratio, can be distorted by the payment period for one or two large suppliers.

As trade payables provide a free source of finance for a business, it is not surprising that some businesses attempt to increase their average settlement period for trade payables. Such a policy can be taken too far, however, and result in a loss of supplier goodwill.

For the year ended 31 March 2018, Alexis plc's average settlement period for trade payables is:

$$\text{Average settlement period for trade payables} = \frac{(183 + 261)/2}{1{,}804} \times 365 = 44.9 \text{ days}$$

(The opening trade payables figure was taken from Note 4 to the financial statements and the purchases figure from Note 3.)

There was an increase between 2018 and 2019 in the average length of time that elapsed between buying goods and services and paying for them. On the face of it, this is beneficial because the business is using free finance provided by suppliers. This may not be so, however, where it results in a loss of supplier goodwill and Alexis plc suffers adverse consequences.

Slow settlement of amounts owed to suppliers is a persistent problem across the world. **Real World 3.5** discusses the results of a survey which reveals that this problem appears to be getting worse.

Real World 3.5

Slow and getting slower

Companies around the world are taking longer to collect payments from customers, leading to a growing risk that they could hit trouble as the global economy slows. Research from trade credit insurer Euler Hermes shows that companies are accepting much longer payment terms from their customers than they were a decade ago. The average global days sales outstanding, or the number of days it takes for suppliers to be paid for their goods or services, has grown by one-tenth since 2008 to 66 days and is likely to increase again this year.

Ludovic Subran, chief economist at Euler Hermes, said the trend increases the risk of insolvencies: 'This is one of the dark sides of the recovery. Companies are extending a lot of trust in the way that clients pay them – it is a loosening of discipline.' He added: 'The longer you wait, the more the risk that your clients hit trouble. When there is a cyclical downturn the companies with longer payment terms are those that get hit first.' One in four insolvencies, said Mr Subran, is because of non-payment from customers. The global days' sales outstanding figure increased by 2 days last year, and the increase was widespread. It grew in two out of three countries, and in two out of three sectors. The increases were sharpest in the US, China and the Eurozone, where Spain, Portugal, Greece and the Netherlands stood out as registering particularly large rises in days sales outstanding.

Euler Hermes looked at 25,000 listed companies in 36 countries. The research reveals sharp differences in payment behaviour around the world. Companies in China have to wait an average of 92 days to be paid by their customers while Turkey and Greece also registered high scores. Companies in New Zealand only have to wait for 43 days on average, while South Africa, Denmark and Austria also recorded low numbers. 'Companies are using this

Sales revenue to capital employed

The **sales revenue to capital employed ratio** (or net asset turnover ratio) examines how effectively the assets of the business are being used to generate sales revenue. It is calculated as follows:

$$\text{Sales revenue to capital employed ratio} = \frac{\text{Sales revenue}}{\text{Share capital} + \text{Reserves} + \text{Non-current liabilities}}$$

Generally speaking, a higher sales revenue to capital employed ratio is preferred to a lower one. A higher ratio will normally suggest that assets are being used more productively in the generation of revenue. A very high ratio, however, may suggest that the business is 'overtrad-ing on its assets'; in other words, it has insufficient assets to sustain the level of sales revenue achieved. We shall take a longer look at overtrading later in the chapter.

When comparing this ratio for different businesses, factors such as the age and condition of assets held, the valuation bases for assets and whether assets are leased or owned outright can complicate interpretation.

A variation of this formula is to use the total assets less current liabilities (which is equiva-lent to long-term capital employed) in the denominator (lower part of the fraction). An identical result is obtained.

For the year ended 31 March 2018, this ratio for Alexis plc is:

$$\text{Sales revenue to capital employed} = \frac{2{,}240}{(638 + 763)/2} = 3.20 \text{ times}$$

Activity 3.11

Calculate the sales revenue to capital employed ratio for Alexis plc for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{Sales revenue to capital employed} = \frac{2{,}681}{(763 + 834)/2} = 3.36 \text{ times}$$

This seems to be an improvement, since in 2019 more sales revenue was being gener-ated for each £1 of capital employed (£3.36) than was the case in 2018 (£3.20). Provided that

overtrading is not an issue, and that the additional sales generate an acceptable profit, this is to be welcomed.

Sales revenue per employee

The **sales revenue per employee ratio** relates sales revenue generated during a reporting period to a particular business resource, that is, labour. It provides a measure of the productivity of the workforce. The ratio is:

$$\text{Sales revenue per employee} = \frac{\text{Sales revenue}}{\text{Number of employees}}$$

Generally, businesses would prefer a high value for this ratio, implying that they are deploying their workforce efficiently.

For the year ended 31 March 2018, the ratio for Alexis plc is:

$$\text{Sales revenue per employee} = \frac{£2,240m}{13,995} = £160,057$$

Activity 3.12

Calculate the sales revenue per employee for Alexis plc for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{Sales revenue per employee} = \frac{£2,681m}{18,623} = £143,962$$

This represents a fairly significant decline, which merits further investigation. As mentioned previously, the number of employees increased significantly (by about 33 per cent) during 2019. We need to know why this has not generated sufficient additional sales revenue to maintain the ratio at its 2018 level. It may be because the extra employees were not appointed until late in the year ended 31 March 2019.

The efficiency, or activity, ratios may be summarised as follows:

	2018	2019
Average inventories turnover period	56.6 days	56.7 days
Average settlement period for trade receivables	37.7 days	34.9 days
Average settlement period for trade payables	44.9 days	47.2 days
Sales revenue to capital employed (net asset turnover)	3.20 times	3.36 times
Sales revenue per employee	£160,057	£143,962

What do you deduce from a comparison of the efficiency ratios over the two years?

Maintaining the inventories turnover period at the 2018 level might be reasonable, although we need to know the planned inventories period to make a proper assessment. The inventories turnover period for other businesses operating in carpet retailing, particularly those regarded as the market leaders, may have been helpful in formulating the plans. On the face of it, a shorter trade receivables settlement period and a longer trade payables settlement period are both desirable. However, these may have been achieved at the cost of a loss of goodwill among customers and suppliers respectively. The increased sales revenue to capital employed ratio seems beneficial, provided that the business can manage this increase. The decline in the sales revenue per employee ratio is undesirable but is probably related to the dramatic increase in the number of employees. As with the inventories turnover period, these other ratios need to be compared with planned, or target, ratios.

Figure 3.5 summaries the efficiency ratios that we have discussed.
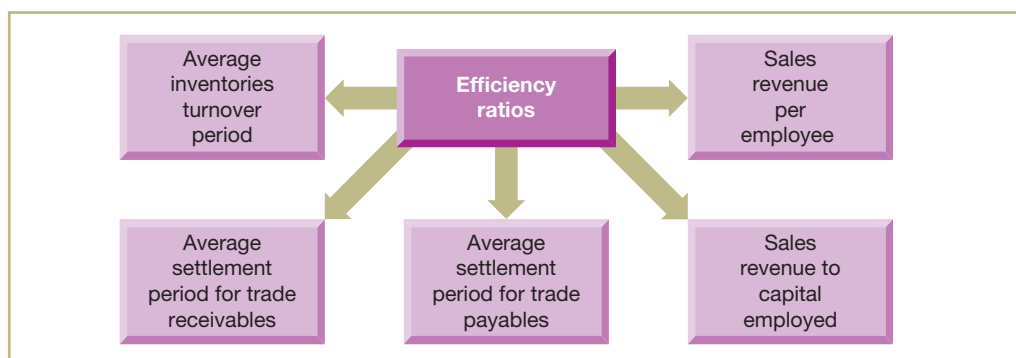
Figure 3.5 Efficiency ratios

RELATIONSHIP BETWEEN PROFITABILITY AND EFFICIENCY

In our earlier discussions concerning profitability ratios, we saw that return on capital employed is regarded as a key ratio by many businesses. The ratio is:

$$\text{ROCE} = \frac{\text{Operating profit}}{\text{Long-term capital employed}} \times 100$$

where long-term capital comprises share capital plus reserves plus non-current liabilities. This ratio can be broken down into two elements, as shown in Figure 3.6. The first ratio is the operating profit margin ratio and the second is the sales revenue to capital employed (net asset turnover) ratio, both of which we discussed earlier.

The ROCE ratio can be divided into two elements: operating profit to sales revenue and sales revenue to capital employed. By analysing ROCE in this way, we can see the influence of both profitability and efficiency on this important ratio.
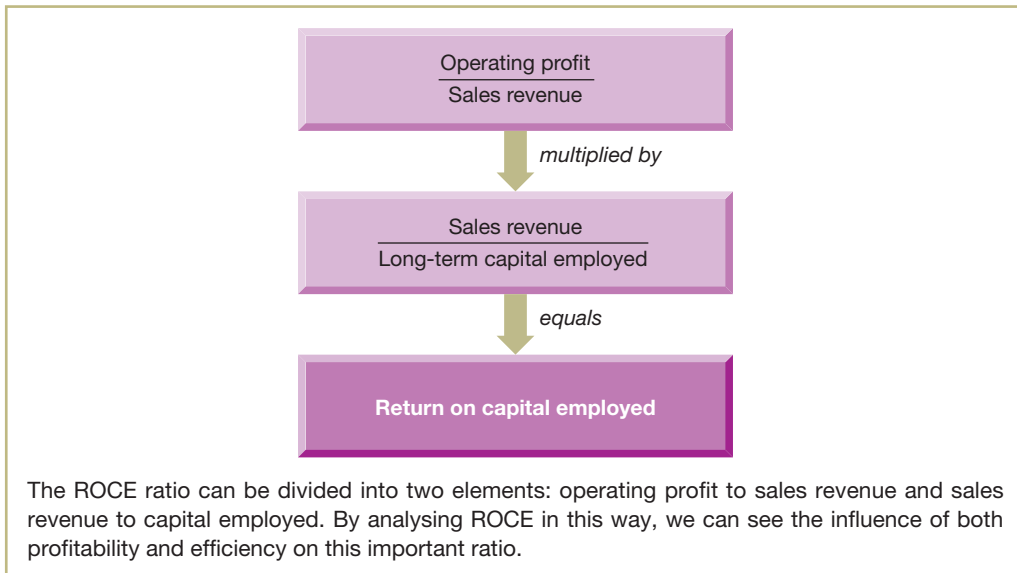
Figure 3.6 The main elements of the ROCE ratio

Source: Atrill, P. and McLaney, E. (2010) Accounting and Finance for Non-specialists, 7th edn, Pearson Education.

By breaking down the ROCE ratio in this way, we highlight the fact that the overall return on funds employed will be determined both by the profitability of sales and by efficiency in the use of capital.

Example 3.2 looks at the return on capital of two different businesses operating in the same industry.

Example 3.2

Consider the following information, for last year, concerning two different businesses operating in the same industry:

	Antler plc £m	Baker plc £m
Operating profit	20	15
Average long-term capital employed	100	75
Sales revenue	200	300

The ROCE for each business is identical (20 per cent). However, the manner in which that return was achieved by each business was quite different. In the case of Antler plc, the operating profit margin is 10 per cent and the sales revenue to capital employed ratio is 2 times (so ROCE = 10% × 2 = 20%). In the case of Baker plc, the operating profit margin is 5 per cent and the sales revenue to capital employed ratio is 4 times (and so ROCE = 5% × 4 = 20%).

Example 3.2 demonstrates that a relatively high sales revenue to capital employed ratio can compensate for a relatively low operating profit margin. Similarly, a relatively low sales revenue to capital employed ratio can be overcome by a relatively high operating profit margin. In many areas of retail and distribution (for example, supermarkets and delivery services), operating profit margins are quite low, but the ROCE can be high, provided that the assets are used productively (that is, low margin, high sales revenue to capital employed).

Activity 3.14

Show how the ROCE ratio for Alexis plc can be analysed into the two elements for each of the years 2018 and 2019. What conclusions can you draw from your figures?

	ROCE	=	Operating profit margin	×	Sales revenue to capital employed
2018	34.7%		10.8%		3.20
2019	5.9%		1.8%		3.36

As we can see, the relationship between the three ratios holds for Alexis plc for both years. (The small apparent differences are simply because the three ratios are stated here only to one or two decimal places.)

In 2019, the business was more effective at generating sales revenue (sales revenue to capital employed ratio increased). However, it fell below the level needed to compensate for the sharp decline in the profitability of sales (operating profit margin). As a result, the 2019 ROCE was well below the 2018 value.

LIQUIDITY

Liquidity ratios are concerned with the ability of the business to meet its short-term financial obligations. The following ratios are widely used:

- current ratio
- acid test ratio.

Let us now consider these two ratios.

Current ratio

The **current ratio** compares the 'liquid' assets (that is, cash and those assets held that will soon be turned into cash) with the current liabilities. The ratio is calculated as follows:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

There seems to be a belief that there is an 'ideal' current ratio (usually 2 times or 2:1) for all businesses. However, this is not the case. Different types of business require different current ratios. A manufacturing business, for example, will often have a relatively high current ratio because it has to hold inventories of finished goods, raw materials and work in progress. It will also sell goods on credit, thereby giving rise to trade receivables. A supermarket chain, meanwhile, will have a relatively low ratio, as it will hold only fast-moving inventories of finished goods and its sales will be for cash rather than on credit.

The higher the current ratio, the more liquid the business is considered to be. As liquidity is vital to the survival of a business, a higher current ratio might be thought to be preferable to a lower one. If a business has a very high ratio, however, it may indicate that excessive funds are tied up in cash, or other liquid assets, rather than being employed more productively.

As at 31 March 2018, the current ratio of Alexis plc is:

$$\text{Current ratio} = \frac{544}{291} = 1.9 \text{ times (or 1.9:1)}$$

Activity 3.15

Calculate the current ratio for Alexis plc as at 31 March 2019.

The ratio as at 31 March 2019 is:

$$\text{Current ratio} = \frac{679}{432} = 1.6 \text{ times (or 1.6:1)}$$

Although there is a decline from 2018 to 2019, this need not be cause for concern. The next ratio may provide a clue as to whether there seems to be a problem.

Acid test ratio

The **acid test ratio** is similar to the current ratio but provides a more stringent test of liquidity. For many businesses, inventories cannot be converted into cash quickly. (Note that, in the case of Alexis plc, the inventories turnover period was about 57 days in both years (see p. 104).) As a result, there is a good case for excluding this particular asset.

The acid test ratio is calculated as follows:

$$\text{Acid test ratio} = \frac{\text{Current assets (excluding inventories)}}{\text{Current liabilities}}$$

The acid test ratio for Alexis plc as at 31 March 2018 is:

$$\text{Acid test ratio} = \frac{544 - 300}{291} = 0.8 \text{ times (or 0.8:1)}$$

We can see that the 'liquid' current assets do not quite cover the current liabilities, so the business may be experiencing some liquidity problems.

Activity 3.16

Calculate the acid test ratio for Alexis plc as at 31 March 2019.

The ratio as at 31 March 2019 is:

$$\text{Acid test ratio} = \frac{679 - 406}{432} = 0.6 \text{ times}$$

The 2019 ratio is significantly below that for 2018. The 2019 level may well be a source of concern. The rapid decline in this ratio should be investigated and, if necessary, corrective action taken.

The minimum level for this ratio is often stated as 1.0 times (or 1:1). For many highly successful businesses, however, it is not unusual for the acid test ratio to be below 1.0 without causing liquidity problems.

The liquidity ratios for the two-year period may be summarised as follows:

	2018	*2019*
Current ratio	1.9 times	1.6 times
Acid test ratio	0.8 times	0.6 times

Activity 3.17

What do you deduce from the liquidity ratios set out above?

Both ratios indicate a decline in liquidity from 2018 to 2019. This decline, however, may be planned, short-term and linked to the increase in non-current assets and the number of employees. When the benefits of the expansion come on stream, liquidity may improve. On the other hand, short-term lenders and suppliers may become anxious when they see signs of weak liquidity. This could lead them to press for payment, which could cause problems for Alexis plc.

The liquidity ratios that we have discussed are summarised in Figure 3.7.
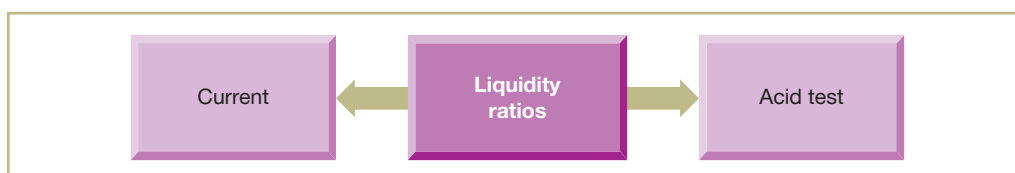
Figure 3.7 Liquidity ratios

FINANCIAL GEARING

Financial gearing occurs where there is borrowing within the capital structure of a business. We saw in Chapter 2 how the existence of financial gearing can affect the risks and returns to ordinary shareholders. In order to measure the level of gearing, two ratios are widely used. They are as follows:

- gearing ratio
- interest cover ratio.

Both of these are discussed below.

Gearing ratio

The **gearing ratio** measures the contribution of long-term lenders to the long-term capital structure of a business.

$$\text{Gearing ratio} = \frac{\text{Long-term (non-current) liabilities}}{\text{Share capital} + \text{Reserves} + \text{Long-term (non-current) liabilities}} \times 100$$

The gearing ratio for Alexis plc, as at 31 March 2018, is:

$$\text{Gearing ratio} = \frac{200}{(563 + 200)} \times 100 = 26.2\%$$

This is a level of gearing that would not normally be considered to be very high.

Activity 3.18

Calculate the gearing ratio of Alexis plc as at 31 March 2019.

The ratio as at 31 March 2019 is:

$$\text{Gearing ratio} = \frac{300}{(534 + 300)} \times 100 = 36.0\%$$

This is a substantial increase in the level of gearing over the year.

Interest cover ratio

The **interest cover ratio** measures the amount of operating profit available to cover interest payable. The ratio may be calculated as follows:

$$\textbf{Interest cover ratio} = \frac{\textbf{Operating profit}}{\textbf{Interest payable}}$$

The ratio for Alexis plc for the year ended 31 March 2018 is:

$$\text{Interest cover ratio} = \frac{243}{18} = 13.5 \text{ times}$$

This ratio shows that the level of operating profit is considerably higher than the level of interest payable. This means that a large fall in operating profit could occur before operating profit levels failed to cover interest payable. The lower the level of operating profit coverage, the greater the risk to lenders that interest payments will not be met. There will also be a greater risk to the shareholders that lenders will take action to recover the interest due.

Activity 3.19

Calculate the interest cover ratio of Alexis plc for the year ended 31 March 2019.

The ratio for the year ended 31 March 2019 is:

$$\text{Interest cover ratio} = \frac{47}{32} = 1.5 \text{ times}$$

Interest cover ratios vary considerably between industries. They also vary between companies within the same industry. **Real World 3.6** reveals the average interest cover ratios for different US industries.

Cover up

Figure 3.8 sets out the average interest cover ratios for US-listed businesses within different industry sectors.
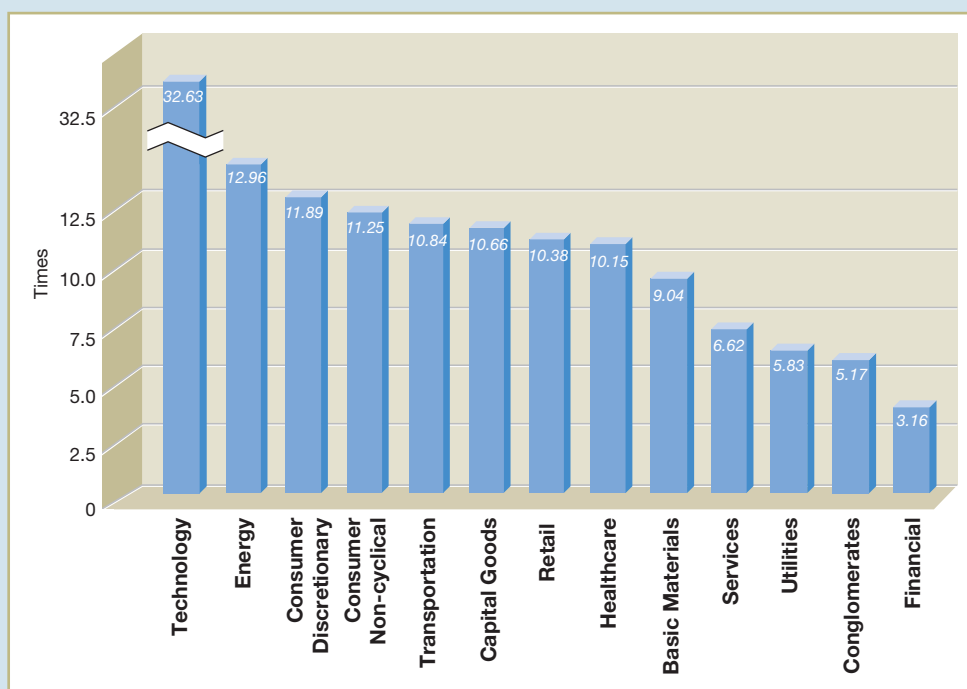
Figure 3.8 Average interest cover ratios for US industries

We can see that this ratio varies significantly between industries.

Source: Diagram compiled from information in CSIMarket.com, 'Interest coverage screening', https://csimarket.com/screening/, accessed 13 December 2018.

Alexis plc's gearing ratios are:

	2018	*2019*
Gearing ratio	26.2%	36.0%
Interest cover ratio	13.5 times	1.5 times

Activity 3.20

What do you deduce from a comparison of Alexis plc's gearing ratios over the two years?

The gearing ratio has changed significantly. This is mainly due to the substantial increase in the contribution of long-term lenders to financing the business. The gearing ratio at 31 March 2019 would not necessarily be considered to be very high for a business that was trading successfully. It is the low profitability that is the problem.

The interest cover ratio has declined dramatically from 13.5 times in 2018 to 1.5 times in 2019. This was partly caused by the increase in borrowings in 2019, but was mainly caused by the dramatic decline in profitability in that year. The situation in 2019 looks hazardous. Only a small decline in future operating profit would leave the business unable to cover its interest payments.

Without knowing the planned ratios, it is not possible to reach a firm conclusion on Alexis plc's gearing.

Figure 3.9 shows the gearing ratios that we considered.
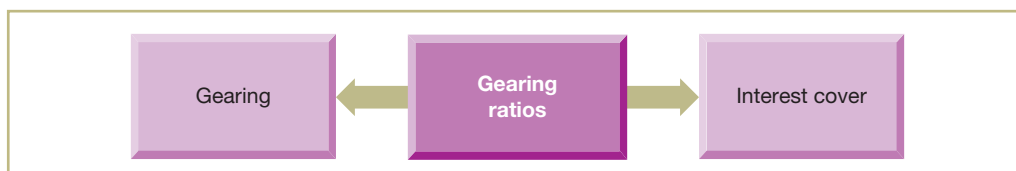
Figure 3.9 Gearing ratios

INVESTMENT RATIOS

Various ratios are available to help shareholders assess the returns on their investment. The following are widely used:

- dividend payout ratio
- dividend yield ratio
- earnings per share
- price/earnings ratio.

We shall look at each of these in turn.

Dividend payout ratio

The **dividend payout ratio** measures the proportion of earnings that a business pays out to shareholders in the form of dividends. The ratio is calculated as follows:

$$\text{Dividend payout ratio} = \frac{\text{Dividends announced for the year}}{\text{Earnings for the year available for dividends}} \times 100$$

In the case of ordinary shares, the earnings available for dividend will normally be the profit for the year (that is, the profit after taxation) less any preference dividends relating to the year. This ratio is normally expressed as a percentage.

The dividend payout ratio for Alexis plc for the year ended 31 March 2018 is:

$$\text{Dividend payout ratio} = \frac{40}{165} \times 100 = 24.2\%$$

Calculate the dividend payout ratio of Alexis plc for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{Dividend payout ratio} = \frac{40}{11} \times 100 = 363\%$$

This reveals an alarming increase in the ratio over the two years. Paying a dividend of £40 million in 2019 appears to be very imprudent.

The information provided by the above ratio is often expressed slightly differently as the **dividend cover ratio**. Here the calculation is:

$$\text{Dividend cover ratio} = \frac{\text{Earnings for the year available for dividends}}{\text{Dividends announced for the year}}$$

For 2018, the ratio for Alexis plc would be $165/40 = 4.1$ times. That is to say, the earnings available for dividend cover the actual dividend paid by just over four times. For 2019, the ratio is $11/40 = 0.3$ times.

Real World 3.7 discusses how recent dividend payout (or cover) ratios for many UK listed businesses may be unsustainable.

Real World 3.7

Time to run for cover

Investors should proceed with caution when buying UK income stocks, as the high dividends they offer may be unsustainable, according to broker AJ Bell. Many of these stocks are not on track to generate enough revenue to cover their dividends more than two times over, which analysts cite as the ideal minimum level. This means that if those stocks run into trouble this year, investors could see their dividends cut too. According to AJ Bell, earnings cover improved over the first quarter of 2018 but remains at an average of 1.71 times, meaning companies could not pay out their planned dividends more than 1.71 times from current earnings. At the end of 2017, cover had been even more precarious, at a level of 1.63 times. AJ Bell said: 'Dividends cover of around 1.5 is less than ideal because it means a company has less room for manoeuvre if profits fall in one year. It will then need to decide whether to reduce its dividend, stop reinvesting in the business or take on more debt.'

Dividend yield ratio

The **dividend yield ratio** relates the cash return from a share to its current market value. This can help investors to assess the cash return on their investment in the business. The ratio, expressed as a percentage, is:

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market value per share}} \times 100$$

The dividend yield for Alexis plc for the year ended 31 March 2018 is:

$$\text{Dividend yield} = \frac{0.067^*}{2.50} \times 100 = 2.7\%$$

*Dividend proposed/number of shares = 40/(300 × 2) = £0.067 dividend per share (the 300 is multiplied by 2 because they are £0.50 shares).

The shares' market value is given in Note 1 to Example 3.1 (p. 94).

Earnings per share

The **earnings per share (EPS) ratio** relates the earnings generated by the business, and available to shareholders, during a period to the number of shares in issue. For equity (ordinary) shareholders, the amount available will be represented by the profit for the year (profit after taxation) less any preference dividend, where applicable. The ratio for equity shareholders is calculated as follows:

$$\text{Earnings per share} = \frac{\text{Earnings available to ordinary shareholders}}{\text{Number of ordinary shares in issue}}$$

$$\text{EPS} = \frac{£165m}{600m} = 27.5p$$

Many investment analysts regard the EPS ratio as a fundamental measure of share performance. The trend in earnings per share over time is used to help assess the investment potential of a business's shares. Although it is possible to make total profit increase through ordinary shareholders investing more in the business, this will not necessarily lead to an increase in the profitability *per share.*

Real World 3.8 points out the danger of placing too much emphasis on this ratio. The equity fund manager, Terry Smith, argues that, had more attention been paid to ROCE rather than EPS, investors would have spotted that all was not well with Tesco plc, the supermarket giant. He also takes to task, Warren Buffett, the legendary investor, for ignoring his own advice and investing heavily in the business.

Real World 3.8

A trolley load of problems

In his 1979 letter to shareholders, Mr Buffett stated: 'The primary test of managerial economic performance is the achievement of a high earnings rate on equity capital employed (without undue gearing, accounting gimmickry, etc) and not the achievement of consistent gains in earnings per share.'

This makes it all the more surprising to me that both Mr Buffett and the many acolytes who have seemingly followed him to the gates of hell in Tesco, ignored this chart [reproduced as Figure 3.10]:
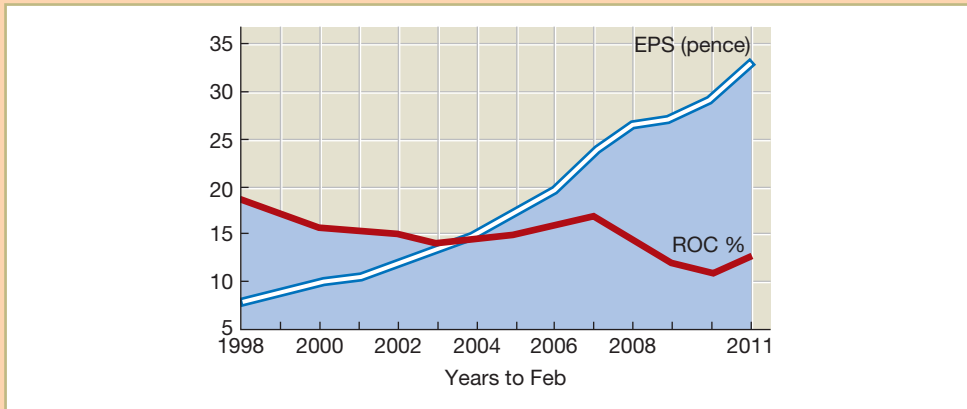
Figure 3.10 Tesco: The Leahy years

This is not the first such chart that I have come across in which a company reports steadily rising earnings per share (EPS), on which most analysts and 'investors' focus. For them, the rise in EPS seems to have a mesmeric effect like Kaa the snake in *The Jungle Book*. But they ignore the point that more capital is being employed to generate those earnings at ever lower returns. Add in the fact that Tesco has changed its definition of return on capital employed (ROCE) eight times during those years, and there's more than enough material to send investors running for cover – even those who have less aversion than I do to retailers.

Yet much of the commentary about what has gone wrong at Tesco focuses on Philip Clarke, who took over as chief executive from Sir Terry Leahy in 2011, as if everything was going swimmingly until then. Looking at the ROCE line in the chart it is clear that this was not the case.

Moreover, one thing to bear in mind is that if Tesco's ROCE during the Leahy years fell from a very good 19 per cent to a less than adequate 10 per cent, this is an average of returns on capital employed, which includes both capital invested years ago and more recent commitments. To drag the average ROCE down so dramatically it is likely that returns on new investments in those years were not just inadequate, but in some cases negative – as the ill-starred US expansion proved to be.

Even if return on capital employed does not have the same importance for you as it does for me, or Mr Buffett (at least in 1979), consider this: in 14 of the past 18 years (taking us back to 1997 when Sir Terry became chief executive) Tesco's free cash flow less its dividend (with free cash defined as operating cash flow less gross capital expenditure) was a negative number. In plain English, Tesco was not generating enough cash both to invest and to pay its dividend. In half of those 14 years, the proceeds of fixed asset disposals took the numbers back into the black, but that is not exactly a sustainable source of financing.

So, guess what they did instead? Yes, they borrowed it. Tesco's gross debt, which was £894 million when Sir Terry took over, peaked at nearly £15.9 billion in 2009. The company spent much of its free cash on fixed-asset investment and raised debt to help pay the dividend. This is neither healthy nor sustainable, as investors in Tesco have now come to realise.

The concept that this might not be sustainable hardly requires much thought. Neither does charting the ROCE versus the growth in EPS. Yet it is evident that many investors, including it seems Mr Buffett (who has been trimming his Tesco stake in recent years) either didn't do this or ignored the results if they did. It makes me wonder what else they are ignoring.

Calculate the earnings per share of Alexis plc for the year ended 31 March 2019.

The ratio for 2019 is:

$$\text{EPS} = \frac{£11m}{600m} = 1.8p$$

It is not usually very helpful to compare the EPS of one business with that of another. Differences in financing arrangements (for example, in the nominal value of shares issued) can render any such comparison meaningless. However, it can be very useful to monitor the changes that occur in this ratio for a particular business over time.

Price/earnings (P/E) ratio

The **price/earnings (P/E) ratio** relates the market value of a share to the earnings per share. This ratio can be calculated as follows:

$$\text{P/E ratio} = \frac{\textbf{Market value per share}}{\textbf{Earnings per share}}$$

The P/E ratio for Alexis plc as at 31 March 2018 is:

$$\text{P/E ratio} = \frac{£2.50}{27.5p^*} = 9.1 \text{ times}$$

* The EPS figure (27.5p) was calculated above.

This ratio indicates that the market value of the share is 9.1 times higher than its current level of earnings. It is a measure of market confidence in the future of a business. The higher the P/E ratio, the greater the confidence in the future earning power of the business and, consequently, the more investors are prepared to pay in relation to that current earning power.

Calculate the P/E ratio of Alexis plc as at 31 March 2019.

The ratio as of 31 March 2019 is:

$$\text{P/E ratio} = \frac{£1.50}{1.8p} = 83.3 \text{ times}$$

As P/E ratios provide a useful guide to market confidence about the future, they can be helpful when comparing different businesses. However, differences in accounting policies between businesses can lead to different profit and earnings per share figures. This can distort comparisons.

The investment ratios for Alexis plc over the two-year period are as follows:

	2018	2019
Dividend payout ratio	24.2%	363.6%
Dividend yield ratio	2.7%	4.5%
Earnings per share	27.5p	1.8p
Cash generated from operations per share	41.8p	5.7p
P/E ratio	9.1 times	83.3 times

What do you deduce from the investment ratios set out above? Can you explain why the share price has not fallen as much as it might have done, bearing in mind the much poorer trading performance in 2019?

Although the EPS has fallen dramatically and the dividend payment for 2019 seems very imprudent, the share price has held up reasonably well (fallen from £2.50 to £1.50). Moreover, the dividend yield and P/E ratios have improved in 2019. This is an anomaly of these two ratios, which stems from using a forward-looking value (the share price) in conjunction with historic data (dividends and earnings). Share prices are based on investors' assessments of the business's future. It seems that 'the market' was less happy with Alexis plc at the end of 2019 than at the end of 2018. This is evidenced by the fact that the share price had fallen by £1 a share.

The decline in share price, however, was less dramatic than the decline in profit for the year. This suggests that investors believe that the business will perform better in the future. Perhaps they are confident that the large increase in assets and employee numbers occurring in 2019 will yield benefits in the future: benefits that the business was not able to generate during 2019.

Real World 3.9 provides information about the share performance of a selection of large, well-known UK businesses. This type of information is provided on a daily basis by several newspapers, notably the *Financial Times*.

Real World 3.9

Market statistics for some well-known businesses

The following data was extracted from the *Financial Times* of 7 March 2019, relating to the previous day's trading of the shares of some well-known businesses on the London Stock Exchange:

Share	Price (pence)	Chng (pence)	52 Week High/Low		Yld %	P/E	Volume 000s
Marks and Spencer	279.30	2.50	316.60	240.00	6.70	155.17	8,460.9
Royal Mail	265.60	−2.60	632.60	246.60	9.04	28.87	7,418.0
National Express	433.20	3.00	438.00	356.00	3.12	16.12	535.6
Tesco	232.30	0.40	266.80	187.05	1.29	20.52	18,862.5
Coca Cola HBC AG	2582	−16.00	2817	2224	1.85	23.74	709.0
National Grid	846.30	−3.70	895.10	742.00	5.43	8.61	5,974.5

The column headings are as follows:

	Mid-market price in pence (that is, the price midway between buying and selling price) of the shares at the end of trading on 6 March 2019
Chng	Gain or loss in the mid-market price during 6 March 2019
High/Low	Highest and lowest prices reached by the share during the 52 weeks ended on 6 March 2019
Yld	Dividend yield, based on the most recent year's dividend and the current share price
P/E	Price/earnings ratio, based on the most recent year's (after-tax) profit for the year and the current share price
Volume	The number of shares (in thousands) that were bought/sold on 6 March 2019

Let us take as an example National Grid plc, the utility business:

- the shares had a mid-market price of 846.3p each at the close of Stock Exchange trading on 6 March 2019
- the shares had decreased in price by 3.70p during trading on 6 March 2019
- the shares had highest and lowest prices during the previous 52 weeks of 895.10p and 742.00p, respectively
- the shares had a dividend yield, based on the 6 March 2019 price (and the dividend for the most recent year) of 5.43 per cent
- the shares had a P/E ratio, based on the 6 March 2019 price (and the after-taxation earnings per share for the most recent year), of 8.61 times.
- during trading on 6 March 2019, 5,974,500 of the business's shares had changed hands between buyers and sellers.

Real World 3.10 shows how investment ratios can vary between different industry sectors.

Real World 3.10

Yielding dividends

Investment ratios can vary significantly between businesses and between industries. To give some indication of the range of variations that occurs, the average dividend yield ratios and average P/E ratios for listed businesses in 12 different industries in Western Europe are shown in Figures 3.11 and 3.12, respectively.
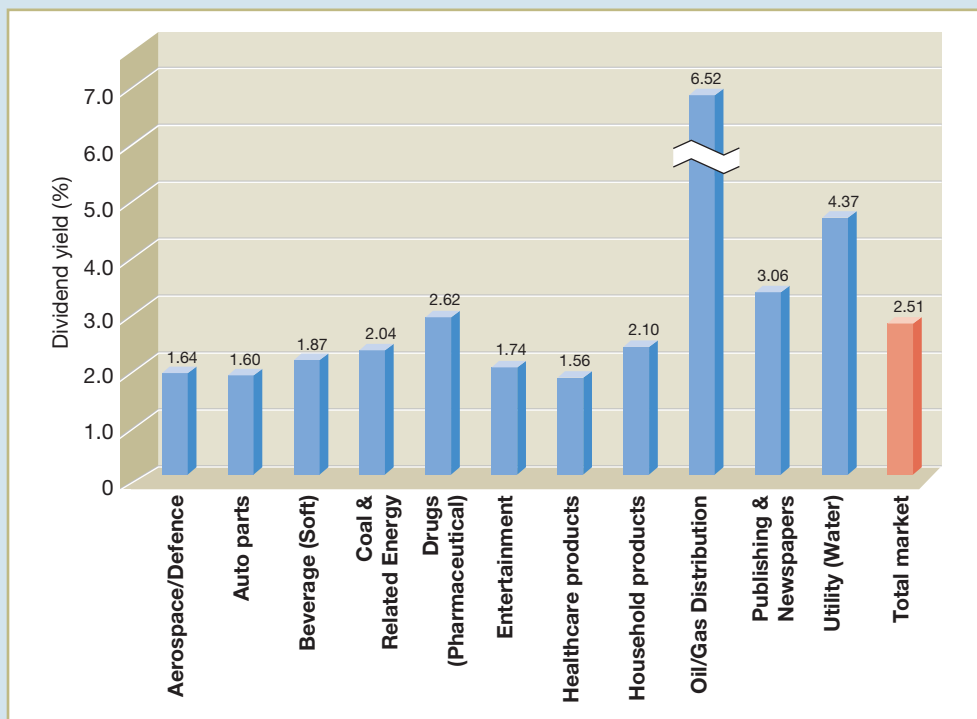
Figure 3.11 Average dividend yield ratios for businesses in a range of industries

These dividend yield ratios are calculated from the current market value of the shares and the most recent year's dividend paid.

We can see that the average dividend yield for the market as a whole was 2.51 per cent (as shown in Figure 3.11), but there is a wide variation with healthcare products at 1.56 per cent and oil and gas distribution at 6.52 per cent.

Differences in dividend yield can arise for various reasons. Businesses operating in growth industries may be investing heavily in developing new products. This will often mean low, or even no, dividends and low dividend yields. Businesses in mature industries, however, where re-investment opportunities are limited, may pay higher dividends.

Share prices are based on expectations of their future prospects whereas dividends are actual, past, events. Where businesses within a particular industry have poor prospects, share prices will be lower. These businesses may, however, wish to maintain dividend payments at current levels despite the expected downturn in their fortunes. Thus, a high current dividend and a low share price can also lead to a high dividend yield.

P/E ratios are calculated from the current share price and the most recent year's EPS (see Figure 3.12).
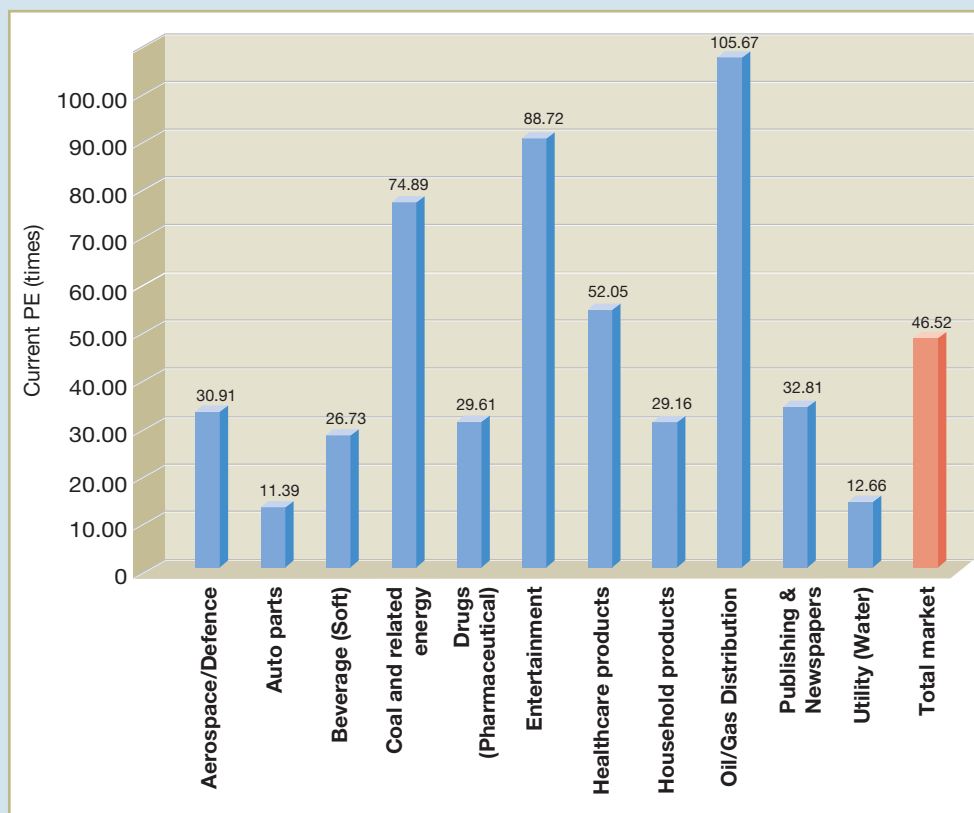
Figure 3.12 Average price/earnings ratios for businesses in a range of industries

Businesses that have a high share price relative to their recent historic earnings have high P/E ratios. This occurs where their future prospects are considered bright. The average P/E for the market as a whole was 46.52 times but auto parts was as low as 11.39 times and oil and gas distribution as high as 105.67 times.

Source: Charts compiled from data in Damodaran, A., 'Useful data sets', www.stern.nyu.edu/~adamodar/New_Home_Page/data.html, accessed 9 January 2019.

The investment ratios discussed are summarised in Figure 3.13.
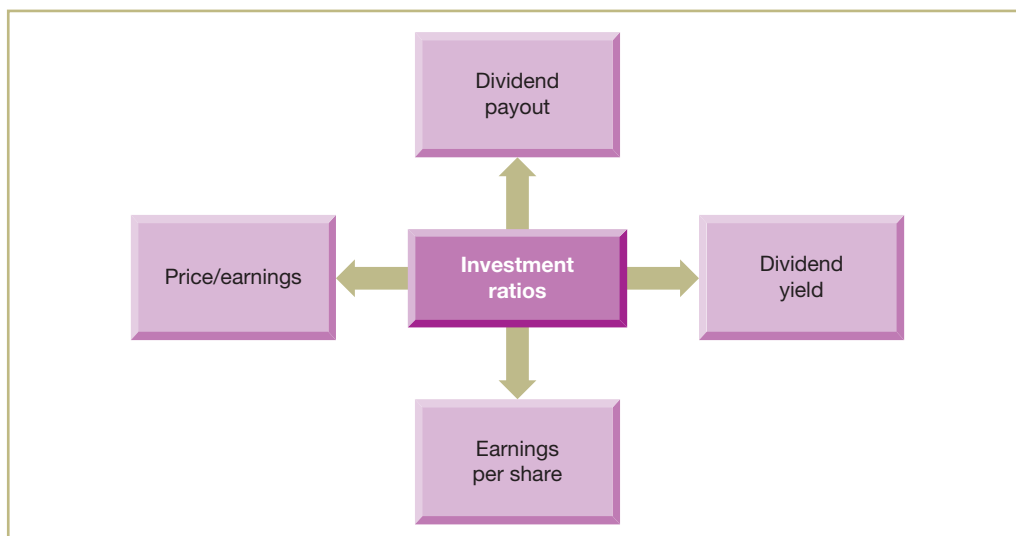
Figure 3.13 Investment ratios

FINANCIAL RATIOS AND THE PROBLEM OF OVERTRADING

Overtrading occurs where a business is operating at a level of activity that cannot be supported by the amount of finance that has been committed. This situation is usually due to poor financial control over the business by its managers. The underlying reasons for overtrading are varied. It may occur:

■ in young, expanding businesses that fail to prepare adequately for the rapid increase in demand for their goods or services. This often leads to insufficient finance to fund the trade receivables and inventories needed to support the additional sales generated

■ in businesses where the managers may have misjudged the level of sales demand or have failed to control escalating project costs

■ as a result of a fall in the value of money (inflation), causing more finance to be committed to inventories and trade receivables, even where there is no expansion in the real volume of trade

■ where the owners are unable to inject further funds into the business and/or they cannot persuade others to invest in the business.

Whatever the reason, the problems that it brings must be resolved if the business is to survive over the longer term.

Overtrading results in liquidity problems such as exceeding borrowing limits, or slow repayment of borrowings and trade payables. The last of these can result in suppliers withholding supplies, thereby making it difficult to meet customer needs. The managers of the business may be forced to direct all of their efforts to dealing with immediate and pressing problems, such as finding cash to meet interest charges due or paying wages. Longer-term planning becomes difficult as managers spend their time going from crisis to crisis. Ultimately, the business may fail because it cannot meet its maturing obligations – it runs out of cash.

Activity 3.26

If a business is overtrading, do you think the following ratios would be higher or lower than normally expected?

1. Current ratio
2. Average inventories turnover period
3. Average settlement period for trade receivables
4. Average settlement period for trade payables

Your answers should be as follows:

1. The current ratio would be lower than normally expected. This ratio is a measure of liquidity and lack of liquidity is a typical symptom of overtrading.
2. The average inventories turnover period would be lower than normally expected. Where a business is overtrading, the level of inventories held will be low because of the problems of financing them. In the short term, sales revenue may not be badly affected by the low inventories levels and therefore inventories will be turned over more quickly.
3. The average settlement period for trade receivables may be lower than normally expected. Where a business is suffering from liquidity problems, it may chase credit customers more vigorously in an attempt to improve cash flows.
4. The average settlement period for trade payables may be higher than normally expected. The business may delay payments to its suppliers because of the liquidity problems arising.

To deal with the overtrading problem, a business must ensure that the finance available is consistent with the level of operations. Thus, if a business that is overtrading is unable to raise new finance, it should cut back its level of operations in line with the finance available. Although this may lead to lost sales and lost profits in the short term, cutting back may be necessary to ensure survival over the longer term.

KEY PERFORMANCE INDICATORS

Many businesses use **key performance indicators (KPIs)** to measure the degree of success achieved in fulfilling their objectives. KPIs should also provide a focus for managers when making strategic and operational decisions. They normally include financial measures, such as the financial ratios discussed above, as well as non-financial measures of performance.

Real World 3.11 describes the KPIs for one well-known business.

Real World 3.11

Not taking it easy

easyJet plc, the well-known budget airline operator, has developed various KPIs, through which its performance is monitored. Some are for internal use only, while others are for external publication. For 2019 onwards, the external KPIs that will be reported are:

- profit per seat
- on-time performance – arrival within 15 minutes

→

- customer satisfaction score
- return on capital employed (ROCE)
- earnings per share
- CO_2 emissions per passenger kilometre.

Source: easyJet Annual Report and Accounts 2018, p. 21.

TREND ANALYSIS

It is often helpful to see whether ratios are indicating trends. Key ratios can be plotted on a graph to provide a simple visual display of changes occurring over time. The trends occurring within a business may be plotted against trends for rival businesses or for the industry as a whole for comparison purposes. An example of trend analysis is shown in **Real World 3.12**.

Real World 3.12

Trend setting

In Figure 3.14, the current ratios of three of the UK's leading supermarket businesses are plotted over time.

The current ratio for three leading UK supermarket businesses is plotted for the reporting years ended during 2008 to 2018. This enables comparison to be made regarding the ratio, both for each of the three businesses over time and between the businesses.
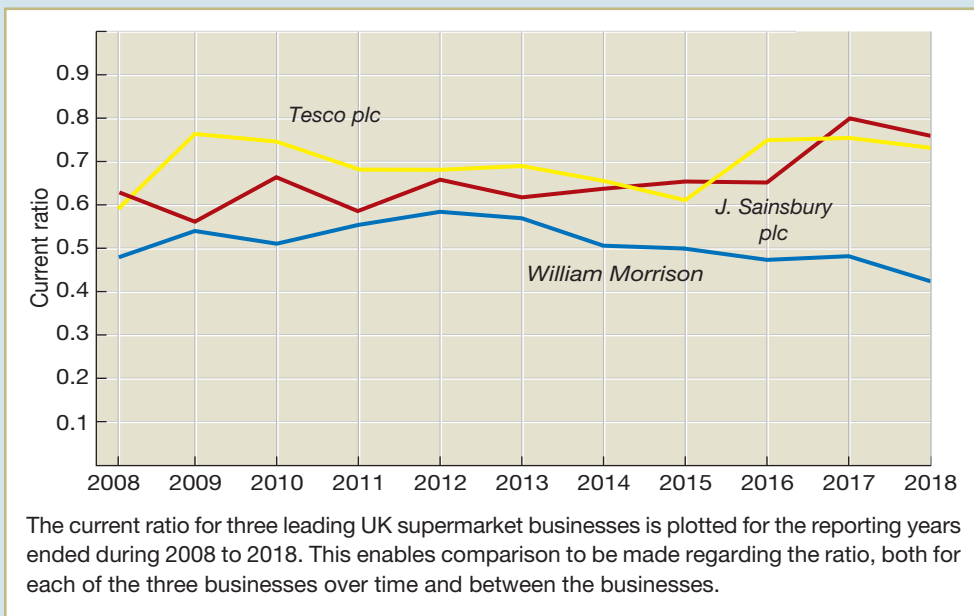
Figure 3.14 Current ratio of three leading businesses

Source: Ratios calculated from information in the annual reports of the three businesses for each of the years 2008 to 2018.

We can see that the current ratios of the three businesses are fairly close. Tesco's ratio was lower than those of its main rivals until 2005; it then overtook Morrison and, in 2009,

Sainsbury. Sainsbury's current ratio shows a fairly consistent downward path until 2010. Morrison has tended to maintain the lowest current ratio over time. With well-managed businesses like these, it is highly likely that any changes are the result of deliberate policy.

Source: Annual reports of the three businesses 2008 to 2018.

USING RATIOS TO PREDICT FINANCIAL FAILURE

Financial ratios, based on current or past performance, are often used to help predict the future. Normally, both the choice of ratios and the interpretation of results are dependent on the judgement and opinion of the analyst. However, there have been attempts to develop a more rigorous and systematic approach to the use of ratios for prediction purposes. These attempts have often focused on the ability of ratios to predict the financial failure of a business.

By financial failure, we mean a business either being forced out of business or being severely adversely affected by its inability to meet its financial obligations. It is often referred to as 'going bust' or 'going bankrupt'. This, of course, is an area of concern for all those connected with the business.

Using single ratios

Various methods of using ratios to predict future financial failure have been developed. Early research looked at whether a single ratio was a good or bad predictor of financial failure. It involved tracking a particular ratio (for example, the current ratio) for a business over several years leading up to the date of the failure. This was to see whether the ratio exhibited a trend that could be taken as a warning sign.

Beaver (see reference 1 at the end of the chapter) carried out the first research in this area. He identified 79 businesses that had failed. He then calculated the average (mean) of various ratios for these 79 businesses, going back over the financial statements of each business for each of the ten years leading up to each business's failure. Beaver then compared these average ratios with similarly derived ratios for a sample of 79 businesses that did not fail over this period. (The research used a matched-pair design, where each failed business was matched with a non-failed business of similar size and industry type.) He found that some ratios exhibited a marked difference between the failed and non-failed businesses for up to five years prior to failure. These were:

- cash flow/total debt
- net income (profit)/total assets
- total debt/total assets
- working capital/total assets
- current ratio
- no credit interval (that is, cash generated from operations to maturing obligations).

To illustrate Beaver's findings, the average current ratio of failed businesses for five years prior to failure, along with the average current ratio of non-failed businesses for the same period, is shown in Figure 3.15.

The vertical scale of the graph is the average value of the current ratio for each group of businesses (failed and non-failed). The horizontal axis is the number of years before failure. Thus, Year 1 is the most recent year and Year 5 the least recent year. We can see that a clear difference between the average for the failed and non-failed businesses can be detected five years prior to the failure of the former group.

Figure 3.15 Average (mean) current ratio of failed and non-failed businesses

Research by Zmijewski (see reference 2 at the end of the chapter), using a sample of 72 failed and 3,573 non-failed businesses over a six-year period, found that businesses that ultimately went on to fail were characterised by lower rates of return, higher levels of gearing, lower levels of coverage for their fixed interest payments and more variable returns on shares. While we may not find these results very surprising, it is interesting to note that Zmijewski, like a number of other researchers in this area, did not find liquidity ratios particularly useful in predicting financial failure. Intuition might have led us (wrongly it seems) to believe that the liquidity ratios would have been particularly helpful in this context. As we saw earlier, however, Beaver did find the current ratio to be a useful predictor.

The approach adopted by Beaver and Zmijewski is referred to as **univariate analysis** because it looks at one ratio at a time. It can produce interesting results, but there are practical problems associated with its use.

Activity 3.27

Let us assume that research indicates that a particular ratio is shown to be a good predictor of failure. Can you think of a practical problem that may arise when using this ratio to predict financial failure for a particular business?

Where a particular ratio for a business differs from the mean ratios of non-failed businesses, the analyst must rely on judgement to interpret whether it is significant. There is no clear decision rule that can be applied. Different analysts may therefore come to different conclusions about the likelihood of failure.

A further problem arises where more than one ratio is used to predict failure. Let us say, for example, that past research has identified two ratios as being good predictors of financial failure. When applied to a particular business, however, it may be that one ratio predicts financial failure, whereas the other does not. Given these conflicting signals, how should the analyst interpret the results?

Using combinations of ratios

The weaknesses of univariate analysis have led to the development of models that combine ratios so as to produce a single index that can be interpreted more clearly. One approach to model development, much favoured by researchers, uses **multiple discriminate analysis** (MDA). This is, in essence, a statistical technique that is similar to regression analysis and which can be used to draw a boundary between those businesses that fail and those businesses that do not. This boundary is referred to as the **discriminate function**. In this context, MDA attempts to identify those factors likely to influence financial failure. MDA differs from regression analysis in that it assumes that the observations come from two different populations (for example, failed and non-failed businesses) rather than from a single population.

To illustrate this approach, let us assume that we wish to test whether two ratios (say, the current ratio and the return on capital employed) can help to predict failure. To do this, we can calculate these ratios, first for a sample of failed businesses and then for a matched sample of non-failed ones. From these two sets of data we can produce a scatter diagram that plots each business according to these two ratios to produce a single co-ordinate. Figure 3.16 illustrates this approach.

The distribution of failed and non-failed businesses is based on two ratios. The line represents a boundary between the samples of failed and non-failed businesses. Although there is some crossing of the boundary, the boundary represents the line that minimises the problem of misclassifying particular businesses.
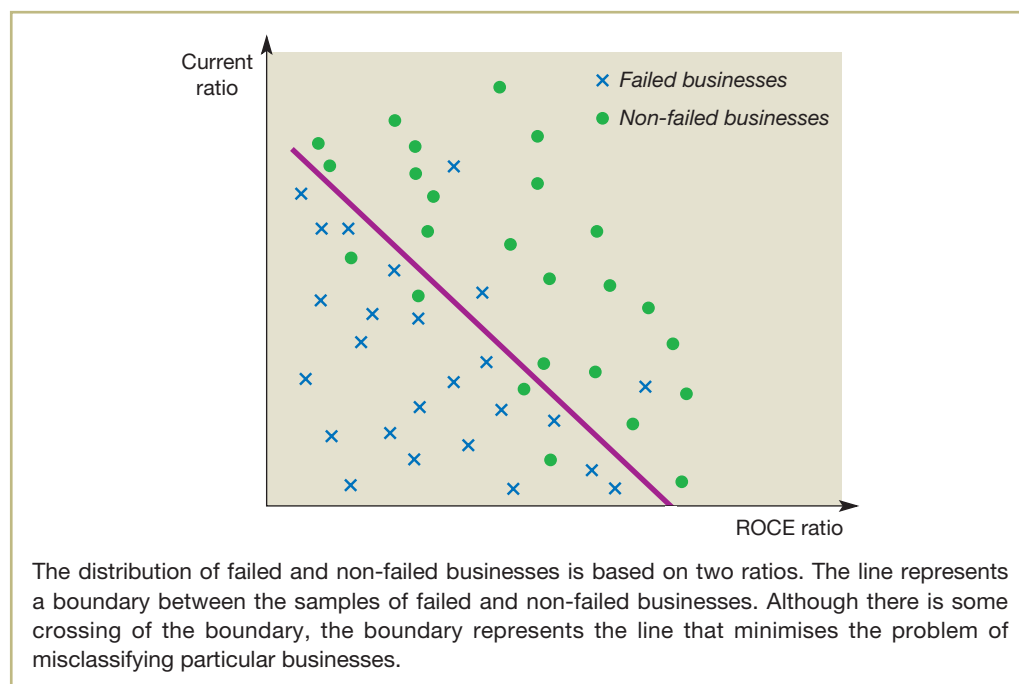
Figure 3.16 Scatter diagram showing the distribution of failed and non-failed businesses

Using the observations plotted on the diagram, we try to identify the boundary between the failed and the non-failed businesses. This is the diagonal line in Figure 3.16. We can see that those businesses that fall below and to the left of the line are predominantly failed and those that fall to the right are predominantly non-failed ones. Note that there is some overlap

between the two populations. In practice, the boundary produced is unlikely to eliminate all errors. Some businesses that fail may fall on the non-failed side of the boundary. The opposite also happens. However, the analysis will *minimise* the misclassification errors.

The boundary shown in Figure 3.16 can be expressed in the form:

$$Z = a + (b \times \text{Current ratio}) + (c \times \text{ROCE})$$

where *a*, *b* and *c* are all constants and *b* and *c* are weights to be attached to each ratio. A weighted average or total score (*Z*) is then derived. By 'constants' we mean that the same values are used for assessing each individual business. The values ascribed to these constants are those that have been found in practice to provide a Z-score that most effectively is able to differentiate between the failed and the non-failed businesses. Using this model to assess a particular business's health, we would deduce the current and ROCE ratios for that business and use them in the equation above. If the resulting Z-score were to come out below a certain value, we should view that business as being at risk.

Note that this example, using the current and ROCE ratios, is purely hypothetical and intended only to illustrate the approach.

Z-score models

Altman was the first to combine financial ratios in a way that successfully predicted financial distress among businesses. The Z-score model that he devised was developed in 1968 and is based on five financial ratios. The Z-score model is as follows:

$$Z = 1.2a + 1.4b + 3.3c + 0.6d + 1.0e$$

where:

a = Working capital (current assets – current liabilities)/Total assets
b = Retained earnings/Total assets
c = Operating profit/Total assets
d = Market value of equity shares/Total liabilities at book (statement of financial position) value
e = Sales revenue/Total assets

The weightings (or coefficients) in the above model are constants that reflect the importance to the Z-score of each of the ratios (*a* to *e*). It is interesting to note that Operating profit/Total assets (a profitability ratio) is given far more weight in the model than Working capital/Total assets (a liquidity ratio). The five ratios employed were identified by Altman through trial and error, as there is no theory of financial distress to offer guidance as to which ratios should be chosen.

According to Altman, those businesses with a Z-score of less than 1.81 occupy a 'distress zone'. This means that they are unstable and have a high risk of failure within two years. (The lower the score, the greater the risk of failure.) Those with a Z-score greater than 2.99 are considered to be financially stable and occupy a 'safe zone'. Those businesses with a Z-score between 1.81 and 2.99 occupy a 'grey zone', where there is some risk of financial distress within two years. The model has demonstrated a high level of predictive ability. In a series of tests over sample periods up to 1999, it had around 80 per cent and 90 per cent accuracy in predicting financial distress one year prior to the event. However, the accuracy of the model diminishes significantly as the lead time increases (see reference 3 at the end of the chapter).

Altman based his original model on US manufacturing businesses but later adapted it to non-manufacturing businesses. (The adapted model excludes the Sales revenue/Total assets ratio as non-manufacturing businesses tend to have a smaller asset base.) Further adaptations were carried out to accommodate private businesses and businesses in emerging markets.

In recent years, other models, using a similar approach, have been developed throughout the world. In the UK, Taffler has developed separate Z-score models for different types of business. (See reference 4 at the end of the chapter for a discussion of the work of Taffler and others.)

Real World 3.13 shows the distribution of Z-scores among large US businesses.

There has been a great deal of investigation, much of it by academics, into the effectiveness of Altman's Z-score model, or some variation of it. These investigations, which span different economies and industries, overwhelmingly support the model. Further support can be seen through its widespread use among businesses and independent analysts for decision-making purposes.

The prediction of financial failure is not the only area where research into the predictive ability of ratios has taken place. Researchers have also developed ratio-based models to assess the vulnerability of a business to takeover by another. This is another area that is of vital importance to all those connected with the business.

LIMITATIONS OF RATIO ANALYSIS

Although ratios offer a quick and useful method of analysing the position and performance of a business, they are not without their problems and limitations. We shall now review some of their shortcomings.

Quality of financial statements

It must always be remembered that ratios are based on financial statements. They will, therefore, inherit the limitations of the financial statements on which they are based. One important limitation of financial statements is their failure to include all resources controlled by the business. Internally generated goodwill and brands, for example, are excluded from the statement of financial position because they fail to meet the strict definition of an asset. This means that even though these resources may be of considerable value, key ratios such as ROSF, ROCE and the gearing ratio will fail to acknowledge their presence.

Activity 3.28

Assume that a business has internally generated goodwill that was created in earlier years. If this resource were introduced as a non-current asset with an indefinite life in the current statement of financial position, what would be the effect on ROSF, ROCE and the gearing ratio?

Total assets will increase and equity will also increase. An increase in equity will increase the denominator (lower part of the fraction) for all three ratios. This in turn will lead to lower ratios than would be the case if the goodwill were not introduced.

Creative accounting

There is also the problem of deliberate attempts to make the financial statements misleading. Despite the proliferation of accounting rules and the independent checks that are imposed, the directors of a business may employ particular accounting policies or structure particular transactions in such a way as to portray a picture of financial health that is in line with what they would like users to see rather than what is a true and fair view of financial position and performance. This practice is referred to as **creative accounting** and it can pose a major problem for those seeking to gain an impression of the financial health of a business.

Activity 3.29

Why might the directors of a business engage in creative accounting? Try to think of at least three reasons.

There are many reasons and these include:

■ to get around restrictions (for example, to report sufficient profit to pay a dividend)
■ to avoid government action (for example, the taxation of excessive profits)
■ to hide poor management decisions
■ to achieve sales or profit targets, thereby ensuring that performance bonuses are paid to the directors
■ to attract new share capital or loan capital by showing a healthy financial position, and
■ to satisfy the demands of major investors concerning levels of return.

The particular methods that unscrupulous directors use to manipulate the financial statements are many and varied. They can involve overstatement of revenues, manipulation of expenses, concealing losses and liabilities and overstating asset values.

When examining the financial statements of a business, a number of checks may be carried out to help gain a 'feel' for their reliability. These can include checks to see whether:

- the reported profits are significantly higher than the operating cash flows for the period, which may suggest that profits have been overstated
- the tax charge is low in relation to reported profits, which may suggest, again, that profits are overstated, although there may be other, more innocent, explanations
- the valuation methods used for assets held are based on historic cost or current values and, if the latter approach has been used, why, and how the current values were determined
- there have been any changes in accounting policies over the period, particularly in key areas such as revenue recognition, inventory valuation and depreciation
- the accounting policies adopted are in line with those adopted by the rest of the industry
- the auditors' report gives a 'clean bill of health' to the financial statements
- the 'small print', that is, the notes to the financial statements, is not being used to hide significant events or changes.

Although such checks are useful, they are not guaranteed to identify creative accounting practices, some of which may be very deeply seated.

Inflation

A persistent, though recently less severe, problem in most countries is that the financial results of businesses can be distorted as a result of inflation. One effect of inflation is that the reported value of assets held for any length of time may bear little relation to current values. Generally speaking, the reported values of assets will be understated in current terms during a period of inflation as they are usually reported at the original cost (less any amounts written off for depreciation). This means that comparisons, either between businesses or between periods, will be hindered. A difference in, say, ROCE may simply be owing to the fact that assets shown in one of the statements of financial position being compared were acquired more recently (ignoring the effect of depreciation on the asset values). Another effect of inflation is to distort the measurement of profit. In the calculation of profit, sales revenue is often matched with costs incurred at an earlier time. This is because there is often a time lag between acquiring a particular resource and using it to help generate sales revenue. For example, inventories may well be acquired several months before they are sold. During a period of inflation, this will mean that the expense does not reflect prices that are current at the time of the sale. The cost of sales figure is usually based on the historic cost of the inventories concerned. As a result, expenses will be understated in the income statement and this, in turn, means that profit will be overstated. One effect of this will be to distort the profitability ratios discussed earlier.

Over-reliance on ratios

It is important not to rely exclusively on ratios, thereby losing sight of information contained in the underlying financial statements. As we saw earlier in the chapter, some items reported in these statements can be vital in assessing position and performance. For example, the total sales revenue, capital employed and profit figures may be useful in assessing changes in absolute size that occur over time, or in assessing differences in scale between businesses. Ratios do not provide such information. When comparing one figure with another, ratios measure relative performance and position and therefore provide only part of the picture. When comparing

two businesses, therefore, it will often be useful to assess the absolute size of profits, as well as the relative profitability of each business. For example, Business A may generate £1 million operating profit and have a ROCE of 15 per cent and Business B may generate £100,000 operating profit and have a ROCE of 20 per cent. Although Business B has a higher level of profitability, as measured by ROCE, it generates lower total operating profits.

Basis for comparison

We saw earlier that if ratios are to be useful, they require a basis for comparison. Moreover, it is important that we compare like with like. Where the comparison is with another business, there can be difficulties. No two businesses are identical: the greater the differences between the businesses being compared, the greater the limitations of ratio analysis. Furthermore, any differences in accounting policies, financing methods (gearing levels) and financial year-ends will add to the problems of making comparisons between businesses.

Statement of financial position ratios

Because the statement of financial position is only a 'snapshot' of the business at a particular moment in time, any ratios based on statement of financial position figures, such as the liquidity ratios, may not be representative of the financial position of the business for the year as a whole. It is common for a seasonal business, for example, to have a financial year-end that coincides with a low point in business activity. As a result, inventories and trade receivables may be low at the year-end. This means that the liquidity ratios may also be low. A more representative picture of liquidity can only really be gained by taking additional measurements at other points in the year.

Real World 3.14 points out another way in which ratios are limited.

Real World 3.14

Remember, it's people that really count . . .

Lord Weinstock (1924–2002) was an influential industrialist whose management style and philosophy helped to shape management practice in many UK businesses. During his long and successful reign at GEC plc, a major engineering business, Lord Weinstock relied heavily on financial ratios to assess performance and to exercise control. In particular, he relied on ratios relating to sales revenue, expenses, trade receivables, profit margins and inventories turnover. However, he was keenly aware of the limitations of ratios and recognised that, ultimately, people produce profits.

In a memo written to GEC managers he pointed out that ratios are an aid to good management rather than a substitute for it. He wrote:

> The operating ratios are of great value as measures of efficiency but they are only the measures and not efficiency itself. Statistics will not design a product better, make it for a lower cost or increase sales. If ill-used, they may so guide action as to diminish resources for the sake of apparent but false signs of improvement.
>
> Management remains a matter of judgement, of knowledge of products and processes and of understanding and skill in dealing with people. The ratios will indicate how well all these things are being done and will show comparison with how they are done elsewhere. But they will tell us nothing about how to do them. That is what you are meant to do.

Source: Extract from Aris, S. (1998) *Arnold Weinstock and the Making of GEC,* Aurum Press, published in *The Sunday Times*, 22 February 1998, p. 3.

Self-assessment question 3.1

Both Ali plc and Bhaskar plc operate wholesale electrical stores throughout the UK. The financial statements of each business for the year ended 30 June last year are as follows:

Statements of financial position as at 30 June last year

	Ali plc £m	Bhaskar plc £m
ASSETS		
Non-current assets		
Property, plant and equipment (cost less depreciation)		
Land and buildings	360.0	510.0
Fixtures and fittings	87.0	91.2
	447.0	601.2
Current assets		
Inventories	592.0	403.0
Trade receivables	176.4	321.9
Cash at bank	84.6	91.6
	853.0	816.5
Total assets	1,300.0	1,417.7
EQUITY AND LIABILITIES		
Equity		
£1 ordinary shares	320.0	250.0
Retained earnings	367.6	624.6
	687.6	874.6
Non-current liabilities		
Borrowings – loan notes	190.0	250.0
Current liabilities		
Trade payables	406.4	275.7
Taxation	16.0	17.4
	422.4	293.1
Total equity and liabilities	1,300.0	1,417.7

Income statements for the year ended 30 June last year

	Ali plc £m	Bhaskar plc £m
Revenue	1,478.1	1,790.4
Cost of sales	(1,018.3)	(1,214.9)
Gross profit	459.8	575.5
Operating expenses	(308.5)	(408.6)
Operating profit	151.3	166.9
Interest payable	(19.4)	(27.5)
Profit before taxation	131.9	139.4
Taxation	(32.0)	(34.8)
Profit for the year	99.9	104.6

All purchases and sales were on credit. Ali plc had announced its intention to pay a dividend of £135 million and Bhaskar plc £95 million in respect of the year. The market values of a share in Ali plc and Bhaskar plc at the end of the year were £6.50 and £8.20, respectively. →

SUMMARY

The main points of this chapter may be summarised as follows:

Ratio analysis

- Compares two related figures, usually both from the same set of financial statements.
- Is an aid to understanding what the financial statements really mean.
- Is an inexact science and results must be interpreted with caution.
- Usually requires the business's performance for past periods, the performance of similar businesses and/or planned performance as benchmark ratios.
- Can benefit from a brief overview of the financial statements to provide insights not revealed by ratios and/or may help in the interpretation of them.

Profitability ratios

- Are concerned with effectiveness at generating profit.
- Include the return on ordinary shareholders' funds (ROSF), return on capital employed (ROCE), operating profit margin and gross profit margin.

Efficiency ratios

- Are concerned with efficiency of using assets/resources.
- Include the average inventories turnover period, average settlement period for trade receivables, average settlement period for trade payables, sales revenue to capital employed and sales revenue per employee.

Liquidity ratios

- Are concerned with the ability to meet short-term obligations.
- Include the current ratio and the acid test ratio.

Gearing ratios

- Are concerned with the relationship between equity and debt financing.
- Include the gearing ratio and the interest cover ratio.

Investment ratios

- Are concerned with returns to shareholders.

- Include the dividend payout ratio, dividend yield ratio, earnings per share and price/earnings ratio.

Uses of ratios

- Can be used to identify signs of overtrading.

- Individual ratios can be tracked (by plotting on a graph, for example) to detect trends.

- Can be used as key performance indicators (KPIs) to help measure the degree of success achieved in fulfilling the business's objectives.

- Can be used to help predict financial distress. Univariate analysis employs one ratio at a time, whereas multiple discriminate analysis combines various ratios within a model.

Limitations of ratio analysis

- Ratios are only as reliable as the financial statements from which they derive.

- Creative accounting can deliberately distort the portrayal of financial health.

- Inflation can also distort financial information.

- Ratios provide only part of the picture and there should not be over-reliance on them.

- It can be difficult to find a suitable benchmark (for example, another business) to compare with.

- Some ratios could mislead due to the 'snapshot' nature of the statement of financial position.

KEY TERMS

REFERENCES

1 Beaver, W. H. (1966) 'Financial ratios as predictors of failure', in *Empirical Research in Accounting: Selected Studies*, pp. 71–111.

2 Zmijewski, M. E. (1983) 'Predicting corporate bankruptcy: an empirical comparison of the extent of financial distress models', Research Paper, State University of New York.

3 Altman, E. I. (2000) 'Predicting financial distress of companies: revisiting the Z-score and Zeta models', New York University Working Paper, June.

4 Neophytou, E., Charitou, A. and Charalambous, C. (2001) 'Predicting corporate failure: empirical evidence for the UK', University of Southampton Department of Accounting and Management Science Working Paper 01-173.

FURTHER READING

If you would like to explore the topics covered in this chapter in more depth, the following are recommended:

Alexander, D., Brtitton, A., Jorissen, A., Hoogendoorn, M. and van Mourik, C. (2017) *International Financial Reporting and Analysis*, 7th edn, Cengage Learning EMEA, Chapters 29–31.

Elliott, B. and Elliott, J. (2017) *Financial Accounting and Reporting*, 18th edn, Pearson, Chapters 28 and 29.

Lessambo, F. (2019) *Financial Statements: Analysis and Reporting*, Palgrave Macmillan, Chapter 17.

Revsine, L., Collins, D., Johnson, B. Mittelstaedt, F. and Soffer, L. (2017) *Financial Reporting and Analysis*, 7th edn, McGraw-Hill Education, Chapters 5, 8, 9 and 10.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 650–51.

3.1 In the chapter, it was mentioned that ratios help to eliminate some of the problems of comparing businesses of different sizes. Does this mean that size is irrelevant when interpreting and analysing the position and performance of different businesses?

3.2 Two businesses operate in the same industry. One has an inventories turnover period that is longer than the industry average. The other has an inventories turnover period that is shorter than the industry average. Give three possible explanations for each business's inventories turnover period ratio.

3.3 Is it responsible to publish Z-scores of businesses that are in financial difficulties? What are the potential problems of doing this?

3.4 Identify and discuss three reasons why the P/E ratio of two businesses operating in the same industry may differ.

EXERCISES

Exercises 3.4 to 3.7 are more advanced than 3.1 to 3.3. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

3.1 Set out below are ratios relating to three different businesses. Each business operates within a different industrial sector.

Ratio	A plc	B plc	C plc
Operating profit margin	3.6%	9.7%	6.8%
Sales to capital employed	2.4 times	3.1 times	1.7 times
Average inventories turnover period	18 days	N/A	44 days
Average settlement period for trade receivables	2 days	12 days	26 days
Current ratio	0.8 times	0.6 times	1.5 times

Required:
State, with reasons, which one of the above is a:

(a) holiday tour operator
(b) supermarket chain
(c) food manufacturer.

3.2 Amsterdam Ltd and Berlin Ltd are both engaged in wholesaling, but they seem to take a different approach to it according to the following information:

Ratio	Amsterdam Ltd	Berlin Ltd
Return on capital employed (ROCE)	20%	17%
Return on ordinary shareholders' funds (ROSF)	30%	18%
Average settlement period for trade receivables	63 days	21 days
Average settlement period for trade payables	50 days	45 days
Gross profit margin	40%	15%
Operating profit margin	10%	10%
Average inventories turnover period	52 days	25 days

Required:
Describe what this information indicates about the differences in approach between the two businesses. If one of them prides itself on personal service and one of them on competitive prices, which do you think is which and why?

3.3 The directors of Helena Beauty Products Ltd have been presented with the following abridged financial statements:

Income statement for the year ended 30 September

	2018		2019	
	£000	£000	£000	£000
Sales revenue		3,600		3,840
Cost of sales				
Opening inventories	320		400	
Purchases	2,240		2,350	
	2,560		2,750	
Closing inventories	(400)	(2,160)	(500)	(2,250)

	2018		2019	
	£000	£000	£000	£000
Gross profit		1,440		1,590
Expenses		(1,360)		(1,500)
Operating profit		80		90
Corporation tax		(15)		(20)
Profit before taxation		65		70
Interest payable		–		–
Profit for the year		65		70

Statement of financial position as at 30 September

	2018	2019
	£000	£000
ASSETS		
Non-current assets		
Property, plant and equipment	1,900	1,860
Current assets		
Inventories	400	500
Trade receivables	750	960
Cash at bank	8	4
	1,158	1,464
Total assets	3,058	3,324
EQUITY AND LIABILITIES		
Equity		
£1 ordinary shares	1,650	1,700
Share premium account	–	116
Retained earnings	1,018	1,058
	2,668	2,874
Current liabilities	390	450
Total equity and liabilities	3,058	3,324

Required:
Using six ratios, comment on the profitability (three ratios) and efficiency (three ratios) of the business as revealed by the statements shown above.

3.4 Bradbury Ltd is a family-owned clothes manufacturer. For a number of years, the chair and managing director was David Bradbury. During his period of office, sales revenue had grown steadily at a rate of 2 to 3 per cent each year. David Bradbury retired on 30 November 2017 and was succeeded by his son Simon. Soon after taking office, Simon decided to expand the business. Within weeks he had successfully negotiated a five-year contract with a large clothes retailer to make a range of sports and leisurewear items. The contract will result in an additional £2 million in sales revenue during each year of the contract. To fulfil the contract, Bradbury Ltd acquired new equipment and premises.

Financial information concerning the business is given below:

Income statements for the years ended 30 November

	2017	2018
	£000	£000
Revenue	9,482	11,365
Operating profit	914	1,042
Interest charges	(22)	(81)
Profit before taxation	892	961
Taxation	(358)	(386)
Profit for the year	534	575

Statements of financial position as at 30 November

	2017	2018
ASSETS	£000	£000
Non-current assets		
Property, plant and equipment		
Premises at cost	5,240	7,360
Plant and equipment (net)	2,375	4,057
	7,615	11,417
Current assets		
Inventories	2,386	3,420
Trade receivables	2,540	4,280
	4,926	7,700
Total assets	12,541	19,117
EQUITY AND LIABILITIES		
Equity		
Share capital	2,000	2,000
Reserves	7,813	8,268
	9,813	10,268
Non-current liabilities		
Borrowing – loans	1,220	3,675
Current liabilities		
Trade payables	1,157	2,245
Taxation	179	193
Short-term borrowings (all bank overdraft)	172	2,736
	1,508	5,174
Total equity and liabilities	12,541	19,117

Dividends of £120,000 were paid on ordinary shares in respect of each of the two years.

Required:

(a) Calculate, for each year (using year-end figures for statement of financial position items), the following ratios:
1 operating profit margin
2 return on capital employed
3 current ratio
4 gearing ratio

5 trade receivables settlement period

6 sales revenue to capital employed.

(b) Using the above ratios, and any other ratios or information you consider relevant, comment on the results of the expansion programme.

3.5 Threads Limited manufactures nuts and bolts, which are sold to industrial users. The abbreviated financial statements for 2018 and 2019 are as follows:

Income statements for the year ended 30 June

	2018	2019
	£000	£000
Sales revenue	1,180	1,200
Cost of sales	(680)	(750)
Gross profit	500	450
Operating expenses	(200)	(208)
Depreciation	(66)	(75)
Operating profit	234	167
Interest	(–)	(8)
Profit before taxation	234	159
Taxation	(80)	(48)
Profit for the year	154	111

Statements of financial position as at 30 June

	2018	2019
	£000	£000
ASSETS		
Non-current assets		
Property, plant and equipment	702	687
Current assets		
Inventories	148	236
Trade receivables	102	156
Cash	3	4
	253	396
Total assets	955	1,083
EQUITY AND LIABILITIES		
Equity		
Ordinary share capital (£1 shares, fully paid)	500	500
Retained earnings	256	295
	756	795
Non-current liabilities		
Borrowings – bank loan	–	50
Current liabilities		
Trade payables	60	76
Other payables and accruals	18	16
Taxation	40	24
Short-term borrowings (all bank overdraft)	81	122
	199	238
Total equity and liabilities	955	1,083

Dividends were paid on ordinary shares of £70,000 and £72,000 for 2018 and 2019, respectively.

Required:

(a) Calculate the following financial ratios for both 2018 and 2019 (using year-end figures for statement of financial position items):
1 return on capital employed
2 operating profit margin
3 gross profit margin
4 current ratio
5 acid test ratio
6 settlement period for trade receivables
7 settlement period for trade payables
8 inventories turnover period.

(b) Comment on the performance of Threads Limited from the viewpoint of a business considering supplying a substantial amount of goods to Threads Limited on usual trade credit terms.

3.6 Genesis Ltd was incorporated three years ago and has grown rapidly since then. The rapid rate of growth has created problems for the business, which the directors have found difficult to deal with. Recently, a firm of management consultants has been asked to help the directors to overcome these problems.

In a preliminary report to the board of directors, the management consultants state: 'Most of the difficulties faced by the business are symptoms of an underlying problem of overtrading.'

The most recent financial statements of the business are set out below.

Income statement for the year ended 31 October

	£000	£000
Sales revenue		1,640
Cost of sales		
Opening inventories	116	
Purchases	1,260	
	1,376	
Closing inventories	(128)	(1,248)
Gross profit		392
Selling and distribution expenses		(204)
Administration expenses		(92)
Operating profit		96
Interest payable		(44)
Profit before taxation		52
Taxation		(16)
Profit for the year		36

Statement of financial position as at 31 October

		£000
ASSETS		
Non-current assets		
Property, plant and equipment at cost less depreciation		
Land and buildings		442
Fixtures and fittings at cost		116
Motor vans at cost		64
		622
Current assets		
Inventories		128
Trade receivables		104
		232
Total assets		854
EQUITY AND LIABILITIES		
Equity		
Ordinary £0.50 shares		60
General reserve		50
Retained earnings		74
		184
Non-current liabilities		
Borrowings – 10% loan notes (secured)		120
Current liabilities		
Trade payables		184
Taxation		8
Short-term borrowings (all bank overdraft)		358
		550
Total equity and liabilities		854

Notes:

1 All purchases and sales were on credit.
2 A dividend was paid during the year on ordinary shares of £4,000.

Required:

(a) Calculate and discuss five financial ratios that might be used to establish whether the business is overtrading. Do these five ratios suggest that the business is overtrading?

(b) State the ways in which a business may overcome the problem of overtrading.

3.7 The financial statements for Clarrods plc are given below for the two years ending 30 June 2018 and 30 June 2019. Clarrods plc operates a large chain of retail stores.

Income statement for the years ending 30 June

	2018	2019
	£m	£m
Sales revenue	2,600	3,500
Cost of sales	(1,560)	(2,350)
Gross profit	1,040	1,150
Wages and salaries	(320)	(350)
Overheads	(260)	(200)
Depreciation	(150)	(250)

	2018	2019
	£m	£m
Operating profit	310	350
Interest payable	(50)	(50)
Profit before taxation	260	300
Taxation	(105)	(125)
Profit for the year	155	175

Statement of financial position as at 30 June

	2018	2019
	£m	£m
ASSETS		
Non-current assets		
Property, plant and equipment	1,265	1,525
Current assets		
Inventories	250	400
Trade receivables	105	145
Cash at bank	380	115
	735	660
Total assets	2,000	2,185
EQUITY AND LIABILITIES		
Equity		
Share capital: £1 shares fully paid	490	490
Share premium	260	260
Retained earnings	350	450
	1,100	1,200
Non-current liabilities		
Borrowings – 10% loan notes	500	500
Current liabilities		
Trade payables	300	375
Other payables	100	110
	400	485
Total equity and liabilities	2,000	2,185

Dividends paid on ordinary shares for 2018 and 2019 were £65 million and £75 million respectively.

Required:

(a) Choose and calculate eight ratios that would be helpful in assessing the performance and position of Clarrods plc. (Use end-of-year values and calculate ratios for both 2018 and 2019.)

(b) Using the ratios calculated in (a) and any others you consider helpful, comment on the business's performance and position from the viewpoint of a prospective purchaser of a majority of shares.

Chapter 4

MAKING CAPITAL INVESTMENT DECISIONS

INTRODUCTION

In this chapter, we take a look at how businesses make decisions concerning investments in new plant, machinery, buildings and other long-term assets. These types of decisions are vitally important for businesses: expensive and far-reaching consequences can flow from making poor choices.

Much of the chapter is taken up with an examination of the main methods of investment appraisal employed by businesses and the strengths and weaknesses of each. However, we also consider the key stages that businesses should go through in arriving at a decision. Given their importance, investment decisions must be approached in a systematic manner.

Learning outcomes

When you have completed this chapter, you should be able to:

- Explain the nature and importance of investment decision making.
- Identify and evaluate the four main investment appraisal methods found in practice.
- Use each of the four methods to reach a decision on a particular investment opportunity.
- Explain the key stages in the investment decision-making process.

THE NATURE OF INVESTMENT DECISIONS

The essential feature of investment decisions is *time*. Investment involves making an outlay of something of economic value, usually cash, at one point in time, which is expected to yield economic benefits to the investor at some other point in time. Usually, the outlay precedes the benefits. The outlay is often a single large amount while the benefits arrive as a series of smaller amounts over a fairly protracted period.

In some cases, however, the outlay may also be over a protracted period. Where a biotechnology business is developing a new therapeutic drug, for example, there are rigorous clinical trials that must be undertaken, which may take several years. During this period there are cash outflows, but there are no cash inflows until the drug has successfully completed the trials and the product is finally launched. The pattern of cash flows may therefore be as shown in Figure 4.1.
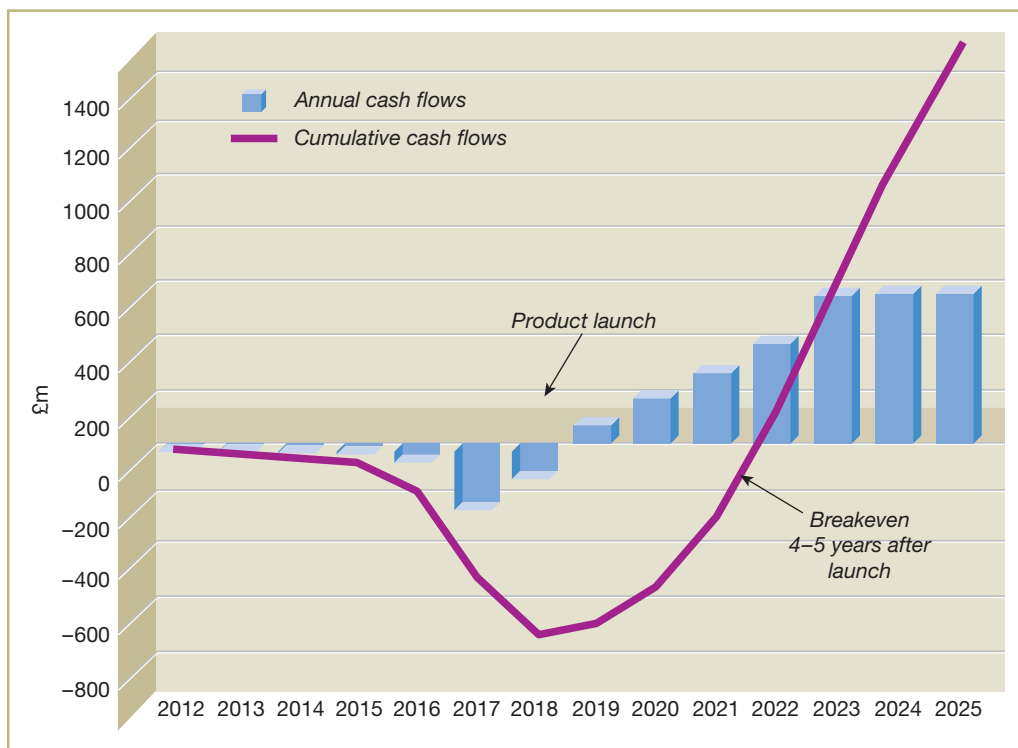
Figure 4.1 Annual and cumulative cash flows over time for the development of a successful therapeutic drug

Source: Adapted from 'Biotech Economics and Valuation' Massachusetts Biotechnology Council and L.E.K. Consulting, August 2009, p. 3. Reprinted with permission from L.E.K. Consulting. L.E.K. Consulting is a registered trademark of L.E.K. Consulting, LLC. All other products and brands mentioned in this document are properties of their respective owners. © 2016 L.E.K. Consulting, LLC. All Rights Reserved.

Investment decisions tend to be of profound importance to the business for the following reasons:

- *Large amounts of resources are often involved.* Many investments made by businesses involve laying out a significant proportion of their total resources. If mistakes are made with the decision, the effects on the business could be significant, if not catastrophic.
- *Relatively long timescales are involved.* There is usually more time for things to go wrong between the decision being made and the end of the project, than with many business decisions.

■ *It is often difficult and/or expensive to bale out of an investment once it has been undertaken.* Investments made by a business are often specific to its needs. A manufacturing business, for example, may invest in a new, custom-designed factory. However, the specialist nature of the factory may lead to it having a limited resale value. If the business found, after having made the investment, that goods produced from the factory had no real market, the only course of action might be to sell it. This may mean that the amount recouped from the investment is much less than its original cost.

Real World 4.1 provides an illustration of a major investment by a cruise operator.

Real World 4.1

Plain sailing?

Norwegian Cruise Line has recently added a new cruise ship, *Norwegian Bliss*, to its fleet. The ship has many features, including a go-kart track, and is reported to have cost US $1 billion. Although Norwegian Cruise Line is a substantial business, this level of outlay is hugely significant. Clearly, the business believes that acquiring the new cruise ship will be worthwhile, but how would it have reached this conclusion? Presumably, the anticipated future benefits from carrying passengers, as well as the costs of operating the ship, will have been major inputs to the decision.

Source: Based on information in CNBC (2018) 'US 1billion ship with a race track aims to dethrone Carnival and Royal Caribbean', www.scmp.com, 9 May.

The issues raised by this cruise ship investment will be the main subject of this chapter.

Real World 4.2 indicates the level of annual investment in non-current assets for a number of randomly selected, well-known UK businesses. We can see that the scale of investment varies from one business to another. (It also tends to vary from one year to another for each business.) Nevertheless, the scale of investment for all these businesses was significant.

Real World 4.2

The scale of investment by UK businesses

	Expenditure on additional non-current assets as a percentage of:	
	Profit for the year	*End-of-year non-current assets*
Sky plc (television)	145	9
Go-Ahead Group plc (transport)	136	19
J D Wetherspoon plc (pub operator)	173	8
Marks and Spencer plc (stores)	1200	6
Ryanair Holdings plc (airline)	101	18
Severn Trent Water plc (water and sewerage)	251	7
Vodafone plc (telecommunications)	293	8
Wm Morrison Supermarkets plc (supermarkets)	161	6

Source: Annual reports of the businesses concerned for the financial year ending in 2018.

Real World 4.2 above considered only non-current asset investment. However, significant current asset investment may also be required (additional inventories, for example). Thus, the figures calculated above do not tell the whole story.

Activity 4.1

When managers of a business are making a decision involving capital investments, what should the decision seek to achieve?

Investment decisions must be consistent with the objectives of the particular organisation. For a business, maximising the wealth of the owners (shareholders) is normally assumed to be the key financial objective.

INVESTMENT APPRAISAL METHODS

Given the importance of investment decisions, it is essential that proper screening of investment proposals takes place. An important part of this screening process is to employ appropriate methods of evaluation. Research shows that there are basically four methods used by businesses to evaluate investment opportunities:

- accounting rate of return (ARR)
- payback period (PP)
- net present value (NPV)
- internal rate of return (IRR).

It is possible to find businesses that use variants of these four methods. It is also possible to find businesses, particularly smaller ones, that do not use any formal appraisal method but rely instead on the 'gut feeling' of their managers. Most businesses, however, seem to use one (or more) of these four methods.

We shall evaluate each of the appraisal methods identified. Only one of them, however, offers a wholly logical approach. The other three are flawed to a greater or lesser extent. Nevertheless, all four methods are fairly widely used by managers, as we shall see later in the chapter.

To help us examine each of the four methods, it is useful to see how each would cope with a particular investment opportunity. Let us consider the following example.

Example 4.1

Billingsgate Battery Company has carried out research relating to a service that it has recently developed. Provision of the service would require investment in a machine that would cost £100,000, payable immediately. Sales of the service would take place throughout the next five years. At the end of that time, it is estimated that the machine could be sold for £20,000.

Inflows and outflows from providing the service are expected to be as follows:

Time		£000
Immediately	Cost of machine	(100)
1 year's time	Operating profit before depreciation	20
2 years' time	Operating profit before depreciation	40
3 years' time	Operating profit before depreciation	60
4 years' time	Operating profit before depreciation	60
5 years' time	Operating profit before depreciation	20
5 years' time	Disposal proceeds from the machine	20

Sales revenues result in cash flowing into the business and expenses tend to lead to it flowing out. Depreciation, however, does not involve an outlay of cash, it is simply a bookkeeping exercise. (The outlay of cash occurs when the asset is first acquired.) In broad terms, therefore, the operating profit *before* deducting depreciation (that is, before non-cash items) will be equal to the net cash amount flowing into the business. For the time being, we shall assume that working capital – which is made up of inventories, trade receivables and trade payables – remains constant.

To simplify matters, we shall assume that the cash from sales and for expenses relating to the service is received and paid, respectively, at the end of each year. This is clearly not the case in real life. Money must be paid to employees (for salaries and wages) on a weekly or a monthly basis. Customers will pay within a month or two of buying the service. Making the assumption, however, probably does not lead to any serious distortion. It is a simplifying assumption, that is often made in practice, and it will make things more straightforward. We should be clear, however, that there is nothing about any of the four methods that *demands* that this assumption is made.

Having set up the example, let us now go on to consider how each of the appraisal methods works.

ACCOUNTING RATE OF RETURN (ARR)

The first method that we shall consider is the **accounting rate of return (ARR)**. This method takes the average annual operating profit that the investment will generate and expresses it as a percentage of the average investment made over the life of the investment project. In other words:

$$\text{ARR} = \frac{\text{Average annual operating profit}}{\text{Average investment to earn that profit}} \times 100\%$$

We can see from the equation that, to calculate the ARR, we need two pieces of information concerning the particular project:

- the annual average operating profit, and
- the average investment.

In our example, the average annual operating profit *before depreciation* over the five years is £40,000 (that is, £(20 + 40 + 60 + 60 + 20)000/5) Assuming 'straight-line' depreciation (that is, equal annual amounts), the annual depreciation charge will be £16,000 (that is, £(100,000 − 20,000)/5). Thus, the average annual operating profit *after depreciation* is £24,000 (that is, £40,000 − £16,000).

The average investment over the five years can be calculated as follows:

$$\text{Average investment} = \frac{\text{Cost of machine} + \text{Disposal value*}}{2}$$

$$= \frac{£100,000 + £20,000}{2}$$

$$= £60,000$$

*Note: To find the average investment, we are simply adding together the value of the amount invested at the beginning and end of the investment period and dividing by two.

Thus, the ARR of the investment is:

$$\text{ARR} = \frac{£24,000}{£60,000} \times 100\% = 40\%$$

In order to make sense of the ARR calculated above, the following decision rules should be applied:

- **For a project to be acceptable, it must achieve a target ARR as a minimum.**
- **If there are two, or more, competing projects that achieve the target ARR, the one with the higher (or highest) ARR should be selected.**

Thus, for the 40 per cent return to be acceptable, it must at least achieve the target ARR set by the business.

Activity 4.2

Chaotic Industries is considering an investment in a fleet of ten delivery vans to deliver its products to customers. The vans will cost £15,000 each to buy, which is payable immediately. The annual running costs are expected to total £50,000 for each van (including the driver's salary). The vans are expected to operate successfully for six years, at the end of which period they will all have to be sold. The disposal proceeds are expected to be about £3,000 per van. At present, the business outsources its deliveries, to a commercial carrier. The carrier is expected to charge a total of £530,000 each year for the next six years to undertake this service.

What is the ARR of buying the vans? (Note that cost savings are as relevant a benefit from an investment as net cash inflows.)

The vans will save the business £30,000 a year (that is, £530,000 − (£50,000 × 10)), before depreciation, in total. Thus, the inflows and outflows will be:

Time		£000
Immediately	Cost of vans (10 × £15,000)	(150)
1 year's time	Saving before depreciation	30
2 years' time	Saving before depreciation	30
3 years' time	Saving before depreciation	30
4 years' time	Saving before depreciation	30
5 years' time	Saving before depreciation	30
6 years' time	Saving before depreciation	30
6 years' time	Disposal proceeds from the vans (10 × £3,000)	30

The total annual depreciation expense (assuming a straight-line method) will be £20,000 (that is, (£150,000 − £30,000)/6). Thus, the average annual saving, **after depreciation,** is £10,000 (that is, £30,000 − £20,000).

The average investment will be:

$$\text{Average investment} = \frac{£150,000 + £30,000}{2} = £90,000$$

and the ARR of the investment is:

$$\text{ARR} = \frac{£10,000}{£90,000} \times 100\% = 11.1\%$$

ARR and ROCE

In essence, ARR and the return on capital employed (ROCE) ratio take the same approach to measuring business performance. Both relate operating profit to the investment required to generate that profit. However, ROCE assesses the overall performance of the business *after* it has performed, while ARR assesses the performance of a particular investment *before* it has performed.

We saw that investments must achieve a minimum target ARR. Given the link between ARR and ROCE, this target could be based on some measure of ROCE. It could, for example, be based on the industry-average ROCE, or the past ROCE of the business.

The link between ARR and ROCE appears to strengthen the case for adopting ARR as the appropriate method of investment appraisal. ROCE is a widely used measure of profitability and some businesses express their financial objective in terms of a target ROCE. It may seem logical, therefore, to use a method of investment appraisal that is consistent with this overall measure of business performance. A secondary point in favour of ARR is that it provides a result expressed in percentage terms, which many managers seem to prefer. Such advantages, however, are far outweighed by the serious problems associated with this method.

Problems with ARR

ARR suffers from a major defect as a means of assessing investment opportunities. To illustrate this defect, consider Activity 4.3.

Activity 4.3

A business is evaluating three competing projects whose profits are shown below. All three involve investment in a machine that is expected to have no residual value at the end of the five years. Note that all the projects have the same total operating profits after depreciation over the five years.

Time		Project A £000	Project B £000	Project C £000
Immediately	Cost of machine	(160)	(160)	(160)
1 year's time	Operating profit after depreciation	20	10	160
2 years' time	Operating profit after depreciation	40	10	10
3 years' time	Operating profit after depreciation	60	10	10
4 years' time	Operating profit after depreciation	60	10	10
5 years' time	Operating profit after depreciation	20	160	10

What defect in the ARR method would prevent it from distinguishing between these competing projects? (*Hint*: The defect is not concerned with the ability of the decision maker to forecast future events, though this too can be a problem. Try to remember the essential feature of investment decisions, which we identified at the beginning of this chapter.)

In this example, each project has the same total operating profit over the five years (£200,000) and the same average investment of £80,000 (that is, £160,000/2). This means that each project will give rise to the same ARR of 50 per cent (that is, £40,000/£80,000).

ARR, therefore, fails to distinguish between them even though they are not of equal merit. This is because ARR ignores the time factor and, therefore, the cost of financing the project.

To maximise the wealth of the owners, a manager faced with a choice between the three projects set out in Activity 4.3 should select Project C. This is because most of the benefits arise within 12 months of making the initial investment. Project A would rank second and Project B would finish a poor third. Any appraisal technique that is incapable of distinguishing between these three situations is seriously flawed. We will look at why timing is so important later in the chapter.

The ARR method suffers from further problems, which are discussed below.

Use of average investment

Using the average investment in calculating ARR can lead to daft results. Example 4.2 below illustrates the kind of problem that can arise.

Example 4.2

George put forward an investment proposal to his boss. The business uses ARR to assess investment proposals using a minimum 'hurdle' rate of 27 per cent. Details of the proposal were as follows:

Cost of equipment	£200,000
Estimated residual value of equipment	£40,000
Average annual operating profit before depreciation	£48,000
Estimated life of project	10 years
Annual straight-line depreciation charge	£16,000 (that is, [(£200,000 − £40,000)/10]

The ARR of the project will be:

$$ARR = \frac{£48,000 - £16,000}{(£200,000 + £40,000)/2} \times 100\% = 26.7\%$$

The boss rejected George's proposal because it failed to achieve an ARR of at least 27 per cent. Although George was disappointed, he realised that there was still hope. In fact, all the business had to do was to give away the piece of equipment at the end of its useful life rather than sell it. The residual value of the equipment then became zero and the annual depreciation charge became ((£200,000 − £0)/10) = £20,000 a year. The revised ARR calculation was then as follows:

$$ARR = \frac{£48,000 - £20,000}{(£200,00 + 0)/2} \times 100\% = 28\%$$

Use of accounting profit

We have seen that ARR is based on the use of accounting profit. When measuring performance over the whole life of a project, however, it is cash flows rather than accounting profits that are important. Cash is the ultimate measure of the economic wealth generated by an investment. This is because it is cash that is used to acquire resources and for distribution to the owners. Accounting profit is more appropriate for reporting achievement on a periodic basis. It is a useful measure of productive effort for a relatively short period, such as a year or half-year. Thus, it is a question of 'horses for courses'.

Target ARR

We saw earlier a target ARR against which to assess investment opportunities that must be chosen. This cannot be objectively determined and so will depend on the subjective judgement of managers. The target ARR may therefore vary over time. It is also likely to vary between businesses.

Competing investments

The ARR method can create problems when considering competing investments of different size. Consider Activity 4.4.

Activity 4.4

Sinclair Wholesalers plc is considering opening a new sales outlet in Coventry. Two possible sites have been identified for the new outlet. Site A has an area of 30,000 sq m. It will require an average investment of £6 million and will produce an average operating profit of £600,000 a year. Site B has an area of 20,000 sq m. It will require an average investment of £4 million and will produce an average operating profit of £500,000 a year.

What is the ARR of each investment opportunity? Which site would you select and why?

➔

The ARR of Site A is £600,000/£6m = 10 per cent. The ARR of Site B is £500,000/£4m = 12.5 per cent. Thus, Site B has the higher ARR. In terms of the absolute operating profit generated, however, Site A is the more attractive. If the ultimate objective is to increase the wealth of the shareholders of Sinclair Wholesalers plc, it would be better to choose Site A even though the percentage return is lower. It is the absolute size of the return rather than the relative (percentage) size that is important. This is a general problem of using comparative measures, such as percentages, when the objective is measured in absolute terms, such as an amount of money.

Real World 4.3 illustrates how using percentage measures can lead to confusion.

Real World 4.3

Increasing road capacity by sleight of hand

During the 1970s, the Mexican government wanted to increase the capacity of a major four-lane road. It came up with the idea of repainting the lane markings so that there were six narrower lanes occupying the same space as four wider ones had previously done. This increased the capacity of the road by 50 per cent (that is, $^2/_4 \times 100$). A tragic outcome of the narrower lanes was an increase in deaths from road accidents. A year later the Mexican government had the six narrower lanes changed back to the original four wider ones. This reduced the capacity of the road by 33 per cent (that is, $^2/_6 \times 100$). The Mexican government reported that, overall, it had increased the capacity of the road by 17 per cent (that is, 50% – 33%), despite the fact that its real capacity was identical to that which it had been originally. The confusion arose because each of the two percentages (50 per cent and 33 per cent) is based on different bases (four and six).

Source: Gigerenzer, G. (2002) *Reckoning with Risk*, Penguin.

PAYBACK PERIOD (PP)

The second approach to appraising possible investments is the **payback period (PP)**. This is the time taken for an initial investment to be repaid out of the net cash inflows from a project. As the PP method takes time into account, it appears at first glance to overcome a key weakness of the ARR method.

Let us consider PP in the context of the Billingsgate Battery example. We should recall that the project's cash flows are:

Time		£000
Immediately	Cost of machine	(100)
1 year's time	Operating profit before depreciation	20
2 years' time	Operating profit before depreciation	40
3 years' time	Operating profit before depreciation	60
4 years' time	Operating profit before depreciation	60
5 years' time	Operating profit before depreciation	20
5 years' time	Disposal proceeds	20

Note that all of these figures are amounts of cash to be paid or received (we saw earlier that operating profit before depreciation is a rough measure of the cash flows from the project).

The payback period can be derived by calculating the cumulative cash flows as follows:

Time		Net cash flows £000	Cumulative cash flows £000	
Immediately	Cost of machine	(100)	(100)	
1 year's time	Operating profit before depreciation	20	(80)	$(-100 + 20)$
2 years' time	Operating profit before depreciation	40	(40)	$(-80 + 40)$
3 years' time	Operating profit before depreciation	60	20	$(-40 + 60)$
4 years' time	Operating profit before depreciation	60	80	$(20 + 60)$
5 years' time	Operating profit before depreciation	20	100	$(80 + 20)$
5 years' time	Disposal proceeds	20	120	$(100 + 20)$

We can see that the cumulative cash flows become positive at the end of the third year. Thus, if we assume that cash flows occur at the year-ends, the investment will take three years for the initial outlay to be paid back. If, however, we assume that cash flows occur evenly over the year, the payback period will be:

$$2 \text{ years} + \left(\frac{40}{60}\right) = 2\,{}^2\!/_3 \text{ years}$$

where the top part of the fraction (40) represents the cash flow needed at the beginning of the third year to repay the initial outlay and the bottom part (60) represents the projected cash flow during the third year.

The following decision rules apply when using PP:

- **For a project to be acceptable, it should have a payback period no longer than a maximum payback period set by the business.**
- **If there are two (or more) competing projects with payback periods that are no longer than the maximum payback period, the project with the shorter (or shortest) payback period should be selected.**

Thus, if Billingsgate Battery project had a maximum payback period requirement of four years, it should be undertaken. If, however, there was a maximum payback period requirement of two years the project would not be acceptable.

What is the payback period of the Chaotic Industries project from Activity 4.2?

The inflows and outflows are expected to be:

Time		Net cash flows £000	Cumulative net cash flows £000	
Immediately	Cost of vans	(150)	(150)	
1 year's time	Saving before depreciation	30	(120)	(−150 + 30)
2 years' time	Saving before depreciation	30	(90)	(−120 + 30)
3 years' time	Saving before depreciation	30	(60)	(−90 + 30)
4 years' time	Saving before depreciation	30	(30)	(−60 + 30)
5 years' time	Saving before depreciation	30	0	(−30 + 30)
6 years' time	Saving before depreciation	30	30	(0 + 30)
6 years' time	Disposal proceeds from the vans	30	60	(30 + 30)

The payback period here is five years. It is not until the end of the fifth year that the vans will pay for themselves out of the savings that they are expected to generate.

The logic of using PP is that projects that can recoup their cost quickly are financially more appealing than those with longer payback periods. In other words, it emphasises liquidity.

The PP method has certain advantages. It is quick and easy to calculate and can be easily understood by managers. PP is an improvement on ARR by its use of cash flows (rather than accounting flows) and by taking account of their timing. It is not, however, a complete answer to the problem.

Problems with PP

To understand why PP is not a complete answer, consider the following cash flows arising from three competing projects:

Time		Project 1 £000	Project 2 £000	Project 3 £000
Immediately	Cost of machine	(200)	(200)	(200)
1 year's time	Operating profit before depreciation	70	20	70
2 years' time	Operating profit before depreciation	60	20	100
3 years' time	Operating profit before depreciation	70	160	30
4 years' time	Operating profit before depreciation	80	30	200
5 years' time	Operating profit before depreciation	50	20	440
5 years' time	Disposal proceeds	40	10	20

Can you see from the above why PP is not a complete answer to the problem concerning the timing of cash flows? (*Hint*: Again, the defect is not concerned with the ability of the manager to forecast future events. This is a problem, but it is a problem whatever approach we take.)

The PP for each project is three years and so the PP method would regard the projects as being equally acceptable. It cannot distinguish between those projects that pay back a significant amount early within the three-year payback period and those that do not.

In addition, this method ignores cash flows beyond the payback period. Managers concerned with increasing owners' wealth would greatly prefer Project 3 because the cash inflows are received earlier. In fact, most of the initial cost of making the investment has been repaid by the end of the second year. Furthermore, the cash inflows over the life of the project are very much greater.

The cumulative cash flows of each project in Activity 4.6 are set out in Figure 4.2.

The payback method of investment appraisal would view Projects 1, 2 and 3 as being equally attractive. In doing so, the method completely ignores the fact that Project 3 provides most of the payback cash earlier in the three-year period and goes on to generate large benefits in later years.
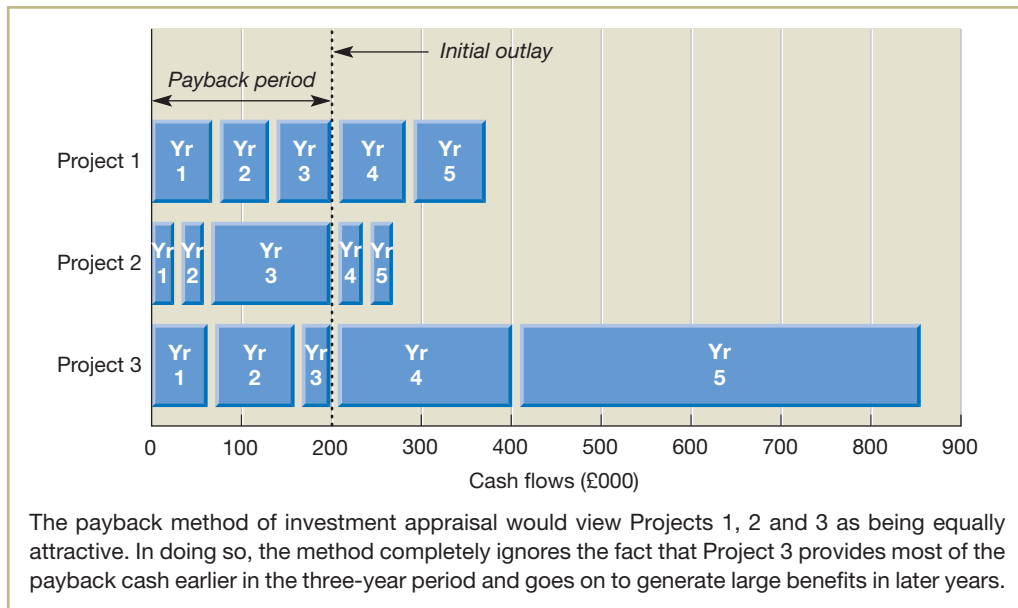
Figure 4.2 Cumulative cash flows for each project in Activity 4.6

Source: Adapted from Atrill, P. and McLaney E. (2009) *Accounting: An Introduction*, 5th edn, Pearson Education.

There are further problems with the PP method, which are considered below.

Relevant information

We saw earlier that the PP method is simply concerned with how quickly the initial investment can be recouped. While this neatly avoids the practical problems of forecasting cash flows over a long period, it means that not all relevant information will be taken into account. Cash flows arising beyond the payback period will be ignored.

Risk

By favouring projects with a short payback period, the PP method provides a way of dealing with risk. However, it offers a fairly crude approach to the problem. It deals only with the risk that the project will end earlier than expected. There are many other risk areas. For example, what about the risk that product demand will be less than expected? More systematic approaches to dealing with risk are available and we shall look at these in the next chapter.

Wealth maximisation

Although the PP method takes some note of the timing of project costs and benefits, it is not concerned with maximising the wealth of the business owners. Rather, it favours projects that pay for themselves quickly.

Target payback period

Managers must decide upon a maximum acceptable payback period. When doing so, they confront a similar problem to that arising when setting a target ARR. No objective basis can be used to determine this period: it is simply a matter of judgement.

Real World 4.4 is a short extract from the 2018 annual report of UK-based Associated British Foods plc which discusses how it uses solar power in one of the business's Australian bakeries and how quickly the cost of installing it is paid for through electricity cost savings.

Real World 4.4

It's payback time at tip top Bakery

The city of Townsville in Far North Queensland is one of the sunniest locations in Australia, making it a prime area for solar installations. In December 2017, a 97 kW solar photovoltaic system was installed at our Tip Top site in Townsville, reducing energy costs at the site and generating revenue through small-scale technology certificates. The project has an estimated payback period of just 2.8 years and will reduce greenhouse gas emissions at the site by more than 115 tonnes CO_2e a year.

Source: Associated British Foods plc, 2018 Annual Report, p. 26.

NET PRESENT VALUE (NPV)

From what we have seen so far, it seems that to make sensible investment decisions, we need a method of appraisal that both:

■ considers *all* of the cash flows for each investment opportunity, and
■ makes a logical allowance for the *timing* of those cash flows.

The third of the four methods of investment appraisal, the **net present value (NPV)** method, provides us with exactly this.

Consider the Billingsgate Battery example's cash flows, which we should recall are as follows:

Time		£000
Immediately	Cost of machine	(100)
1 year's time	Operating profit before depreciation	20
2 years' time	Operating profit before depreciation	40
3 years' time	Operating profit before depreciation	60
4 years' time	Operating profit before depreciation	60
5 years' time	Operating profit before depreciation	20
5 years' time	Disposal proceeds	20

Given a financial objective of maximising owners' wealth, it would be easy to assess this investment if all cash inflows and outflows were to occur immediately. It would then simply be a matter of adding up the cash inflows (total £220,000) and comparing them with the cash outflows (£100,000). This would lead us to conclude that the project should go ahead because the owners would be better off by £120,000. It is, of course, not as easy as this because time is involved. The cash outflow will occur immediately, whereas the cash inflows will arise at different points in the future.

Why does time matter?

Time is an important issue because people do not normally see an amount paid out now as equivalent in value to the same amount being received in a year's time. Thus, if we were offered £100 in one year's time in exchange for paying out £100 now, we would not be interested, unless we wished to do someone a favour.

Activity 4.7

Why would we see £100 to be received in a year's time as not equal in value to £100 to be paid immediately? (There are basically three reasons.)

The reasons are:

- interest lost
- risk
- inflation.

We shall now take a closer look at these three reasons in turn.

Interest lost

If we are to be deprived of the opportunity to spend our money for a year, we could equally well be deprived of its use by placing it on deposit in a bank or building society. By doing this, we could have our money back at the end of the year along with some interest earned. This interest, which is forgone by not placing our money on deposit, represents an *opportunity cost*. It arises where one course of action deprives us of the opportunity to derive benefit from an alternative course of action.

An investment must exceed the opportunity cost of the funds invested if it is to be worthwhile. Thus, if Billingsgate Battery Company sees putting the money in the bank on deposit as the alternative to investment in the machine, the return from investing in the machine must exceed the return from investing in the bank. If this is not the case, there is no reason to make the investment.

Risk

All investments expose their investors to risk. Thus, when Billingsgate Battery Company buys a machine on the strength of estimates made before its purchase, it must accept that things may not turn out as expected.

It is important to remember that the purchase decision must be taken *before* any of these things are known. Thus, it is only after the machine has been purchased that we find out whether, say, the forecast level of sales is going to be achieved. We can study reports and analyses of the market. We can commission sophisticated market surveys and advertise widely to promote sales. All these may give us more confidence in the likely outcome. Ultimately, however, we must decide whether to accept the risk that things will not turn out as expected in exchange for the opportunity to generate profits.

We saw in Chapter 1 that people normally expect greater returns in exchange for taking on greater risk. So, when considering the Billingsgate Battery Company's investment opportunity, it is not enough to say that this business should buy the machine providing the expected returns are higher than those from investing in a bank deposit. It should expect much greater returns than the bank deposit interest rate because of the much greater risk involved. The logical equivalent of investing in the machine would be an investment of similar risk. Determining how risky a particular project is, and therefore how large the **risk premium** should be, is a difficult task. We will consider this in more detail in the next chapter.

Inflation

If we are to be deprived of £100 for a year, when we come to spend that money it will not buy the same amount of goods and services as it would have done a year earlier. Generally, we shall not be able to buy as many tins of baked beans or loaves of bread or bus tickets as before. This is because of the loss in the purchasing power of money, or **inflation**, which occurs over time. Investors will expect to be compensated for this loss of purchasing power. This will be on top of a return that takes account of what could be gained from an alternative investment of similar risk.

In practice, interest rates observable in the market tend to take inflation into account. Thus, rates offered to building society and bank depositors include an allowance for the expected rate of inflation.

What should managers do?

To summarise, managers seeking to increase the wealth of business owners should invest only when they believe the owners will be adequately compensated for the loss of interest, for the loss in the purchasing power of money invested and for the risk that the expected returns may not materialise. This normally involves checking to see whether the proposed investment will yield a return greater than the basic rate of interest (which will include an allowance for inflation) plus an appropriate risk premium.

These three factors (interest lost, risk and inflation) are set out in Figure 4.3.

There are three factors that influence the required return to investors (opportunity cost of finance).
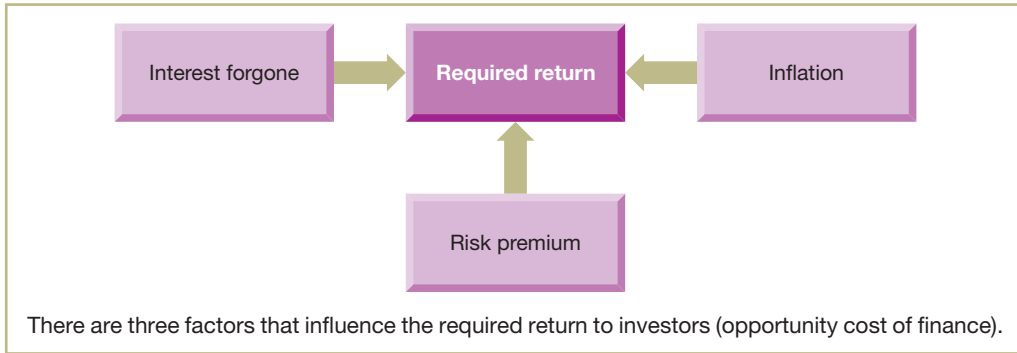
Figure 4.3 Factors influencing the return required by investors from a project

Dealing with the time value of money

We saw above that money has a *time value:* that is, £100 received today is not regarded as equivalent in value to £100 received at some future date. We cannot, therefore, simply compare the cash inflows with cash outflows for an investment where they arise at different points in time. Each of these cash flows must be expressed in similar terms. Only then can a direct comparison be made.

To illustrate how this can be done, let us return to the Billingsgate Battery Company example. We should recall that the cash flows expected from this investment are:

Time		£000
Immediately	Cost of machine	(100)
1 year's time	Operating profit before depreciation	20
2 years' time	Operating profit before depreciation	40
3 years' time	Operating profit before depreciation	60
4 years' time	Operating profit before depreciation	60
5 years' time	Operating profit before depreciation	20
5 years' time	Disposal proceeds	20

Let us assume that the business could make an alternative investment with similar risk and obtain a return of 20 per cent a year.

Activity 4.9

Given that the Billingsgate Battery Company could invest its money at a rate of 20 per cent a year, what is the present (immediate) value of the expected first-year receipt of £20,000? In other words, if instead of having to wait a year for the £20,000, and therefore be deprived of the opportunity to invest it at 20 per cent, the business could have some money now, what sum would be equivalent to getting £20,000 in one year's time?

The business should be happy to accept a lower amount immediately than if it had to wait a year. This is because it could invest this amount at 20 per cent (in the alternative project). Logically, the business should be prepared to accept the amount that, with a year's income, will grow to £20,000. If we call this amount PV (for present value) we can say:

$$PV + (PV \times 20\%) = £20,000$$

→

NET PRESENT VALUE (NPV) **163**

That is, the amount plus income from investing the amount for the year equals the £20,000.
If we rearrange this equation, we find:

$$PV \times (1 + 0.2) = £20,000$$

(Note that 0.2 is the same as 20 per cent, but expressed as a decimal.) Further rearranging gives:

$$PV = £20,000/(1 + 0.2) = £16,667$$

Thus, managers of Billingsgate Battery Company who have the opportunity to invest at 20 per cent a year should not mind whether they have £16,667 now or £20,000 in a year's time. In other words, £16,667 represents the *present value* of £20,000 received in one year's time.

We can make a more general statement about the PV of a particular cash flow. It is:

PV of the cash flow of year n = actual cash flow of year n divided by $(1 + r)^n$

where n is the year of the cash flow (that is, how many years into the future) and r is the opportunity financing cost expressed as a decimal (instead of as a percentage).

If we derive the present value (PV) of each of the cash flows associated with Billingsgate's machine investment, we can easily make the direct comparison between the cost of making the investment (£100,000) and the subsequent benefits to be derived in years 1 to 5. We have already seen how this works for the £20,000 inflow for year 1. For year 2 the calculation would be:

$$\text{PV of year 2 cash flow (that is, £40,000)} = £40,000/(1 + 0.2)^2 = £40,000/(1.2)^2$$
$$= £40,000/1.44 = £27,778$$

Thus, the present value of the £40,000 to be received in two years' time is £27,778.

Activity 4.10

See whether you can show that Billingsgate Battery would find £27,778, receivable now, equally acceptable to receiving £40,000 in two years' time, assuming that there is a 20 per cent investment opportunity.

To answer this activity, we simply apply the principles of *compounding*. Income earned is reinvested and then added to the initial investment to derive its future value. Thus:

	£
Amount available for immediate investment	27,778
Income for year 1 (20% × 27,778)	5,556
	33,334
Income for year 2 (20% × 33,334)	6,667
	40,001

(The extra £1 is only a rounding error.)
Since Billingsgate Battery can turn £27,778 into £40,000 in two years, these amounts are equivalent. That is, £27,778 is the present value of £40,000 receivable after two years (given a 20 per cent cost of finance).

The act of reducing the value of a cash flow, to take account of the period between the present time and the time that the cash flow is expected, is known as **discounting**. In effect, discounting charges the project with the cost of financing it. Ignoring this financing cost would be to overlook a significant cost of undertaking the project.

Calculating the net present value

Now let us calculate the present values of all of the cash flows associated with the Billingsgate machine project and from them, the *net present value* of the project as a whole.

The relevant cash flows and calculations are as follows:

Time	Cash flow £000	Calculation of PV	PV £000
Immediately (time 0)	(100)	$*(100)/(1 + 0.2)^0$	(100.00)
1 year's time	20	$20/(1 + 0.2)^1$	16.67
2 years' time	40	$40/(1 + 0.2)^2$	27.78
3 years' time	60	$60/(1 + 0.2)^3$	34.72
4 years' time	60	$60/(1 + 0.2)^4$	28.94
5 years' time	20	$20/(1 + 0.2)^5$	8.04
5 years' time	20	$20/(1 + 0.2)^5$	8.04
Net present value (NPV)			24.19

*Note that $(1 + 0.2)^0 = 1$.

Once again, we must decide whether the machine project is acceptable to the business. To help us, the following decision rules for NPV should be applied:

- **If the NPV is positive, the project should be accepted; if it is negative, the project should be rejected.**
- **If there are two (or more) competing projects that have positive NPVs, the project with the higher (or highest) NPV should be selected**.

In this case, the NPV is positive, so we should accept the project and buy the machine. The reasoning behind this decision rule is quite straightforward. Investing in the machine will make the business, and its owners, £24,190 better off than they would be by taking up the next best available opportunity. The gross benefits from investing in this machine are worth £124,190 today. Since the business can 'buy' these benefits for just £100,000 today, the investment should be made. If, however, the present value of the gross benefits were below £100,000, it would be less than the cost of 'buying' those benefits and the opportunity should therefore be rejected.

Activity 4.11

What is the *maximum* the Billingsgate Battery Company would be prepared to pay for the machine, given the potential benefits of owning it?

The business would logically be prepared to pay up to £124,190 since the wealth of the owners of the business would be increased up to this price – although the business would prefer to pay as little as possible.

Using present value tables

To deduce each PV in the Billingsgate Battery Company project, we took the relevant cash flow and multiplied it by $1/(1 + r)^n$. There is a slightly different way to do this. Tables exist (called *present value tables*, or *discount tables*) that show values of this **discount factor** for a range of values of r and n. Such a table appears in Appendix A at the end of the book. Take a look at it.

Look at the column for 20 per cent and the row for one year. We find that the factor is 0.833. This means that the PV of a cash flow of £1 receivable in one year is £0.833. So the present value of a cash flow of £20,000 receivable in one year's time is £16,660 (that is, 0.833 × £20,000). This is the same result, ignoring rounding errors, as we found earlier by using the equation.

Activity 4.12

What is the NPV of the Chaotic Industries project from Activity 4.2, assuming a 15 per cent opportunity cost of finance (discount rate)? (Use the table in Appendix A.)

Remember that the inflows and outflow are expected to be:

Time		£000
Immediately	Cost of vans	(150)
1 year's time	Saving before depreciation	30
2 years' time	Saving before depreciation	30
3 years' time	Saving before depreciation	30
4 years' time	Saving before depreciation	30
5 years' time	Saving before depreciation	30
6 years' time	Saving before depreciation	30
6 years' time	Disposal proceeds from the vans	30

The calculation of the NPV of the project is as follows:

Time	Cash flows £000	Discount factor (15%)	Present value £000
Immediately	(150)	1.000	(150.00)
1 year's time	30	0.870	26.10
2 years' time	30	0.756	22.68
3 years' time	30	0.658	19.74
4 years' time	30	0.572	17.16
5 years' time	30	0.497	14.91
6 years' time	30	0.432	12.96
6 years' time	30	0.432	12.96
		NPV	(23.49)

Activity 4.13

How would you interpret this result?

The project has a negative NPV. This means that the present values of the benefits from the investment are worth less than the initial outlay. Any amount up to £126,510 (the present value of the benefits) would be worth paying, but not £150,000.

The present value table in Appendix A shows how the value of £1 diminishes as its receipt goes further into the future. Assuming an opportunity cost of finance of 20 per cent a year, £1 to be received immediately, obviously, has a present value of £1. However, as the time before it is to be received increases, the present value diminishes significantly, as shown in Figure 4.4.

The present value of a future receipt (or payment) of £1 depends on how far in the future it will occur. Those that occur in the near future will have a larger present value than those occurring at a more distant point in time.
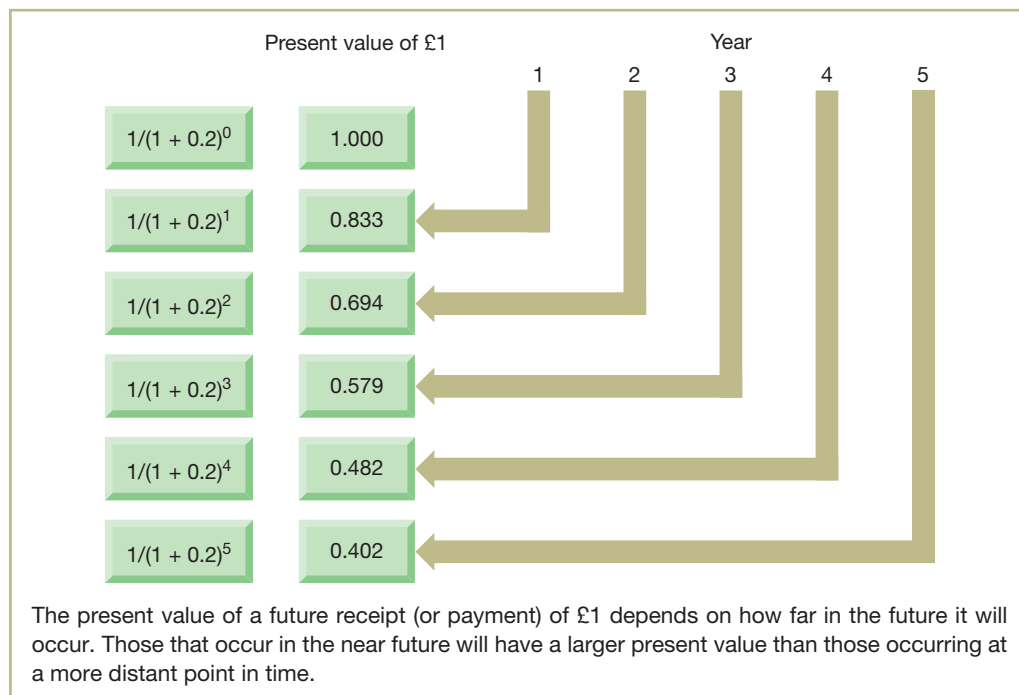
Figure 4.4 Present value of £1 receivable at various times in the future, assuming an annual financing cost of 20 per cent

The discount rate and the cost of capital

We have seen that the appropriate discount rate to use in NPV assessments is the opportunity cost of finance. This is, in effect, the cost to the business of the finance needed to fund the investment. It will normally be the cost of a mixture of funds (shareholders' funds and borrowings) employed by the business and is often referred to as the **cost of capital**. We shall refer to it as cost of capital from now on. The way in which we determine the cost of capital for a business will be considered in detail in Chapter 8.

WHY NPV IS BETTER

From what we have seen, NPV offers a better approach to appraising investment opportunities than either ARR or PP. This is because it fully takes account of each of the following:

■ *The timing of the cash flows.* By discounting the various cash flows associated with each project according to when they arise, NPV takes account of the time value of money.

Furthermore, as the discounting process takes account of the opportunity cost of capital, the net benefit *after* financing costs have been met is identified (as the NPV of the project).

■ *The whole of the relevant cash flows.* NPV includes *all* of the relevant cash flows. They are treated differently according to their date of occurrence, but they are all taken into account. Thus, they all have an influence on the decision.

■ *The objectives of the business.* NPV is the only method of appraisal in which the output of the analysis has a direct bearing on the wealth of the owners of the business. Positive NPVs enhance wealth; negative ones reduce it. Since we assume that private-sector businesses seek to increase owners' wealth, NPV is superior to the other two methods discussed.

NPV and economic value

NPV can provide the basis for valuing an *economic asset*. This is any asset capable of yielding financial benefits and will include such things as equity shares and loans. The *economic value* of this type of asset will depend on the net benefits that it generates. It can be derived by adding together the discounted (present) values of the asset's future net cash flows.

Real World 4.5 below describes how an energy business used the NPV approach to value some of the economic benefits of acquiring a rival business.

Real World 4.5

Shale scale

Increasingly, companies in the shale industry are arguing for the benefits of scale, saying they can achieve more efficient operations and make savings on administration and procurement.

Diamondback Energy, an independent producer focused on the Permian Basin, this week announced an agreed $9.2bn takeover of rival Energen, which operates in the same region. It said it could achieve initial cost savings and productivity improvements with a net present value of $2bn from combining the two businesses.

INTERNAL RATE OF RETURN (IRR)

This is the last of the four major methods of investment appraisal found in practice. It is closely related to the NPV method in that both involve discounting future cash flows. The **internal rate of return (IRR)** of an investment is the discount rate that, when applied to its future cash flows, will produce an NPV of precisely zero. In essence, it represents the yield, or percentage return, from an investment opportunity.

When we discounted the cash flows of the Billingsgate Battery Company machine project at 20 per cent, we found that the NPV was a positive figure of £24,190 (see p. 165). What does the NPV of the machine project tell us about the rate of return that the investment will yield for the business (that is, the project's IRR)?

As the NPV is positive when discounting at 20 per cent, it implies that the project's rate of return is more than 20 per cent. The fact that the NPV is a pretty large amount suggests that the actual rate of return is quite a lot above 20 per cent. The higher the discount rate, the lower will be the NPV. This is because a higher discount rate gives a lower discounted figure.

IRR cannot usually be calculated directly. Iteration (trial and error) is the approach normally adopted. Doing this manually can be fairly laborious. Fortunately, computer spreadsheet packages can do this with ease.

Despite it being laborious, we shall calculate the IRR for the Billingsgate project manually. We have to increase the size of the discount rate in order to reduce NPV. This is because a higher discount rate gives a lower discounted figure.

Let us try a higher rate, say 30 per cent, and see what happens.

Time	Cash flow £000	Discount factor 30%	PV £000
Immediately (time 0)	(100)	1.000	(100.00)
1 year's time	20	0.769	15.38
2 years' time	40	0.592	23.68
3 years' time	60	0.455	27.30
4 years' time	60	0.350	21.00
5 years' time	20	0.269	5.38
5 years' time	20	0.269	5.38
		NPV	(1.88)

By increasing the discount rate from 20 per cent to 30 per cent, we have reduced the NPV from £24,190 (positive) to £1,880 (negative). Since the IRR is the discount rate that will give us an NPV of exactly zero, we can conclude that the IRR of Billingsgate Battery Company's machine project is very slightly below 30 per cent. Further trials could lead us to the exact rate, but there is probably not much point, given likely inaccuracies with the cash flow estimates. For most practical purposes, it is good enough to say that the IRR is about 30 per cent.

The relationship between the NPV method discussed earlier and the IRR is shown graphically in Figure 4.5 using the information relating to the Billingsgate Battery Company.
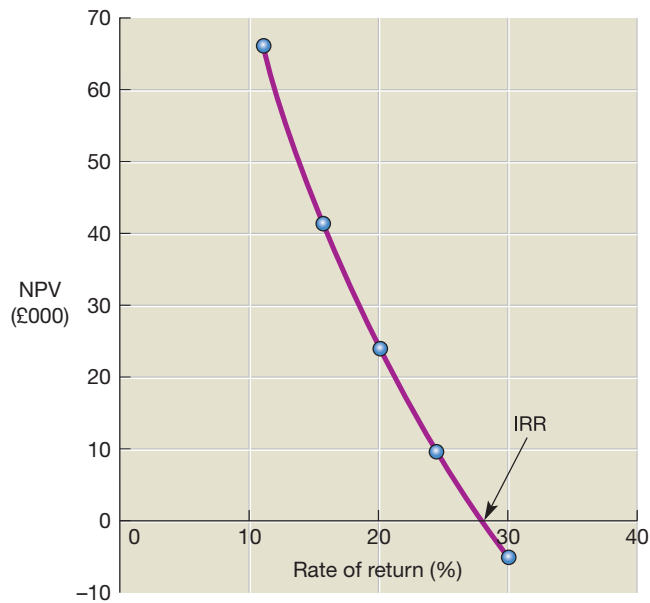
When the NPV line crosses the horizontal axis, there will be a zero NPV. The point where it crosses is the IRR.

Figure 4.5 The relationship between the NPV and IRR methods

Source: Adapted from Atrill, P. and McLaney E. (2009) *Accounting: An Introduction*, 5th edn, Pearson Education.

In Figure 4.5, if the discount rate is equal to zero, the NPV will be the sum of the net cash flows. In other words, no account is taken of the time value of money. However, as the discount rate increases there is a corresponding decrease in the NPV of the project. When the NPV line crosses the horizontal axis, there will be a zero NPV. That point represents the IRR.

Activity 4.15

What is the internal rate of return of the Chaotic Industries project from Activity 4.2? (*Hint*: Remember that you already know the NPV of this project at 15 per cent (from Activity 4.12).)

Since we know that at a 15 per cent discount rate, the NPV is a relatively large negative figure, our next trial is using a lower discount rate, say 10 per cent:

Time	Cash flows £000	Discount factor 10%	Present value £000
Immediately	(150)	1.000	(150.00)
1 year's time	30	0.909	27.27
2 years' time	30	0.826	24.78
3 years' time	30	0.751	22.53
4 years' time	30	0.683	20.49
5 years' time	30	0.621	18.63
6 years' time	30	0.564	16.92
6 years' time	30	0.564	16.92
		NPV	(2.46)

This figure is close to zero NPV. However, the NPV is still negative and so the precise IRR will be a little below 10 per cent.

We could undertake further trials to derive the precise IRR. If done manually, this can be quite time-consuming. We can, however, get an acceptable approximation to the answer fairly quickly by first calculating the change in NPV arising from a 1 per cent change in the discount rate. This is achieved by taking the difference between the two trials (that is, 15 per cent and 10 per cent) that have already been carried out (in Activities 4.12 and 4.15):

Trial	Discount factor %	Net present value £000
1	15	(23.49)
2	10	(2.46)
Difference	5	21.03

The change in NPV for every 1 per cent change in the discount rate will be:

$$(21.03/5) = 4.21$$

The reduction in the 10% discount rate required to achieve a zero NPV would therefore be:

$$(2.46/4.21) \times 1\% = 0.58\%$$

The IRR is therefore:

$$(10.00 - 0.58)\% = 9.42\%$$

However, to say that the IRR is about 9 per cent or 10 per cent is near enough for most purposes.

Note that this approach assumes a straight-line relationship between the discount rate and NPV. We can see from Figure 4.5 that this assumption is not strictly correct. Over a relatively short range, however, this simplifying assumption is not usually a problem and so we can still arrive at a reasonable approximation using the approach taken. As most businesses have computer software packages to derive a project's IRR, it is not normally necessary to make the calculations just described.

The following decision rules are applied when using IRR:

- **For any project to be acceptable, it must meet a minimum IRR requirement. This is often referred to as the *hurdle rate* and, logically, this should be the opportunity cost of capital.**
- **If two, or more, competing projects meet the hurdle rate, the one with the higher (or highest) IRR should be selected**

Real World 4.6 gives some examples of IRRs sought in practice.

Real World 4.6

Rates of return

IRRs for investment projects can vary considerably. Here are a few examples of the expected or target returns from investment projects of large businesses:

- Merlin Entertainments plc, the entertainments business (cinemas, Legoland, Alton Towers) targets an IRR of 14 per cent for new facilities.
- Next plc, the fashion retailer, requires an annual IRR of 30 per cent when appraising online advertising campaigns.

➡

- Rentokil Initial plc, the business services provider, has an after-tax required IRR of between 13 and 15 per cent for any investments that it may be considering.
- Draper Esprit plc, a venture capital provider, seeks an IRR of 20 per cent on its investments.

These values seem surprisingly high. A study of returns made by all of the businesses listed on the London Stock Exchange between 1900 and 2017 showed an average annual return of 5.5 per cent. This figure is the real return (that is, ignoring inflation). It would probably be fair to add at least 3 per cent to it to compare it with the targets for the businesses listed above. Also, the targets for the four businesses are probably pre-tax (the businesses do not always specify). In that case it is probably reasonable to add about a third to the average Stock Exchange returns. This would give us around 11 per cent per year. In view of this, the targets for the businesses seem rather ambitious. Next's target is very high, though it relates to advertising campaigns.

Problems with IRR

IRR shares certain key attributes with NPV. All cash flows are taken into account and their timing is logically handled. The main problem of IRR, however, is that it does not directly address the question of wealth generation. It can therefore lead to the wrong decision being made. The IRR approach will always rank a project with an IRR of 25 per cent, for example, above that of a project with an IRR of 20 per cent. Although accepting the project with the higher percentage return will often generate more wealth, this may not always be so. This is because IRR completely ignores the *scale of investment*.

With a 15 per cent cost of capital, £15 million invested at 20 per cent for one year will make us wealthier by £0.75 million (15 × (20 − 15)% = 0.75). With the same cost of capital, £5 million invested at 25 per cent for one year will make us only £0.5 million wealthier (5 × (25 − 15)% = 0.50). IRR does not acknowledge this point.

Activity 4.16

Which other investment appraisal method ignores the scale of investment?

We saw earlier that the ARR method suffers from this problem.

Competing projects do not usually possess such large differences in scale and so IRR and NPV normally give the same signal. However, as NPV will always give the correct signal, it is difficult to see why any other method should be used.

A further problem with the IRR method is that it has difficulty handling projects with unconventional cash flows. In the examples studied so far, each project has a negative cash flow arising at the start of its life and then positive cash flows thereafter. In some cases, however, a project may have both positive and negative cash flows at future points in its life. Such a pattern of cash flows can result in there being more than one IRR, or even no IRR at all. This can make the IRR method difficult to use, although it should be said that this problem is quite rare in practice.

Example 4.3

Let us assume that a project has the following pattern of cash flows:

Time	Cash flows £000s
Immediately	(4,000)
One year's time	9,400
Two years' time	(5,500)

Figure 4.6 shows the NPV of the above project for different discount rates. Once again, where the NPV touches the horizontal axis, there will be a zero NPV and this will represent the IRR.

The point at which the NPV line touches the horizontal axis will be the IRR. The figure shows that the NPV of the project is zero at a 10 per cent discount rate and a 25 per cent discount rate. Hence there are two possible IRRs for this project.
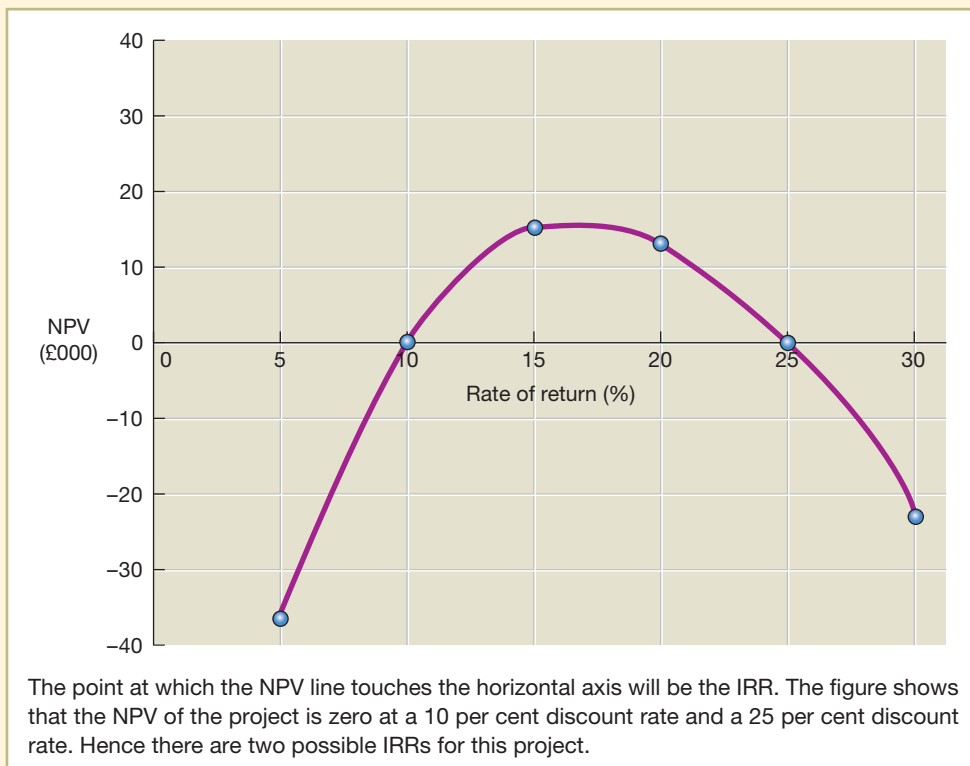
Figure 4.6 The IRR method providing more than one solution

We can see that these cash flows will give a zero NPV at both 10 per cent and 25 per cent. Thus, there are two IRRs, which can be confusing. Let us assume that the minimum acceptable IRR is 15 per cent. Should the project be accepted or rejected?

SOME PRACTICAL POINTS

When undertaking an investment appraisal, there are several practical points to bear in mind:

- *Past costs.* As with all decisions, we should take account only of **relevant costs** in our analysis. This means that only costs that vary with the decision should be considered. Thus,

all past costs should be ignored as they cannot vary with the decision. A business may incur costs (such as development costs and market research costs) *before* the evaluation of an opportunity to launch a new product. As those costs have already been incurred, they should be disregarded, even though the amounts may be substantial and relate directly to the project. Costs that have already been committed but not yet paid should also be disregarded. Where a business has entered into a binding contract to incur a particular cost, it becomes in effect a past cost even though payment may not be due until some point in the future.

■ *Common future costs.* It is not only past costs that do not vary with the decision; some future costs may be the same. For example, the cost of raw materials may not vary with the decision whether to invest in a new piece of manufacturing plant or to continue to use existing plant.

■ *Opportunity costs.* Opportunity costs arising from benefits forgone must be taken into account. Thus, for example, when considering a decision concerning whether or not to continue to use a machine already owned by the business, the realisable value of the machine may be an important **opportunity cost**.

These points concerning costs are brought together in Activity 4.17.

Activity 4.17

A garage has an old car that it bought several months ago for £3,000. The car needs a replacement engine before it can be sold. It is possible to buy a reconditioned engine for £300. This would take seven hours to fit by a mechanic who is paid £15 an hour. At present, the garage is short of work, but the owners are reluctant to lay off any mechanics or even cut down their basic working week because skilled labour is difficult to find and an upturn in repair work is expected soon.

Without the engine, the car could be sold for an estimated £3,500. What is the minimum price at which the garage should sell the car, with a reconditioned engine fitted, to avoid making a loss? (Ignore any timing differences in receipts and payments.)

The minimum price is the amount required to cover the relevant costs of the job. At this price, the business will make neither a profit nor a loss. Any price below this amount will result in a reduction in the wealth of the business. Thus, the minimum price is:

	£
Opportunity cost of the car	3,500
Cost of the reconditioned engine	300
Total	3,800

The original cost of the car is a past cost and is therefore irrelevant. However, we are told that without the engine, the car could be sold for £3,500. This is the opportunity cost of the car, which represents the real benefits forgone, and should be taken into account.

The cost of the new engine is relevant because, if the work is done, the garage will have to pay £300 for the engine; it will pay nothing if the job is not done. The £300 is a future cost that varies with the decision and should be taken into account.

The labour cost is irrelevant because the same cost will be incurred whether the mechanic undertakes the work or not. This is because the mechanic is being paid to do nothing if this job is not undertaken; thus, the additional labour cost arising from this job is zero.

- *Taxation.* Owners will be interested in the after-tax returns generated from the business. Profits from the project will be taxed, the capital investment may attract tax relief and so on. As the rate of tax is often significant, taxation becomes an important consideration when making an investment decision. Unless tax is formally taken into account, the wrong decision could easily be made. This means that both the amount and the timing of tax outflows should be reflected in the cash flows for the project.

- *Cash flows not profit flows.* We have seen that for the NPV, IRR and PP methods, it is cash flows rather than profit flows that are relevant for the assessment of investment proposals. Nevertheless, some proposals may contain only data relating to profits over the investment period. These will need to be adjusted in order to derive the cash flows. As mentioned earlier, operating profit *before* non-cash items (such as depreciation) provides an approximation to the cash flows for a particular period. We should, therefore, work back to this figure.

- *Working capital adjustment.* Where data relating to profit rather than cash flows has been provided, some adjustment for changes in working capital may also be needed. Launching a new product, for example, may give rise to an increase in the net investment made in working capital (trade receivables and inventories less trade payables). This would normally lead to an immediate outlay of cash, which should be shown as a cash outflow in the NPV calculations. However, at the end of the life of the project, the additional working capital will be released. This divestment results in an effective inflow of cash at the end of the project. This should be shown in the NPV calculations at the point at which it is received.

- *Year-end assumption.* In the examples and activities considered so far, we have assumed that cash flows arise at the end of the relevant year. This simplifying assumption is used to make the calculations easier. As already mentioned, this assumption is unrealistic as employees are paid on a weekly or monthly basis, credit customers pay within a month or two of the sale and so on. Nevertheless, it is probably not a serious distortion. If required, it is perfectly possible to deal more precisely with the timing of cash flows.

- *Interest payments.* When using discounted cash flow techniques (NPV and IRR), interest payments should not be taken into account in deriving cash flows for the period. The discount factor already takes account of the costs of financing. To include interest charges in deriving cash flows for the period would, therefore, be double counting.

- *Non-quantifiable factors.* Investment decision making must not be viewed as simply a mechanical exercise. The results derived from a particular investment appraisal method will be only one input to the decision-making process. There may be broader issues connected to the decision that have to be taken into account but may be difficult or impossible to quantify. Nevertheless, they may be critical to the final decision. The degree of confidence in the reliability of the forecasts and the validity of the assumptions used in the evaluation will also have a bearing on the final decision.

Activity 4.18

The directors of Manuff (Steel) Ltd are considering closing one of the business's factories. There has been a reduction in the demand for the products made at the factory in recent years. The directors are not optimistic about the long-term prospects for these products. The factory is situated in an area where unemployment is high.

The factory is leased, with four years of the lease remaining. The directors are uncertain whether the factory should be closed immediately or at the end of the period of the lease. Another business has offered to sublease the premises from Manuff (Steel) Ltd at a rental of £40,000 a year for the remainder of the lease period.

The machinery and equipment at the factory cost £1,500,000. The value at which they appear on the statement of financial position is £400,000. In the event of immediate closure, the machinery and equipment could be sold for £220,000. The working capital at the factory is £420,000. It could be liquidated for that amount immediately, if required. Alternatively, the working capital can be liquidated in full at the end of the lease period. Immediate closure would result in redundancy payments to employees of £180,000.

If the factory continues in operation until the end of the lease period, the following operating profits (losses) are expected:

	Year 1 £000	Year 2 £000	Year 3 £000	Year 4 £000
Operating profit (loss)	160	(40)	30	20

The above figures include a charge of £90,000 a year for depreciation of machinery and equipment. The residual value of the machinery and equipment at the end of the lease period is estimated at £40,000.

Redundancy payments are expected to be £150,000 at the end of the lease period if the factory continues in operation. The business has an annual cost of capital of 12 per cent. Ignore taxation.

(a) Determine the relevant cash flows arising from a decision to continue operations until the end of the lease period rather than to close immediately.
(b) Calculate the net present value of continuing operations until the end of the lease period rather than closing immediately.
(c) What other factors might the directors take into account before making a final decision on the timing of the factory closure?
(d) State, with reasons, whether or not the business should continue to operate the factory until the end of the lease period.

Your answer should be as follows:

(a) Relevant cash flows

	Years				
	0	1	2	3	4
	£000	£000	£000	£000	£000
Operating cash flows (Note 1)		250	50	120	110
Sale of machinery (Note 2)	(220)				40
Redundancy costs (Note 3)	180				(150)
Sublease rentals (Note 4)		(40)	(40)	(40)	(40)
Working capital invested (Note 5)	(420)				420
	(460)	210	10	80	380

Notes:
1 Each year's operating cash flows are calculated by adding back the depreciation charge for the year to the operating profit for the year. In the case of the operating loss, the depreciation charge is deducted.
2 In the event of closure, machinery could be sold immediately. Thus an opportunity cost of £220,000 is incurred if operations continue.
3 By continuing operations, there will be a saving in immediate redundancy costs of £180,000. However, redundancy costs of £150,000 will be paid in four years' time.
4 By continuing operations, the opportunity to sublease the factory will be forgone.
5 Immediate closure would mean that working capital could be liquidated. By continuing operations this opportunity is forgone. However, working capital can be liquidated in four years' time.

(b)

	Years				
	0	1	2	3	4
Discount rate 12 per cent	1.000	0.893	0.797	0.712	0.636
Present value	(460)	187.5	8.0	57.0	241.7
Net present value	34.2				

(c) Other factors that may influence the decision include the following:
- *The overall strategy of the business.* The business may need to set the decision within a broader context. It may be necessary to manufacture the products at the factory because they are an integral part of the business's product range. The business may wish to avoid redundancies in an area of high unemployment for as long as possible.
- *Flexibility.* A decision to close the factory is probably irreversible. If the factory continues, however, there may be a chance that the prospects for the factory will brighten in the future.
- *Creditworthiness of sub-lessee.* The business should investigate the creditworthiness of the sub-lessee. Failure to receive the expected sublease payments would make the closure option far less attractive.
- *Accuracy of forecasts.* The forecasts made by the business should be examined carefully. Inaccuracies in the forecasts or any underlying assumptions may change the expected outcomes.

(d) The NPV of the decision to continue operations rather than close immediately is positive. Hence, shareholders would be better off if the directors took this course of action. The factory should therefore continue in operation rather than close down. This decision is likely to be welcomed by employees and would allow the business to maintain its flexibility.

THE MAIN METHODS SUMMARISED

The main methods of investment appraisal are summarised in Figure 4.7. The figure shows the four investment appraisal methods discussed in the chapter.

The figure shows the four investment appraisal methods discussed in the chapter.
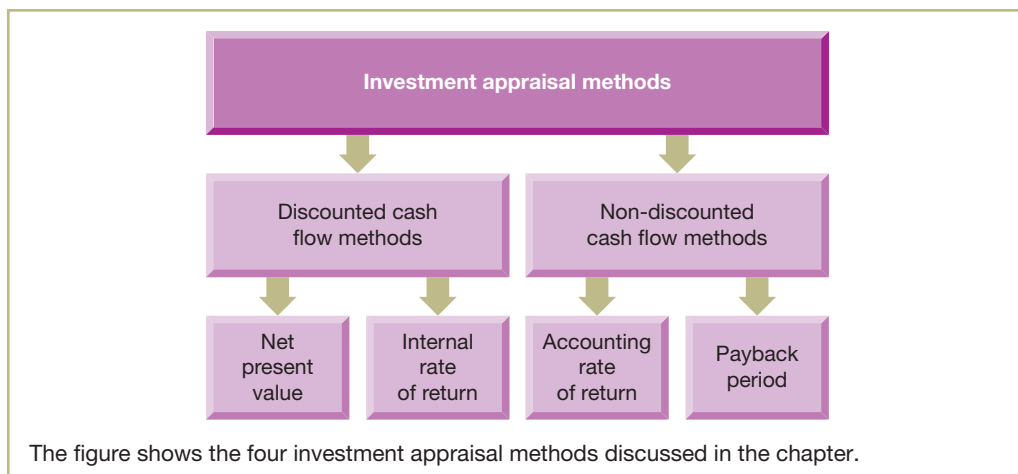
Figure 4.7 The main investment appraisal methods

Source: Adapted from Atrill, P. and McLaney, E. (2013) *Accounting and Finance for Non-Specialists*, 8th edn, Pearson Education.

Table 4.1 provides answers to questions concerning the key features of each appraisal method.

Table 4.1 Investment appraisal methods and their key features

	NPV	IRR	PP	ARR
Is it directly relation to shareholder wealth maximisation?	Yes	No	No	No
Does it take account of the time value of money?	Yes	Yes	No	No
Is it based on the use of cash flows?	Yes	Yes	Yes	No
Is all relevant information (apart from timing) taken into account?	Yes	Yes	No	Yes
Is there a clear decision rule?	Yes	Yes	Yes	Yes
Does the decision rule depend on management judgement?	No	No	Yes	Yes
Is it easy to use?	Yes	Usually	Yes	Yes

INVESTMENT APPRAISAL IN PRACTICE

Many surveys have been conducted in economically developed countries into the methods of investment appraisal used by businesses. They have revealed the following:

- Businesses tend to use more than one method to assess each investment decision.
- The discounting methods (NPV and IRR) have become increasingly popular over time. NPV and IRR are now the most popular of the four methods.
- PP continues to be popular and, to a lesser extent, so does ARR. This is despite the theoretical shortcomings of both methods.
- Larger businesses rely more heavily on discounting methods than smaller businesses and tend to use more of the four methods.

Below we provide a few examples of the survey results in this area.

Survey evidence

A survey of large businesses in five economically developed countries showed considerable support for the NPV and IRR methods. **Real World 4.7** sets out some key findings.

Real World 4.7

A multinational survey of business practice

A survey of investment and financing practices in five different countries was carried out by Cohen and Yagil. This survey, based on a sample of the largest 300 businesses in each country, revealed the following concerning the popularity of three of the investment appraisal methods discussed in this chapter.

Frequency of use of investment appraisal techniques
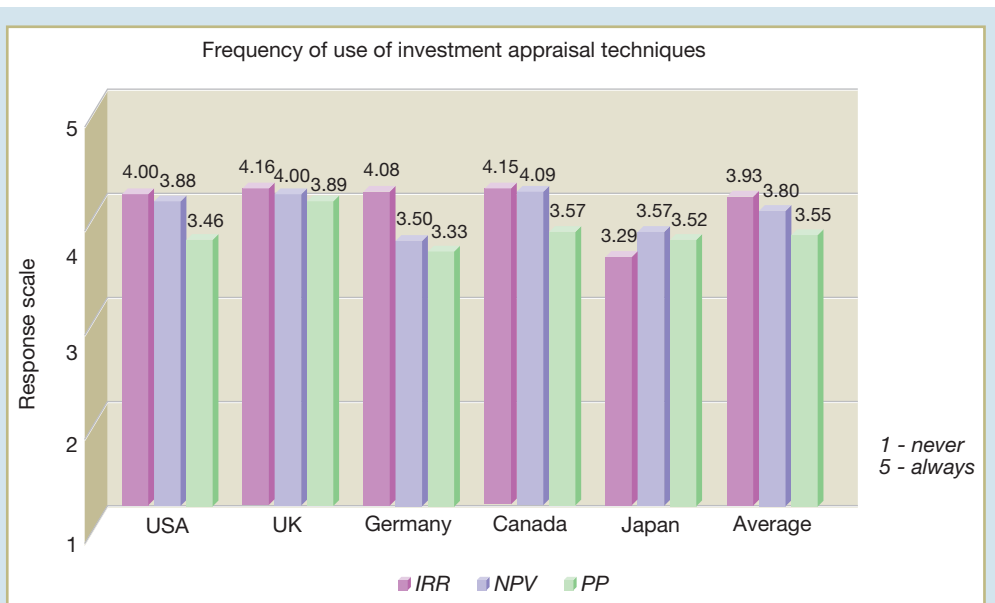
Key findings of the survey include the following:

- IRR is more popular than NPV in all countries, except Japan. However, the difference between the two methods is not statistically significant.
- Managers of UK businesses use investment appraisal techniques the most, while managers of Japanese businesses use them the least. This may be related to business traditions within each country.
- There is a positive relationship between business size and the popularity of the IRR and NPV methods. This may be related to the greater experience and understanding of financial theory of managers of larger businesses.

Source: Based on information in G. Cohen and J. Yagil (2007) 'A multinational survey of corporate financial policies', *Journal of Applied Finance*. vol 17(1).

A survey of 214 Canadian businesses listed on the Toronto Stock Exchange found that 75 per cent often, or always, use NPV while around 68 per cent often, or always, use IRR. The IRR method was, however, more popular among larger businesses. The payback method was also popular with 67 per cent of businesses often or always using this method. ARR was regarded as the least important with around 40 per cent often, or always, using this method. (See reference 1 at the end of the chapter.)

It is interesting to speculate on the reasons for the popularity of IRR revealed by the two surveys above. Perhaps it is because IRR expresses outcomes in percentage terms rather than in absolute terms. Managers are often familiar with percentage figures when dealing with financial targets.

Activity 4.19

What financial targets may be expressed in percentage terms? Try to think of at least two.

The profitability ratios covered in Chapter 3 may be used as targets. The following ratios are all expressed in percentage terms:

- gross profit margin
- operating profit margin

→

   A survey of 18 Irish public listed businesses reports found that NPV was the most important method for investment decisions followed by the payback method. IRR came third with ARR regarded as being the least important. (See reference 2 at the end of the chapter.)

   A survey of 62 small manufacturing businesses in Australia found support for the use of the payback period. More than 48 per cent of small businesses always used this method compared to around 26 per cent for the NPV method and 28 per cent for the IRR method. The ARR method trailed a long way behind with only around 5 per cent of businesses always using it. (See reference 3 at the end of the chapter.) The popularity of PP among survey respondents appears to suggest a lack of financial sophistication by managers of smaller businesses.

INVESTMENT APPRAISAL AND STRATEGIC PLANNING

So far, we have viewed investment opportunities as unconnected, independent events. In practice, however, successful businesses establish a clear framework for the selection of investment projects. Unless this framework is in place, it may be difficult to identify those projects that are likely to generate a positive NPV. The best investment projects are usually those that match the business's internal strengths (for example, skills, experience, access to finance) with the opportunities available. In areas where this match does not exist, other businesses, for which the match does exist, will have a competitive advantage. This means that they will be able to provide the product or service at a better price and/or quality.

   Setting out the framework just described is an essential part of *strategic planning*. In practice, strategic plans often have a time span of around three to five years. It involves asking, 'Where do we want our business to be in (say) five years' time and how can we get there?' It will set the appropriate direction in terms of products, markets, financing and so on, to ensure that the business is best placed to generate profitable investment opportunities.

   Real World 4.8 describes how the Walt Disney Company, the entertainment business, made an investment in 21st Century Fox, the media business. Disney's management believed that this represented a good deal. The same may not have been true, however, for another purchaser, paying the same price, for whom there was not such a high degree of strategic fit.

Real World 4.8

Fox is a good fit

Disney chief executive Robert Iger reached his original $52.4 billion deal with Mr Murdoch (founder of 21st Century Fox) in December. But Mr Iger said he was certain the new price was worth paying even though, once Fox's nearly $14 billion of outstanding debt is included, its overall value would be $85.1 billion, making it one of the largest media takeovers on record. 'After six months of integration planning we're even more enthusiastic and confident in the strategic fit of the assets and the talent at Fox,' Mr Iger said.

FT *Source*: Extract from: Platt, E., Fontanella-Khan, J. and Garrahan, M. (2018) Disney ups the ante in Fox fight with new $71.3bn offer, ft.com, 20 June.
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THE INVESTMENT APPRAISAL PROCESS

So far, we have been concerned with carrying out calculations to help choose between previously identified investment opportunities. While this is important, it is only *part* of the process of investment decision making. There are other important aspects that must be considered.

The investment appraisal process can be viewed as a sequence of six stages. These are set out in Figure 4.8 and described below.

Managing an investment project involves a sequence of six key stages. Evaluating investment projects using the appraisal techniques discussed earlier represents only one of these stages.
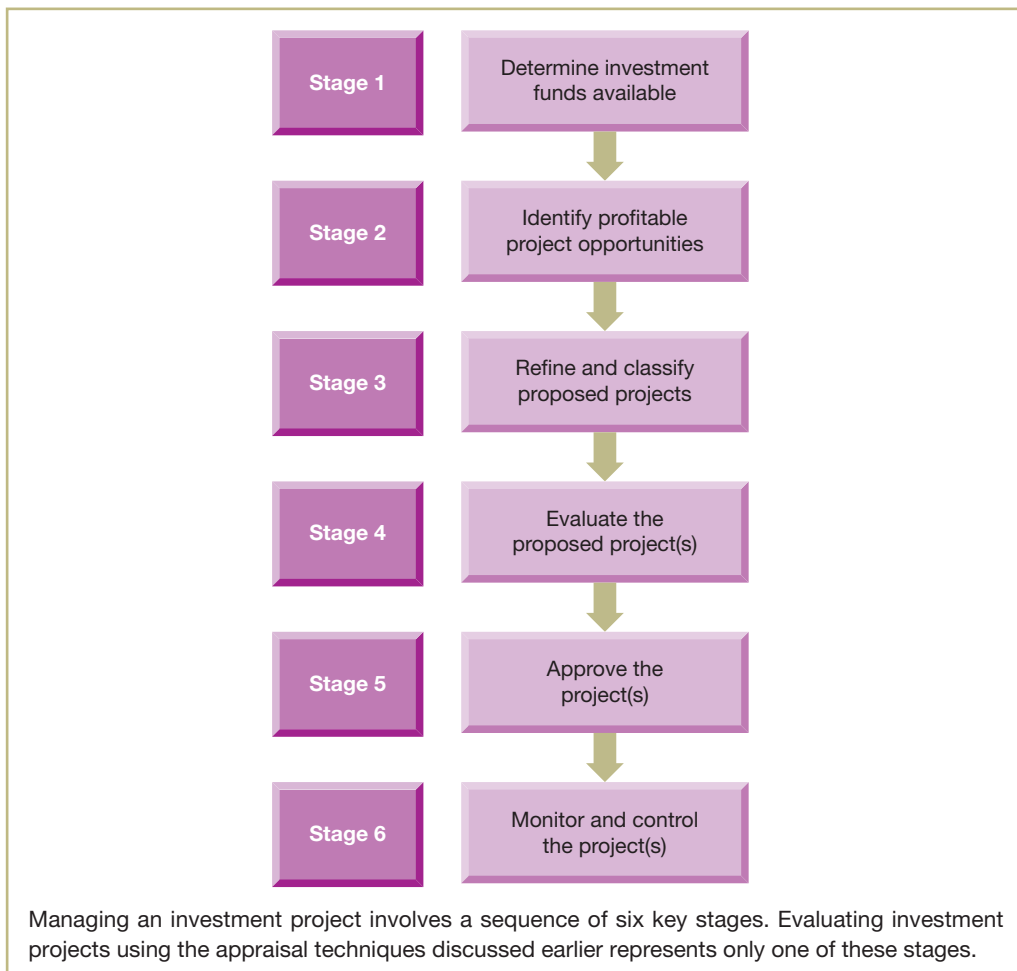
Figure 4.8 Managing the investment decision

Stage 1: Determine investment funds available

The amount of funds available for investment may be limited by the external market for funds or by internal management. In practice, it is the managers that are more likely to impose limits, perhaps because they lack confidence in the business's ability to handle high levels of investment. In either case, however, it may lead to insufficient funds being available to pursue all the potentially profitable investment opportunities identified. This shortage of investment funds is known as **capital rationing**. When it arises, managers are faced with the task of deciding on the most profitable use of those funds available. Competing investment opportunities must be

prioritised and, in order for this to be done correctly, some modification to the NPV decision rule is necessary. This point is discussed further in the next chapter.

Stage 2: Identify profitable project opportunities

A vital part of the investment process is the search for profitable investment opportunities. These opportunities can cover a wide range. They may include the development of new products or services, improving existing products or services, entering new markets, and investing to increase capacity or efficiency.

To maintain a competitive edge, the search for new investment opportunities should be considered a normal part of the planning process. Methodical routines should be carried out to identify feasible projects. As mentioned above, the investments projects pursued should fit the strategic plan of the business.

The search for new opportunities will often involve looking outside the business to identify changes in technology, customer demand, market conditions and so on. Information will need to be gathered and this will take some time, particularly for unusual or non-routine investment opportunities. This information gathering may be done through a research and development department or by some other means. Failure to do this is likely to lead to a loss of competitive position with respect to product development, production methods or market penetration.

To help identify good investment opportunities, financial incentives may be offered to employees who come forward with good investment proposals. Even unrefined proposals may be welcome. Resources can then be invested to help develop the proposals to a point where formal submissions can be made.

Activity 4.20

It can be argued that the sequence of these first two stages can be reversed. Can you figure out why?

In theory, finance can always be found for profitable investment opportunities.

Stage 3: Refine and classify proposed projects

Promising ideas need to be converted into full-blown proposals. This means that further information will probably be required, much of it detailed in nature. Collecting information can be time-consuming and costly, however, and so a two-stage process may be adopted. The first stage will involve collecting enough information to allow a preliminary screening. Many proposals fall at this first hurdle because it soon becomes clear that they are unprofitable or unacceptable for other reasons. Proposals considered worthy of further investigation will continue to the second stage. This stage will involve developing the ideas further so that more detailed screening can be carried out.

It can be helpful to classify investment opportunities. The following has been suggested as a possible framework:

- *New product development.* Where a business operates in fast-changing markets (such as computer manufacture), a regular stream of new, innovative products may be needed to survive.
- *Improving existing product sales.* To maintain or enhance competitive position, a business may continually seek to improve the quality or design of existing products.
- *Reducing costs.* New investments may seek to achieve long-term savings. Acquiring a new piece of equipment, for example, may reduce the costs incurred from scrap, equipment maintenance, quality inspection and electrical power.

- *Equipment replacement.* Equipment may have to be replaced to maintain existing levels of output.
- *Regulatory requirements.* Investment may be necessary to adhere to regulations relating to health and safety, environmental pollution, recycling and so on.

Classification can be useful in deciding on the level of information required for a particular proposal. Equipment replacement, for example, may be a routine occurrence and so a replacement proposal may only require evidence that the particular piece of equipment has reached the end of its economic life. New product development, on the other hand, may require market research evidence, a marketing plan and detailed costings to support the proposal.

Classification can also help in deciding on the acceptance criteria to be applied.

Activity 4.21

How might classification help in this way?

The different classes of investment may reflect different levels of risk. Equipment replacement, for example, may be considered to be low-risk and therefore require only a low rate of return. New product development, however, may be considered to be high-risk and so require a high rate of return. (The issue of risk and return in relation to investment proposals is considered in some detail in the following chapter.)

Stage 4: Evaluate the proposed project(s)

Once a project has undergone the preliminary screening and a proposal has been fully developed, a detailed evaluation can be carried out. For larger projects, this will involve providing answers to a number of key questions, including:

- What are the nature and purpose of the project?
- Does the project align with the overall strategy and objectives of the business?
- How much finance is required? Does this fit with the funds available?
- What other resources (such as expertise, work space and so on) are required for successful completion of the project?
- How long will the project last and what are its key stages?
- What is the expected pattern of cash flows?
- What are the major problems associated with the project and how can they be overcome?
- What is the NPV of the project? If capital is rationed, how does the NPV of this project compare with that of other opportunities available?
- Have risk and inflation been taken into account in the appraisal process and if so, what are the results?

To ensure that potential problems associated with an investment project are properly considered, some businesses carry out *premortems*. This involves inviting project managers to envisage a future in which their project has failed. They are then asked to identify reasons why this may have occurred. The aim is to encourage them to review all aspects of their proposal closely and to check that all risks have been identified and appropriately weighted. It should be of particular help where project managers are suspected of producing biased calculations through overconfidence in the merits of their project.

The ability and commitment of those responsible for proposing and managing the project will be vital to its success. This means that when evaluating a new project, one consideration

will be the quality of those proposing it. Senior managers may reject a potentially profitable project if they lack confidence in the ability of key staff to deliver the results.

Stage 5: Approve the project(s)

Once the managers responsible for investment decision making are satisfied that the project should be undertaken, formal approval can be given. However, a decision on a project may be postponed if senior managers need more information from those proposing the project, or if revisions are required to the proposal. Approval may be authorised at different levels of the management hierarchy according to the nature of the investment and/or the amount of finance required. Where rejection of a proposal seems likely, the implications of not going ahead for such areas as market share, staff morale and existing business operations must be carefully considered.

Real World 4.9 describes how Greggs plc, the bakery business, grants authority for approving investment project outlays (or capital expenditure).

Real World 4.9

Handling the dough

The capital expenditure authorisation process for Greggs plc is as follows:

- The board of directors agrees on an annual basis the appropriate level of capital expenditure.
- Within this agreed level, the chief executive can approve a single investment project up to a maximum of £3 million without prior approval of the board.
- Beyond the approved capital expenditure level, the chief executive, with prior approval of the chairman, can authorise capital expenditure up to a maximum of £3 million but this must be reported to the next board meeting. The total authorised in this way, however, must not exceed 10 per cent of the agreed total capital expenditure for the year.
- The chief executive, after discussion with the finance director, can delegate to an individual executive authority for up to £250,000 of the total capital expenditure available for the year.
- Where the board of directors authorises a capital expenditure project, the chief executive can increase the authorised amount by up to £500,000, or 10 per cent of the authorised amount, whichever is the greater. Any decision taken, however, must be reported to the board at the next board meeting.

Source: Based on information in Greggs plc, 'Operating board terms of reference', http://corporate.greggs.co.uk, accessed 5 March 2019.

Stage 6: Monitor and control the project(s)

Making a decision to invest does not automatically cause the investment to be made or mean that things will progress smoothly. Managers will need to manage the project actively through to completion. This, in turn, will require further information gathering.

Management should receive progress reports at regular intervals concerning the project. These should provide information relating to the actual cash flows for each stage of the project, which can then be compared against the forecast figures. Reasons for any significant variations should be ascertained and corrective action taken where possible. Any changes in the

expected completion date of the project, or any expected variations in future cash flows from forecasts, should be reported immediately. In extreme cases, managers may even abandon the project if things appear to have changed dramatically for the worse.

Key non-financial measures can also be used to monitor performance. These measures may include wastage rates, physical output, employee satisfaction scores and so on. Certain types of projects, such as civil engineering and construction projects, may have 'milestones' (that is, particular stages of completion) to be reached by certain dates. Progress towards each milestone should be monitored carefully and early warnings should be given of any problems that are likely to prevent their achievement. Project management techniques (for example, critical path analysis) should be employed wherever possible and their effectiveness monitored.

An important part of the control process is a **post-completion audit**. This is, in essence, a review of the project performance to see whether it lived up to expectations and whether any lessons can be learned. In addition to an evaluation of financial costs and benefits, non-financial measures of performance, such as the ability to meet deadlines and levels of quality achieved, may be examined.

Adopting post-completion audits should encourage the use of more realistic estimates at the initial planning stage. Where over-optimistic estimates are used in an attempt to secure project approval, the managers responsible should be held accountable at the post-completion stage. **Real World 4.10** provides some evidence of a need for greater realism.

Real World 4.10

Looking on the bright side

McKinsey and Co, the management consultants, surveyed 2,500 senior managers worldwide. The managers were asked their opinions on investments made by their businesses in the previous three years. The general opinion was that estimates for the investment decision inputs had been too optimistic. For example, sales levels had been overestimated in about 50 per cent of cases, but underestimated in less than 20 per cent of cases. It is not clear whether the estimates were sufficiently inaccurate to call into question the decision that had been made.

The survey went on to ask about the extent that investments made seemed, in the light of the actual outcomes, to have been mistakes. Managers felt that 19 per cent of investments that had been made should not have gone ahead. On the other hand, they felt that 31 per cent of rejected projects should have been taken up. Managers also felt that 'good money was thrown after bad' in that existing investments that were not performing well were continuing to be supported in a significant number of cases.

Source: Based on information in: 'How companies spend their money', A McKinsey Global Survey, www.theglobalmarketer.com, 2007.

Activity 4.22

Can you think of any drawbacks to the use of a post-completion audit? Could it have an adverse effect on management behaviour?

A post-completion audit may inhibit managers from proposing and supporting high-risk projects. If things go wrong, they could be blamed. This may result in only low-risk projects being submitted for approval. Managers may also feel threatened by the post-completion audit investigation and so refuse to co-operate fully with the audit team.

The behaviour of managers is likely to be influenced by the way in which a post-completion audit is conducted. If it is simply used as a device to apportion blame, then the problems mentioned in Activity 4.22 may easily occur. But if it is used in a constructive way, these problems may be avoided. It is best used as a tool for learning and should take full account of the degree of risk associated with a project.

Post-completion audits can be costly and time-consuming and so the potential benefits must be weighed against the costs involved. This may result in only larger projects being audited. However, a random sample of smaller projects may also be audited.

Real World 4.11 provides some indication of the extent to which post-completion audits are used by businesses.

Real World 4.11

Looking back

The Chartered Institute of Management Accountants (CIMA) surveyed a wide range of UK businesses. The survey was completed by 439 management accountants. One objective of the survey was to discover the extent to which post-completion audits are used in practice. The results for all businesses surveyed, as well as for very large businesses (with more than 10,000 employees), are set out in Figure 4.9.

The results show that around half of very large businesses and far less than half of businesses overall, use post-completion audits.

The results show that around half of very large businesses and far less than half of businesses overall, use post-completion audits.
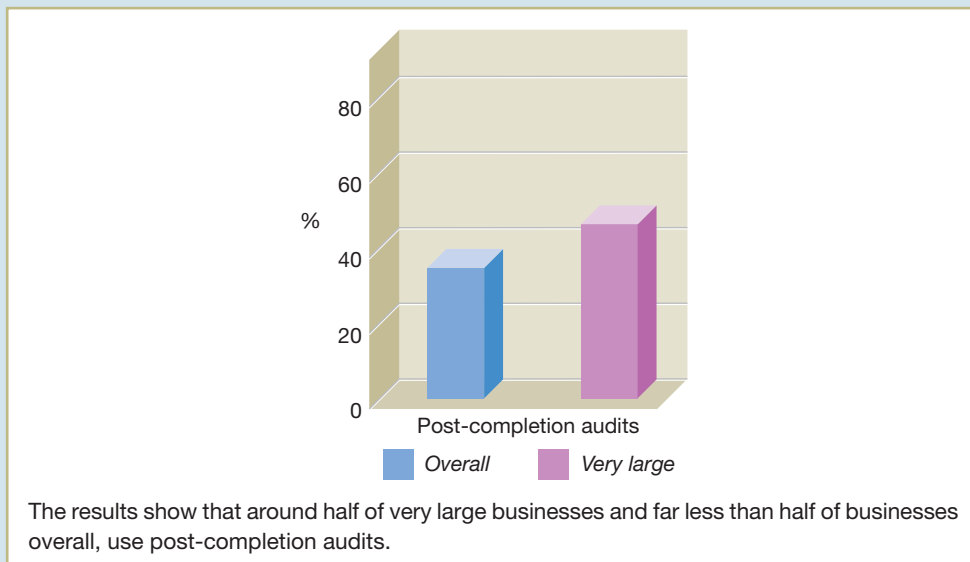
Figure 4.9 Post-completion audits

We can see that larger businesses are more likely to use this technique. This is not surprising. Larger businesses are likely to undertake more and bigger investment projects and have more finance staff to monitor business performance.

Source: Adapted from figure in 'Management accounting tools for today and tomorrow', CIMA, July 2009, p.18.

INVESTMENT DECISIONS AND HUMAN BEHAVIOUR

The sequence of stages described earlier may give the impression that investment decision making is an entirely rational process. Studies have shown, however, that this is not necessarily so. In some cases, an investment project will gather support among managers as it is being developed and the greater the level of support, the greater the potential for bias in the information used to evaluate the project. This bias may be reflected in future cash flows being overestimated, or the level of risk underestimated. In other cases, project sponsors will seek support among senior managers so that final project approval is simply a formality. These behavioural issues help to remind us that investment decisions are made by individuals who have their own agendas to pursue.

Self-assessment question 4.1

Beacon Chemicals plc is considering buying some equipment to produce a chemical named X14. The new equipment's capital cost is estimated at £100 million. If its purchase is approved now, the equipment can be bought and production can commence by the end of this year. £50 million has already been spent on research and development work. Estimates of revenues and costs arising from the operation of the new equipment appear below:

	Year 1	Year 2	Year 3	Year 4	Year 5
Sales price (£/litre)	100	120	120	100	80
Sales volume (million litres)	0.8	1.0	1.2	1.0	0.8
Variable cost (£/litre)	50	50	40	30	40
Fixed cost (£m)	30	30	30	30	30

   If the equipment is bought, sales of some existing products will be lost, resulting in a loss of contribution of £15 million a year, over the life of the equipment.

   The accountant has informed you that the fixed cost includes depreciation of £20 million a year on the new equipment. It also includes an allocation of £10 million in total over the five-year period for fixed overheads relating to the head office. A separate study has indicated that if the new equipment were bought, additional overheads, excluding depreciation, arising from producing the chemical would be £8 million a year. Production would require additional working capital of £30 million.

   For the purposes of your initial calculations, ignore taxation.

Required:
(a) Deduce the relevant annual cash flows associated with buying the equipment.
(b) Calculate the payback period.
(c) Calculate the net present value using a discount rate of 8 per cent.

   (*Hint*: You should deal with the investment in working capital by treating it as a cash outflow at the start of the project and an inflow at the end.)

The solution to this question can be found at the back of the book on pp. 637–38.

SUMMARY

The main points of this chapter may be summarised as follows:

- Four main methods of investment appraisal can be found in practice.

Accounting rate of return (ARR) is the average accounting profit from the project expressed as a percentage of the average investment

- Decision rule – projects with an ARR above a defined minimum are acceptable; the greater the ARR, the more attractive the project becomes.
- Conclusion on ARR:
  - does not relate directly to shareholders' wealth – can lead to illogical decisions
  - takes almost no account of the timing of cash flows
  - ignores some relevant information and may take account of some that is irrelevant
  - relatively simple to use
  - much inferior to NPV.

Payback period (PP) is the length of time that it takes for the cash outflow for the initial investment to be repaid out of resulting cash inflows

- Decision rule – projects with a PP up to a defined maximum period are acceptable; the shorter the PP, the more attractive the project.
- Conclusion on PP:
  - does not relate to shareholders' wealth
  - ignores inflows after the payback date
  - takes little account of the timing of cash flows
  - does not always provide clear signals
  - much inferior to NPV, but is easy to understand and can offer a liquidity insight, which may account for its widespread use.

Net present value (NPV) is the sum of the discounted values of the net cash flows from the investment

- Money has a time value.
- Decision rule – all positive NPV investments enhance shareholders' wealth; the greater the NPV, the greater the enhancement and the greater the attractiveness of the project.
- PV of a cash flow $= \text{cash flow} \times 1/(1 + r)^n$, assuming a constant cost of capital.
- Discounting brings cash flows at different points in time to a common valuation basis (their present value), which enables them to be directly compared.
- Conclusion on NPV:
  - relates directly to shareholders' wealth objective
  - takes account of the timing of cash flows
  - takes all relevant information into account
  - provides clear signals and is practical to use.

Internal rate of return (IRR) is the discount rate that, when applied to the cash flows of a project, causes it to have a zero NPV

- Represents the average percentage return on the investment, taking account of the fact that cash may be flowing in and out of the project at various points in its life.

- Decision rule – projects that have an IRR greater than the cost of capital are acceptable; the greater the IRR, the more attractive the project.

- Cannot normally be calculated directly; a trial and error approach is usually necessary.

- Conclusion on IRR:
  - does not relate directly to shareholders' wealth. Usually gives the same signals as NPV but can mislead where there are competing projects of different size
  - takes account of the timing of cash flows
  - takes all relevant information into account
  - problems of multiple IRRs when there are unconventional cash flows
  - inferior to NPV.

Use of appraisal methods in practice

- All four methods identified are widely used.

- The discounting methods (NPV and IRR) show a steady increase in usage over time.

- Many businesses use more than one method.

- Larger businesses seem to be more sophisticated in their choice and use of appraisal methods than smaller ones.

Investment appraisal and strategic planning

- It is important that businesses invest in a strategic way so as to play to their strengths.

Managing investment projects

- Determine investment funds available – dealing, if necessary, with capital rationing problems.

- Identify profitable project opportunities.

- Refine and classify the project.

- Evaluate the proposed project.

- Approve the project.

- Monitor and control the project – using a post-completion audit approach.

KEY TERMS

Accounting rate of return (ARR) p. 151	**Cost of capital** p. 167
Payback period (PP) p. 156	**Internal rate of return (IRR)** p. 168
Net present value (NPV) p. 160	**Relevant costs** p. 173
Risk premium p. 162	**Opportunity cost** p. 174
Inflation p. 162	**Capital rationing** p. 181
Discounting p. 165	**Post-completion audit** p. 185
Discount factor p. 166	

For definitions of these terms, see the Glossary, pp. 685–94.

REFERENCES

1 Kent Baker, H., Dutta, S. and Saadi, S. (2011) 'Corporate finance practices in Canada: where do we stand?', *Multinational Finance Journal*, vol. 15, pp. 157–92.

2 Kester, G. and Robbins, G. (2011) *Capital Budgeting Practices of Irish Listed Companies: Insights from CFOs on their Investment Appraisal Techniques*, GAA Accounting, 2 February, Global Accounting Alliance.

3 Hasan, M. (2013) 'Capital budgeting techniques used by small manufacturing companies', *Journal of Service Science and Management*, vol. 6, pp. 38–45.

FURTHER READING

If you would like to explore the topics covered in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 2, 3 and 4.

Drury, C. (2018) *Management and Cost Accounting*, 10th edn, South Western Cengage Learning, Chapters 13 and 14.

McLaney, E. (2017) *Business Finance: Theory and Practice*, 11th edn, Pearson, Chapters 4, 5 and 6.

Pike, R., Neale, B., and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 3–7.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found in at the back of the book on page 651.

4.1 Real World 4.6 gives examples of the rates of return that are targeted by a number of well-known businesses. It goes on to look at average returns that have been earned by UK businesses over past years. It is clear that most of the businesses mentioned have target returns that are well in excess of those that have actually been earned.

Why might these businesses have such high targets? What might be the consequences of such high targets?

4.2 The payback period method has been criticised for not taking the time value of money into account. Could this limitation be overcome? If so, would this method then be preferable to the NPV method?

4.3 Research indicates that the IRR method is extremely popular even though it has shortcomings when compared to the NPV method. Why might managers prefer to use IRR rather than NPV when carrying out discounted cash flow evaluations?

4.4 A business assesses potential investment projects on the basis of their IRRs. Why does the business need to know its cost of capital and why would it be helpful to calculate by how much a particular project's IRR exceeds it?

If you wish to try more exercises, visit the students' side of this book's companion website.

4.1 The directors of Mylo Ltd are currently considering two mutually exclusive investment projects. Both projects are concerned with the purchase of new plant. The following data are available for each project:

	Project 1 £000	Project 2 £000
Cost (immediate outlay)	100	60
Expected annual operating profit (loss):		
Year 1	29	18
2	(1)	(2)
3	2	4
Estimated residual value of the plant	7	6

The business has an estimated cost of capital of 10 per cent. It uses the straight-line method of depreciation for all non-current assets, when calculating operating profit. Neither project would increase the working capital of the business. The business has sufficient funds to meet all capital expenditure requirements.

Required:

(a) Calculate for each project:
   (i)   the net present value
   (ii) the approximate internal rate of return
   (iii) the payback period.
(b) State which, if either, of the two investment projects the directors of Mylo Ltd should accept and why.

4.2 C. George (Controls) Ltd manufactures a thermostat that can be used in a range of kitchen appliances. The manufacturing process is, at present, semi-automated. The equipment used cost £540,000 and has a carrying amount of £300,000. Demand for the product has been fairly stable and output has been maintained at 50,000 units a year in recent years.

The following data, based on the current level of output, have been prepared in respect of the product:

Using existing equipment	Per unit	
	£	£
Selling price		12.40
Labour	(3.30)	
Materials	(3.65)	
Overheads: Variable	(1.58)	
Fixed	(1.60)	(10.13)
Operating profit		2.27

Although the existing equipment is expected to last for a further four years before it is sold for an estimated £40,000, the business has recently been considering purchasing new

equipment that would completely automate much of the production process. This would give rise to production cost savings. The new equipment would cost £670,000 and would have an expected life of four years, at the end of which it would be sold for an estimated £70,000. If the new equipment is purchased, the old equipment could be sold for £150,000 immediately.

The assistant to the business's accountant has prepared a report to help assess the viability of the proposed change, which includes the following data:

Using new equipment		*Per unit*
	£	£
Selling price		12.40
Labour	(1.20)	
Materials	(3.20)	
Overheads: Variable	(1.40)	
Fixed	(3.30)	(9.10)
Operating profit		3.30

Depreciation charges will increase by £85,000 a year as a result of purchasing the new machinery; however, other fixed costs are not expected to change.

In the report the assistant wrote:

The figures shown above that relate to the proposed change are based on the current level of output and take account of a depreciation charge of £150,000 a year in respect of the new equipment. The effect of purchasing the new equipment will be to increase the operating profit to sales revenue ratio from 18.3 per cent to 26.6 per cent. In addition, the purchase of the new equipment will enable us to reduce our inventories level immediately by £130,000.

In view of these facts, I recommend purchase of the new equipment.

The business has a cost of capital of 12 per cent.

Required:

(a) Prepare a statement of the incremental cash flows arising from the purchase of the new equipment.
(b) Calculate the net present value of the proposed purchase of new equipment.
(c) State, with reasons, whether the business should purchase the new equipment.
(d) Explain why cash flow projections are used rather than profit projections to assess the viability of proposed capital expenditure projects.
Ignore taxation.

4.3 Bernese plc develops and manufactures drills for businesses operating in the oil and gas industry. Although it is committed to maximising the wealth of its shareholders, the business has incurred heavy losses over recent years. A new chief executive has now been appointed to revive the flagging fortunes of the business. As part of the revival process, a review has been ordered of all projects involving new drills that were either still being developed or were already developed and about to be launched.

Project XK150 began in Year 6 and has incurred costs of £4 million, to date, in developing and testing a new drill for use in offshore oil rigs. The project had experienced numerous problems and the drill has taken longer than expected to develop but it will be ready to market from December Year 7. The new drill is expected to generate sales over a four-year period, after which it will be replaced with an improved version.

The manager of Project XK150 has produced the following calculations to aid the review process:

Year to 30 November

	Year 8 £m	Year 9 £m	Year 10 £m	Year 11 £m
Revenue	18.3	22.5	12.6	7.2
Less				
Salary and wages	(12.7)	(14.4)	(6.6)	(2.5)
Materials and components	(2.3)	(3.5)	(1.5)	(0.6)
Overheads	(4.8)	(4.8)	(4.8)	(4.8)
Depreciation	(2.0)	(2.0)	(2.0)	(2.0)
Development costs	(1.0)	(1.0)	(1.0)	(1.0)
Interest charges on loan*	(1.5)	(1.5)	(1.5)	(1.5)
Profit/(loss)	(6.0)	(4.7)	(4.8)	(5.2)

*The loan was taken out specifically to finance the new drill.

The manager of Project XK150 is dismayed by the above results and believes that the new chief executive will call an immediate halt to the proposed launch when the results are presented to him. Before making the presentation, however, the project manager has asked you to check the figures that he has produced.

When going through the figures, you find the following:

(i) The materials and components are already held in inventories and were purchased specifically for producing the new drills. The materials and components are highly specialised and cannot be used for any other project. They have no ready market value and, if the new drills are not manufactured, the materials and components will have to be disposed of immediately at a cost to the business of £0.2 million.

(ii) The overheads reflect a 'fair share' of the total overheads incurred by the business. However, the overheads that relate specifically to the project account for only 25 per cent of the amount shown in each period.

(iii) The depreciation charge relates to existing plant and equipment which will be required for the manufacture of the new drills. This plant and equipment has a current carrying (net book) value of £8.0 million and a current resale value of £6.0 million. If the project goes ahead, the plant and equipment will be sold for £2.0 million at the end of the project's life.

(iv) Working capital of £2.5 million will be required immediately and will be released at the end of the four-year period of the life of the new drills.

(v) The development costs relate to the costs incurred during the period up to 30 November Year 7. It is the policy of the company to write off development costs in equal annual instalments over the period in which revenues are generated.

(vi) Interest charges arise from a loan that was taken out to help finance the development and manufacture of the new drills.

You can assume the calculations provided by the manager of Project XK150 contain no arithmetic errors.

The business has a cost of capital of 10 per cent.

Ignore taxation.

Required:

(a) Calculate the net present value of the new drill and briefly comment on the viability of the project.
(b) Briefly explain the reasons for any adjustments that you have made to the figures provided by the manager of Project XK150 in order to calculate the net present value of the new drill.

4.4 The accountant of your business has recently been taken ill through overwork. In his absence, his assistant has prepared some calculations of the profitability of a project, which are to be discussed soon at the board meeting of your business. His workings, which are set out below, include some errors of principle. You can assume that the statement below includes no arithmetical errors.

	Year 1 £000	Year 2 £000	Year 3 £000	Year 4 £000	Year 5 £000	Year 6 £000
Sales revenue		450	470	470	470	470
Less costs						
Materials		126	132	132	132	132
Labour		90	94	94	94	94
Overheads		45	47	47	47	47
Depreciation		120	120	120	120	120
Working capital	180					
Interest on working capital		27	27	27	27	27
Write-off of development costs	___	30	30	30	___	___
Total costs	180	438	450	450	420	420
Operating profit/(loss)	(180)	12	20	20	50	50

$$\frac{\text{Total profit (loss)}}{\text{Cost of equipment}} = \frac{(£28,000)}{£600,000} = \text{Return on investment (4.7\%)}$$

You ascertain the following additional information:

■ The cost of equipment includes £100,000, being the carrying amount of an old machine. If it were not used for this project it would be scrapped with a zero net realisable value. New equipment costing £500,000 will be purchased on 31 December Year 0. You should assume that all other cash flows occur at the end of the year to which they relate.
■ The development costs of £90,000 have already been spent.
■ Overheads have been costed at 50 per cent of direct labour, which is the business's normal practice. An independent assessment has suggested that incremental overheads are likely to amount to £30,000 a year.
■ The business's cost of capital is 12 per cent.

Required:

(a) Prepare a corrected statement of the incremental cash flows arising from the project. Where you have altered the assistant's figures you should attach a brief note explaining your alterations.
(b) Calculate:
   (i) The project's payback period.
   (ii) The project's net present value as at 31 December Year 0.
(c) Write a memo to the board advising on the acceptance or rejection of the project. Ignore taxation in your answer.

4.5 Newton Electronics Ltd has incurred expenditure of £5 million over the past three years researching and developing a miniature hearing aid. The hearing aid is now fully developed. The directors are considering which of three mutually exclusive options should be taken to exploit the potential of the new product. The options are as follows:

1 Newton Electronics Ltd could manufacture the hearing aid itself. This would be a new departure, since the business has so far concentrated on research and development projects. However, the business has manufacturing space available that it currently rents to another business for £100,000 a year. Newton Electronics Ltd would have to purchase plant and equipment costing £9 million and invest £3 million in working capital immediately for production to begin.

   A market research report, for which the business paid £50,000, indicates that the new product has an expected life of five years. Sales of the product during this period are predicted as follows:

Predicted sales for the year ended 30 November

	Year 1	Year 2	Year 3	Year 4	Year 5
Number of units (000s)	800	1,400	1,800	1,200	500

   The selling price per unit will be £30 in the first year but will fall to £22 for the following three years. In the final year of the product's life, the selling price will fall to £20. Variable production costs are predicted to be £14 a unit. Fixed production costs (including depreciation) will be £2.4 million a year. Marketing costs will be £2 million a year.

   Newton Electronics Ltd intends to depreciate the plant and equipment using the straight-line method and based on an estimated residual value at the end of the five years of £1 million. The business has a cost of capital of 10 per cent a year.

2 Newton Electronics Ltd could agree to another business manufacturing and marketing the product under licence. A multinational business, Faraday Electricals plc, has offered to undertake the manufacture and marketing of the product and in return will make a royalty payment to Newton Electronics Ltd of £5 per unit. It has been estimated that the annual number of sales of the hearing aid will be 10 per cent higher if the multinational business, rather than Newton Electronics Ltd, manufactures and markets the product.

3 Newton Electronics Ltd could sell the patent rights to Faraday Electricals plc for £24 million, payable in two equal instalments. The first instalment would be payable immediately and the second at the end of two years. This option would give Faraday Electricals the exclusive right to manufacture and market the new product.

Required:

(a) Calculate the net present value (as at 1 January Year 1) of each of the options available to Newton Electronics Ltd.
(b) Identify and discuss any other factors that Newton Electronics Ltd should consider before arriving at a decision.
(c) State what you consider to be the most suitable option and why.

Ignore taxation.

4.6 Chesterfield Wanderers is a professional football club that has enjoyed some success in recent years. As a result, the club has accumulated £10 million to spend on its further development. The board of directors is currently considering two mutually exclusive options for spending the funds available.

The first option is to acquire another player. The team manager has expressed a keen interest in acquiring Basil ('Bazza') Ramsey, a central defender, who currently plays for

a rival club. The rival club has agreed to release the player immediately for £10 million if required. A decision to acquire 'Bazza' Ramsey would mean that the existing central defender, Vinnie Smith, could be sold to another club. Chesterfield Wanderers has recently received an offer of £2.2 million for this player. This offer is still open but will be accepted only if 'Bazza' Ramsey joins Chesterfield Wanderers. If this does not happen, Vinnie Smith will be expected to stay on with the club until the end of his playing career in five years' time. During this period, Vinnie will receive an annual salary of £400,000 and a loyalty bonus of £200,000 at the end of his five-year period with the club.

Assuming 'Bazza' Ramsey is acquired, the team manager estimates that gate receipts will increase by £2.5 million in the first year and £1.3 million in each of the four following years. There will also be an increase in advertising and sponsorship revenues of £1.2 million for each of the next five years if the player is acquired. At the end of five years, the player can be sold to a club in a lower division and Chesterfield Wanderers will expect to receive £1 million as a transfer fee. 'Bazza' will receive an annual salary of £800,000 during his period at the club and a loyalty bonus of £400,000 after five years.

The second option is for the club to improve its ground facilities. The west stand could be extended and executive boxes could be built for businesses wishing to offer corporate hospitality to clients. These improvements would also cost £10 million and would take one year to complete. During this period, the west stand would be closed, resulting in a reduction in gate receipts of £1.8 million. However, gate receipts for each of the following four years would be £4.4 million higher than current receipts. In five years' time, the club has plans to sell the existing ground and to move to a new stadium nearby. Improving the ground facilities is not expected to affect the ground's value when it comes to be sold. Payment for the improvements will be made when the work has been completed at the end of the first year.

Whichever option is chosen, the board of directors has decided to take on additional ground staff. The additional wages bill is expected to be £350,000 a year over the next five years.

The club has a cost of capital of 10 per cent. Ignore taxation.

Required:

(a) Calculate the incremental cash flows arising from each of the options available to the club, and calculate the net present value of each of the options.
(b) On the basis of the calculations made in (a) above, which of the two options would you choose and why?
(c) Discuss the validity of using the net present value method in making investment decisions for a professional football club.

4.7 Haverhill Engineers Ltd manufactures components for the car industry. It is considering automating its line for producing crankshaft bearings. The automated equipment will cost £700,000. It will replace equipment with a scrap value of £50,000 and a book carrying value of £180,000.

At present, the line has a capacity of 1.25 million units per year but typically it has been run at only 80 per cent of capacity because of the lack of demand for its output. The new line has a capacity of 1.4 million units per year. Its life is expected to be five years and its scrap value at that time £100,000.

The accountant has prepared the following cost estimates based on the expected output of 1 million units per year:

	New line (per unit) Pence	Old line (per unit) pence
Materials	40	36
Labour	22	10
Variable overheads	14	14
Fixed overheads	44	20
	120	80
Selling price	150	150
Profit per unit	30	70

Fixed overheads include depreciation on the old machine of £40,000 per year and £120,000 for the new machine. It is considered that, for the business overall, fixed overheads are unlikely to change.

The introduction of the new machine will enable inventories to be reduced by £160,000. The business uses 10 per cent as its cost of capital.

You should ignore taxation.

Required:

(a) Prepare a statement of the incremental cash flows arising from the project.
(b) Calculate the project's net present value.
(c) Calculate the project's approximate internal rate of return.
(d) Explain the terms net present value and internal rate of return. State which method you consider to be preferable, giving reasons for your choice.

Chapter 5

MAKING CAPITAL INVESTMENT DECISIONS: FURTHER ISSUES

INTRODUCTION

The simple NPV decision rules mentioned in the previous chapter were: (1) all projects with a positive NPV should be accepted, and (2) where there are competing projects, the one with the higher (or highest) positive NPV should be selected. There are circumstances, however, that call for a modification to these simple decision rules and in this chapter we consider these.

Inflation has been a persistent problem for most industrialised economies. We shall examine the problems that inflation creates, and the ways in which we can adjust for the effects of inflation when undertaking discounted cash flow analysis.

Investment appraisal involves making estimates about the future. However, producing reliable estimates can be difficult, particularly where the environment is fast-changing, or where new products are being developed. Risk, which is the likelihood that what is estimated to occur will not actually occur, is an important part of investment appraisal. We end this chapter by considering the problem of risk and how it may be taken into account when making investment decisions.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Explain the modifications needed to the simple NPV decision rules where investment funds are limited, or where there are competing projects with unequal lives.

■ Discuss the effect of inflation on investment appraisal and explain how inflation may be taken into account.

■ Discuss the nature of risk and explain why it is important in the context of investment decisions.

■ Describe the main approaches to the measurement of risk and discuss their limitations.

INVESTMENT DECISIONS WHEN FUNDS ARE LIMITED

We saw in the previous chapter that projects with a positive NPV should be undertaken if the business wishes to maximise shareholder wealth. What if, however, there aren't enough funds to undertake all projects with a positive NPV? It may be that investors are not prepared to provide the necessary funds or that managers decide to restrict the funds available for investment projects. Where funds are limited and, as a result, not all projects with a positive NPV can be undertaken, the basic NPV rules require modification. To illustrate the modification required, let us consider Example 5.1.

Example 5.1

Unicorn Engineering Ltd is considering three possible investment projects: X, Y and Z. The expected pattern of cash flows for each project is as follows:

	Project cash flows		
	X	Y	Z
	£m	£m	£m
Initial outlay	(8)	(9)	(11)
1 year's time	5	5	4
2 years' time	2	3	4
3 years' time	3	3	5
4 years' time	4	5	6.5

The business has a cost of capital of 12 per cent and the investment budget for the year that has just begun is restricted to £12 million. Each project is divisible (that is, it is possible to undertake part of a project if required).

Which investment project(s) should the business undertake?

Solution

If the cash flows for each project are discounted using the cost of capital as the appropriate discount rate, the NPVs are:

	Project X			Project Y			Project Z	
Cash	Discount rate	PV	Cash	Discount rate	PV	Cash	Discount rate	PV
£m	12%	£m	£m	12%	£m	£m	12%	£m
(8)	1.00	(8.0)	(9)	1.00	(9.0)	(11)	1.00	(11.0)
5	0.89	4.5	5	0.89	4.5	4	0.89	3.6
2	0.80	1.6	3	0.80	2.4	4	0.80	3.2
3	0.71	2.1	3	0.71	2.1	5	0.71	3.6
4	0.64	2.6	5	0.64	3.2	6.5	0.64	4.2
	NPV	2.8		**NPV**	3.2		**NPV**	3.6

It is tempting to think that the best approach to dealing with the limited availability of funds would be to rank the projects according to their NPV. Hence, Project Z would be ranked first, Project Y would be ranked second and Project X would be ranked last. Given that £12 million is available, this would lead to the acceptance of Project Z (£11 million) and part of Project Y (£1 million). Therefore, the total NPV from the £12 million invested would be:

$$£3.6m + \frac{£3.2m}{9} = £4m$$

However, this solution would not represent the most efficient use of the limited funds available.

The best approach, *when projects are divisible*, is to maximise the *present value per £ of scarce finance*. By dividing the present values of the future cash inflows by the outlay for each project, a figure that represents the present value per £ of scarce finance is obtained. This provides the basis for a measure known as the **profitability index**.

Using the information above, the following figures would be obtained for the profitability index for each project. (In each case, the top part of the fraction represents the future cash flows *before* deducting the investment outlays.)

	Project X	*Project Y*	*Project Z*
Profitability index:	$\frac{10.8}{8.0}$	$\frac{12.2}{9.0}$	$\frac{14.6}{11.0}$
	= 1.35	= 1.36	= 1.33

Note that all the projects provide a profitability index of greater than 1. This will always be so where the NPV from a project is positive.

Activity 5.1

What does the profitability index calculated in Example 5.1 suggest about the relative profitability of the projects? What would be the NPV of the £12 million invested, assuming the profitability index approach is used?

The above calculations indicate that Project Y provides the highest present value per £ of scarce finance and so should be ranked first. Project X should be ranked second and Project Z should be ranked third. To maximise the use of the limited funds available (£12 million), the business should, therefore, undertake all of Project Y (£9 million) and part of Project X (£3 million).

The total NPV of the £12 million invested would be £3.2 million + (3/8 × £2.8 million) = £4.3 million. Note that this figure is higher than the total NPV obtained where projects were ranked according to their absolute NPVs.

Real World 5.1 shows how the profitability index was used to evaluate the viability of deepwater oil and gas reservoirs.

Getting into deep water

The following is an extract from an article in which it is argued that oil and gas businesses have pursued a strategy of 'volumes over value'. This has led them to invest in deep water projects with large reservoirs of oil and gas that do not provide the best use of capital invested.

Operators chased opportunities in deep water in the hopes of finding large accumulations that could be significantly accretive to their production and cash flow. Many operators, in fact, found these large accumulations. But the more important question for the long-term is whether bigger is always better? As [Figure 5.1] suggests – maybe not!

The figure shows that, beyond a certain point, the profitability index starts for fall as the reservoir volume increases.
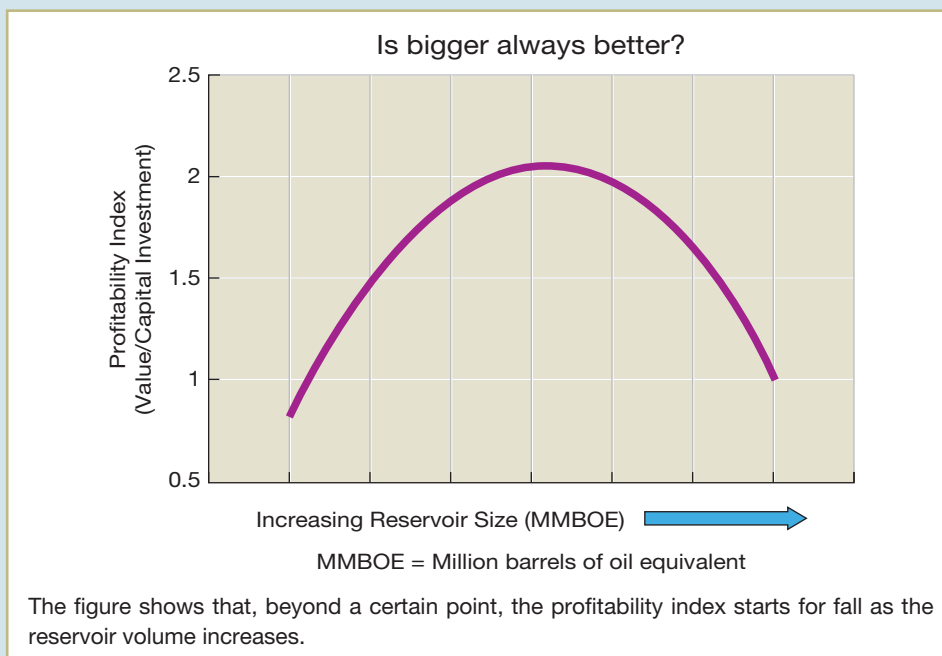
Figure 5.1 Is bigger always better?

The figure illustrates the relationship between the estimated reservoir size (P50 hydrocarbons in place) and the profitability index (How much value does each dollar of capital generate?). The data represents real projects, contained in IPA's proprietary Oil and Gas Databases, which are currently in various stages of planning or execution and focused only on deep water projects globally. Most companies use the profitability index as a hurdle to decide which projects move forward and which don't. The figure shows that bigger reservoirs aren't always the most profitable.

The profitability index increases with larger reservoirs – more reserves, more production, more revenue etc. – up to a point when the capital expenditure required outstrips the gain in higher production. Beyond this 'inflexion point', larger reservoirs make a company's portfolio increasingly capital intensive. In fact, something interesting happens as the reservoirs get larger. Very large reservoirs in deep water require higher capital investment. Companies who use net present value (NPV) as a value metric are then driven towards building facilities for the highest peak production possible – higher production, higher revenue in early years, better NPV. Once the peak is past, the facilities often remain underused. The empirical data suggests that companies are either better off developing things just below the inflexion point or developing reservoirs to the right of the inflexion point in a phased manner.

Source: Nandurdikar, N. (2015) *Is Bigger Always Better? An Examination of the Relationship Between Reservoir Size and Profitability Index in Deepwater*, Independent Project Analysis, www.ipaglobal.com, 20 August.

Davos plc is considering four possible investment projects for the current year but has only a limited amount to invest. As a result, it will not be able to undertake in full all of the projects available. All of the projects are divisible (that is, it is possible to undertake part of a project and to receive a pro rata return). Details of each project are as follows:

Project	Investment outlay	Present value of net cash inflows
	£m	£m
Alpha	40	48
Beta	45	64
Gamma	60	66
Delta	70	92

In what order should they be ranked if the business wishes to maximise the wealth of its shareholders?

Your answer should be as follows:

Project	Investment outlay	Present value of net cash inflows	Profitability index	Rank order
	£m	£m		
Alpha	40	48	1.2 (48/40)	3
Beta	45	64	1.4 (64/45)	1
Gamma	60	66	1.1 (66/60)	4
Delta	70	92	1.3 (92/70)	2

There may be a need for projects to be funded over more than one year and limits may be placed on the availability of funds in each year. In such circumstances, there will be more than one constraint to consider. A mathematical technique known as **linear programming** can be used to maximise the NPV, given that not all projects with a positive NPV can be undertaken. This technique adopts the same approach (that is, it maximises the NPV per £ of scarce finance) as that illustrated above. Computer software is available to undertake the analysis required for this kind of multi-period rationing problem. A detailed consideration of linear programming is beyond the scope of this book. If, however, you are interested in this technique, take a look at the suggested further reading at the end of the chapter.

Real World 5.2 reveals the popularity of the profitability index among large businesses in five major industrialised countries.

A popularity index

The multinational study of financial policies by Cohen and Yagil (see Real World 4.7) revealed the frequency with which the profitability index is used by large businesses, as shown in Figure 5.2.

➔

Response scale: 1 = never, 5 = always.

The figure shows that managers of large German businesses use the profitability index the most, although, generally, this method does not appear to be very popular.

Figure 5.2 Frequency of use of profitability index by large businesses

Source: Cohen, G. and Yagil, J. (2007) 'A multinational survey of corporate financial policies', *Journal of Applied Finance*, vol. 17, no. 1.

Non-divisible investment projects

The profitability index approach is suitable only where projects are divisible. Where this is not the case, the problem must be looked at in a different way. The particular investment project, or combination of whole projects, that will produce the highest NPV for the limited finance available should be selected.

Activity 5.3

Recommend a solution for Unicorn Engineering Ltd in Example 5.1 above if the investment projects were not divisible (that is, it was not possible to undertake part of a project). Assume the finance available was:

(a) £12 million
(b) £18 million
(c) £20 million.

If the capital available was £12 million, only Project Z should be recommended as this would provide the highest NPV (£3.6 million) for the funds available for investment. If the capital available was £18 million, Projects X and Y should be recommended as this would provide the highest NPV (£6 million). If the capital available was £20 million, Projects Y and Z should be recommended as this would provide the highest NPV (£6.8 million).

In the following section, we look at another situation where modification to the simple NPV decision rules is needed to make optimal investment decisions.

COMPARING PROJECTS WITH UNEQUAL LIVES

On occasions, a business may find itself in a position where it has to decide between two (or more) competing investment projects, aimed at meeting a continuous need, which have different life spans. When this situation arises, accepting the project with the shorter life may offer the business the opportunity to reinvest sooner in another project with a positive NPV. The opportunity for earlier reinvestment should be taken into account so that proper comparisons between competing projects can be made. This is not taken into account in the simple form of NPV analysis, however.

To illustrate how direct comparisons between two (or more) competing projects with unequal lives can be made, let us consider Example 5.2.

Example 5.2

Khan Engineering Ltd has the opportunity to invest in two competing machines. Details of each machine are as follows:

	Machine A	Machine B
	£000	£000
Initial outlay	(100)	(140)
Cash flows		
1 year's time	50	60
2 years' time	70	80
3 years' time	–	32

The business has a cost of capital of 10 per cent.
State which of the two machines, if either, should be acquired.

Solution

One way to tackle this problem is to assume that the machines form part of a repeat chain of replacement and to compare the machines using the **shortest-common-period-of-time approach**. If we assume that investment in Machine A can be repeated every two years and that investment in Machine B can be repeated every three years, the *shortest common period of time* over which the machines can be compared is six years (that is, 2 × 3).

The first step in this process of comparison is to calculate the NPV for each project over their expected lives. Thus, the NPV for each project will be as follows:

	Cash flows	Discount rate	Present value
	£000	10%	£000
Machine A			
Initial outlay	(100)	1.00	(100.0)
1 year's time	50	0.91	45.5
2 years' time	70	0.83	58.1
		NPV	3.6
Machine B			
Initial outlay	(140)	1.00	(140.0)
1 year's time	60	0.91	54.6
2 years' time	80	0.83	66.4
3 years' time	32	0.75	24.0
		NPV	5.0

→

The next step is to calculate the NPV arising for each machine, over a six-year period, using the reinvestment assumption discussed above. That is, investment in Machine A will be repeated three times and investment in Machine B will be repeated twice during the six-year period.

This means that, for Machine A, the NPV over the six-year period will be equal to the NPV above (that is, £3,600) plus equivalent amounts two years and four years later. The calculation (in £000s) will be:

$$NPV = £3.6 + \frac{£3.6}{(1 + 0.1)^2} + \frac{£3.6}{(1 + 0.1)^4}$$

$$= £3.6 + £3.0 + £2.5$$

$$= £9.1$$

The calculations above can be shown in the form of a diagram as in Figure 5.3.

The figure shows the NPVs for Machine A arising in Years 2 and 4 translated into present value terms.
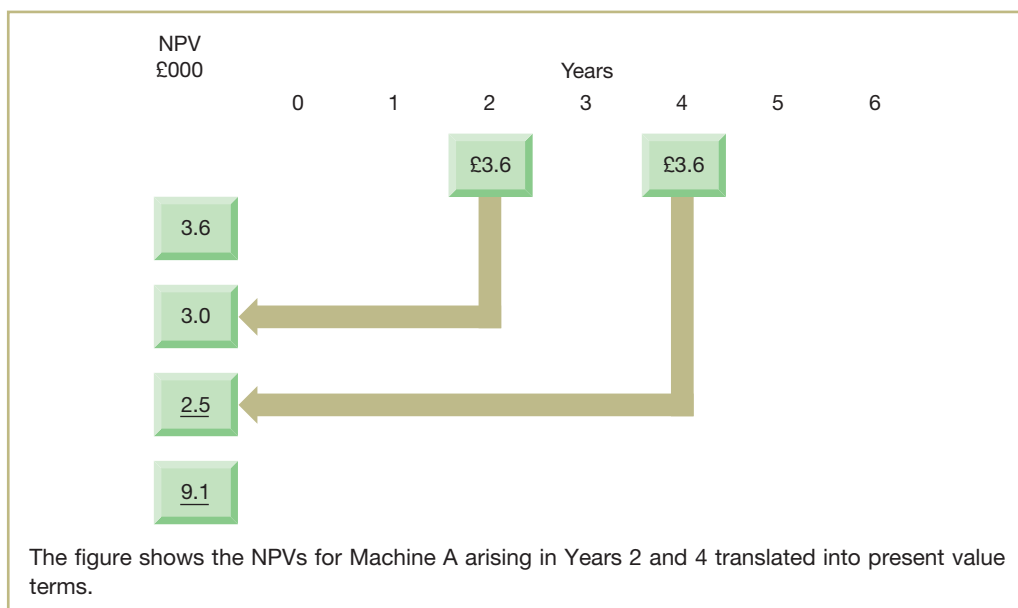
Figure 5.3 NPV for Machine a using a common period of time

Activity 5.4

What is the NPV for Machine B over the six-year period? Which machine is the better buy?

In the case of Machine B, the NPV over the six-year period will be equal to the NPV above plus the equivalent amount three years later. The calculation (in £000s) will be:

$$NPV = £5.0 + \frac{£5.0}{(1 + 0.1)^3} = £8.8$$

The calculations set out above suggest that Machine A is the better buy as it will have the higher NPV over the six-year period.

An alternative approach

When investment projects have a longer life span than those in Example 5.2, the calculations required using this method can be time-consuming. Fortunately, there is another method that can be used which avoids the need for laborious calculations. This approach uses the annuity concept to solve the problem. An **annuity** is simply an investment that pays a constant sum each year over a period of time. Thus, fixed payments made in respect of a loan or mortgage or a fixed amount of income received from an investment bond would be examples of annuities.

To illustrate the annuity principle, let us assume that we are given a choice of purchasing a new car by paying either £6,000 immediately or by paying three annual instalments of £2,410, commencing at the end of Year 1. Assuming interest rates of 10 per cent, the present value of the annuity payments would be:

	Cash outflows £	Discount rate 10%	Present value £
1 year's time	2,410	0.91	2,193
2 years' time	2,410	0.83	2,000
3 years' time	2,410	0.75	1,807
		NPV	6,000

As the immediate payment required is £6,000, we should be indifferent as to the form of payment. They are equal in present value terms.

In the example provided, a cash sum paid today is the equivalent of making three annuity payments over a three-year period. The second approach to solving the problem of competing projects that have unequal lives is based on this annuity principle. Put simply, the **equivalent-annual-annuity approach**, as it is referred to, converts the NPV of a project into an annual annuity stream over its expected life. This conversion is carried out for each competing project and the one that provides the highest annual annuity is the most profitable project.

To establish the equivalent annual annuity of the NPV of a project, we apply the formula:

$$\text{Annual annuity} = \frac{i}{1 - (1 + i)^{-n}}$$

where i is the interest rate and n is the number of years.

Thus, using the information from the car loan example above, the annual value of an annuity that lasts for three years, which has a present value of £6,000 and where the discount rate is 10 per cent, is:

$$\text{Annual annuity} = £6,000 \times \frac{0.1}{1 - (1 + 0.1)^{-3}}$$

$$= £6,000 \times 0.402$$

$$= £2,412$$

(*Note*: The small difference between this final figure and the one used in the example earlier is due to rounding.)

There are tables that make life easier by providing the annual equivalent factors for a range of possible discount rates. An example of such an annuity table is given as Appendix B at the end of this book.

Use the table provided in Appendix B to calculate the equivalent annual annuity for each machine referred to in Example 5.2. Which machine is the better buy?

The equivalent annual annuity for Machine A (in £000s) is:

$$£3.6 \times 0.5762 = £2.07$$

The equivalent annual annuity for Machine B (in £000s) is:

$$£5.0 \times 0.4021 = £2.01$$

Machine A is therefore the better buy as it provides the higher annuity value. This is consistent with the finding of the shortest-common-period-of-time approach described earlier.

THE ABILITY TO DELAY

In recent years, there has been some criticism of the NPV approach. One important criticism is that conventional theory does not recognise the fact that, in practice, it is often possible to delay making an investment decision. This ability to delay can have a profound effect on the final investment decision.

Activity 5.6

What are the possible benefits of delaying an investment decision?

By delaying, it may be possible to acquire more information concerning the likely outcome of the investment proposal. If a business decides not to delay, the investment decision, once made, may be irreversible. This may lead to losses if conditions prove to be unfavourable.

If managers do not exercise their option to delay, there may be an opportunity cost in the form of the benefits lost from later information. This opportunity cost can be large, and so failure to take it into account could be a serious error. One way of dealing with this problem is to modify the NPV decision rule so that the present value of the future cash flows must exceed the initial outlay *plus* any expected benefits from delaying the decision in order to obtain additional information. While in theory this may be fine, in practice the benefits will often be difficult to quantify.

THE PROBLEM OF INFLATION

Inflation is a problem that affects most modern economies. Although the rate of inflation may change over time, there has been a persistent tendency for the general price level to rise. It is important to recognise this phenomenon when evaluating investment projects, as inflation will affect both the cash flows and the discount rate over the life of the project.

During a period of inflation, the physical monetary amount required to acquire resources will rise over time and the business may seek to pass on any increase to customers in the form of higher prices. Inflation will also have an effect on the cost of financing the business, as investors seek to protect their investment from a decline in purchasing power by demanding higher returns. As a result of these changes, the cash flows and discount rates relating to the investment project will be affected.

To deal with the problem of inflation in the appraisal of investment projects, two possible approaches can be used:

- *Either* include inflation in the calculations by adjusting annual cash flows by the expected rate of inflation and by using a discount rate that is also adjusted for inflation. This will mean estimating the actual monetary cash flows expected from the project and using a market rate of interest that will take inflation into account.
- *Or* exclude inflation from the calculations by adjusting cash flows accordingly and by using a 'real' discount rate that does not include any element to account for inflation.

Both methods, properly applied, will give the same result. However, it is important to be consistent and to avoid mixing the two approaches.

If all cash flows are expected to increase in line with the general rate of inflation, it would be possible to use net cash flows as the basis for any adjustments. However, it is unlikely that the relationship between the various items that go to make up the net cash flows of the business (materials, labour costs and so on) will remain constant over time. In practice, inflation is likely to affect each item of cash flow differently. Separate adjustments for each item will therefore be needed.

Activity 5.7

Why is inflation likely to have a differing effect on the various items making up the net cash flow of a business?

Different costs (such as materials and labour) may increase at different rates due to relative changes in demand. In addition, some costs (such as lease payments) may be fixed over time and therefore unaffected by inflation, at least for the period of the project.

In a competitive environment, a business may be unable to pass on all of the increase in costs to customers and so will have to absorb some of the increase by reducing profits. Thus, cash inflows from sales may not fully reflect the rise in the costs of the various inputs such as materials and labour.

To compute the real cash flows from a project, it will be necessary to calculate the monetary cash flows relating to each item and then deflate these amounts by the *general* rate of inflation. This adjustment will provide us with the *current general purchasing power* of the cash flows. This measure of general purchasing power is of more relevance to investors than if the cash flows were deflated by a specific rate of inflation relevant to each type of cash flow. Similarly, the real discount rate will be deduced by deflating the market rate of interest by the *general* rate of inflation.

Real World 5.3 sets out the findings of a survey of UK businesses which reveals how inflation is dealt with in practice.

Adjusting for inflation

The following table summarises the ways in which UK businesses adjust for inflation for investment appraisal purposes.

Approach used	Business size			
	Small %	Medium %	Large %	Total %
Specify cash flow in constant prices and apply a real rate of return	47	29	45	42
All cash flows expressed in inflated price terms and discounted at the market rate of return	18	42	55	39
Considered at risk analysis or sensitivity stage*	21	13	16	17
No adjustment	18	21	3	13
Other	0	0	3	1

*This approach is discussed later in the chapter.

Two points worth noting from the summary table are:

- Large and medium-sized businesses are more likely to inflate cash flows and to use a market rate of return than to use real cash flows and a real discount rate. For small businesses, however, it is the other way round.
- Small and medium-sized businesses are more likely to make no adjustment for inflation than large businesses.

The survey findings are now pretty old and so should be approached with caution. In the absence of more up-to-date findings, however, they may still be taken as indicative.

Source: Arnold, G. and Hatzopoulos, P. (2000) 'The theory–practice gap in capital budgeting: evidence from the United Kingdom', *Journal of Business Finance and Accounting*, vol. 27, no. 5–6.

THE PROBLEM OF RISK

Risk arises where the future is unclear and where a range of possible future outcomes exists. As the future is uncertain, there is a chance (or risk) that estimates made concerning the future will not occur. Risk is particularly important in the context of investment decisions.

Activity 5.8

Why should this be the case? Try to think of at least one reason.

Risk is particularly important because of:

- the relatively long timescales involved – there may be a lot of time for things to go wrong between the decision being made and the end of the project
- the size of the investment – if things do go wrong, the impact can be both significant and lasting.

Sometimes a distinction is made in the literature between risk and uncertainty. However, this distinction is not helpful for our purposes and in this chapter the two words are used interchangeably.

In the sections that follow, we examine various methods that can be used to help managers deal with the problem of risk. While these methods cannot insure businesses against disaster, they may help to reduce their incidence and severity. Our examination will focus on the more useful and systematic approaches to dealing with risk that have been proposed. In practice, crude methods of dealing with risk are sometimes used, such as shortening the required payback period and employing conservative cash flows. However, these methods rely on arbitrary assumptions and have little to commend them. They have therefore been excluded from our examination.

The first two methods of dealing with risk that we consider were discussed briefly in Chapter 2 during our examination of projected financial statements. We now consider them in more detail as they are also relevant to investment decisions.

SENSITIVITY ANALYSIS

A popular way of assessing the level of risk is to carry out *sensitivity analysis*. We may recall from Chapter 2 that it involves an examination of key input values in order to see how changes in each input might influence the likely outcomes. One form of sensitivity analysis involves posing a series of 'what if?' questions. For example:

- What if sales volume is 5 per cent higher than expected?
- What if sales volume is 10 per cent lower than expected?

By answering these 'what if?' questions, managers will have a range of possible outcomes to consider. However, the changes to each input must be justified for them to be useful for decision making.

There is another form of sensitivity analysis that is particularly useful in the context of investment appraisal. Where the result from an appraisal, using the best estimates, is positive, the value for each key factor can be examined to see by how much it could be changed before the project became unprofitable for that reason alone.

Assume that the NPV for an investment in a machine to provide a particular service is estimated to be a positive value of £50,000. To carry out sensitivity analysis on this investment proposal, we must first identify each of the key variables in the decision. Let us assume they are:

- initial cost of the machine
- sales volume and price
- relevant operating costs
- life of the machine
- financing cost.

We must then find the value that each variable could have before the NPV figure becomes negative (that is, the value at which NPV is zero). The difference between the value derived and the estimated value for that variable represents the *margin of safety* for the particular variable.

In your previous studies of accounting, you may have studied break-even analysis. This form of sensitivity analysis is, in essence, a form of break-even analysis. The point at which the NPV is zero is the point at which the project breaks even (that is, makes neither profit nor loss). The margin of safety for a particular variable associated with the project can be interpreted in the same way as this measure is interpreted in break-even analysis.

The various elements considered in sensitivity analysis are set out in Figure 5.4.

Sensitivity analysis involves identifying key factors that affect the project. In the figure, 6 factors have been identified. (In practice, the key factors are likely to vary between projects.) Once identified, each factor will be examined in turn to find the value it should have for the project to have a zero NPV.
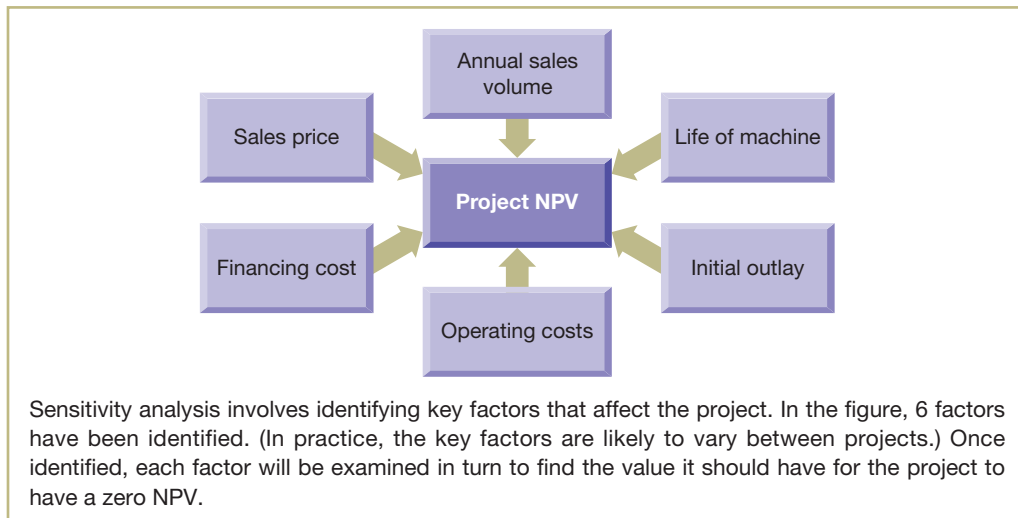
Figure 5.4 Factors affecting the sensitivity of NPV calculations

A computer spreadsheet model of the project can be extremely valuable when undertaking sensitivity analysis because it then becomes a simple matter to try various values for the key variables and to calculate the effect of changes in each. Example 5.3, which illustrates sensitivity analysis, is straightforward and can be undertaken without recourse to a spreadsheet.

Example 5.3

S. Saluja (Property Developers) Ltd intends to bid at an auction, to be held today, for a large town house that has fallen into disrepair. The auctioneer believes that the house will be sold for about £450,000. The business wishes to renovate the property and divide it into studio apartments to be sold for £150,000 each. The renovation will be in two stages and will cover a two-year period. Stage 1 will cover the first year of the project. It will cost £500,000 and the six studio apartments completed during this stage are expected to be sold for a total of £900,000 at the end of the first year. Stage 2 will cover the second year of the project. It will cost £300,000 and the three remaining apartments are expected to be sold at the end of the second year for a total of £450,000.

The cost of renovation is subject to a binding agreement with local builders if the town house is acquired. There is, however, some uncertainty over the remaining key variables. The business estimates its cost of capital at 12 per cent a year.

(a) What is the NPV of the proposed project?
(b) Assuming none of the other inputs deviates from the best estimates provided:
  (i)   What auction price would have to be paid for the town house to cause the project to have a zero NPV?
  (ii) What cost of capital would cause the project to have a zero NPV?
  (iii) What is the sale price of each of the studio apartments that would cause the project to have a zero NPV? (Each apartment will be sold for the same price: £150,000.)
(c) Comment on the calculations carried out in answering (b) above.

Solution

(a) The NPV of the proposed project is as follows:

	Cash flows £	Discount factor 12%	Present value £
Year 1 (£900,000 − £500,000)	400,000	0.893	357,200
Year 2 (£450,000 − £300,000)	150,000	0.797	119,550
Less Initial outlay			(450,000)
		NPV	26,750

(b) (i) To obtain a zero NPV, the auction price for the town house would have to be £26,750 higher than the current estimate (that is, the amount of the estimated NPV). This would make a total price of £476,750, which is about 6 per cent above the current estimated price.

(ii) As there is a positive NPV, the cost of capital that would cause the project to have a zero NPV must be higher than 12 per cent. Let us try 20 per cent.

	Cash flows £	Discount factor 20%	Present value £
Year 1 (£900,000 − £500,000)	400,000	0.833	333,200
Year 2 (£450,000 − £300,000)	150,000	0.694	104,100
Less Initial outlay			(450,000)
		NPV	(12,700)

As the NPV, using a 20 per cent discount rate, is negative, the 'break-even' cost of capital must lie somewhere between 12 per cent and 20 per cent. A reasonable approximation is obtained as follows:

	Discount rate %		NPV £
	12		26,750
	20		(12,700)
Difference	8	Range	39,450

The change in NPV for every 1 per cent change in the discount rate will be:

$$\frac{39,450}{8} = 4,931$$

The reduction in the 20 per cent discount rate required to achieve a zero NPV would therefore be:

$$\frac{12,700}{4,931} = 2.6\%$$

The cost of capital (that is, the discount rate) would therefore have to be 17.4 (20.0 − 2.6) per cent for the project to have a zero NPV.

This calculation is, of course, the same as that used in the previous chapter when calculating the IRR of the project. In other words, 17.4 per cent is the IRR of the project.

(iii) To obtain a zero NPV, the sale price of each studio apartment must be reduced so that the NPV is reduced by £26,750. In Year 1, six apartments are sold, and in

→

Year 2, three apartments are sold. The discount factor for Year 1 is 0.893 and for Year 2 it is 0.797. We can derive the fall in value per apartment (Y) to give a zero NPV by using the equation:

$$(6Y \times 0.893) + (3Y \times 0.797) = £26,750$$

$$Y = £3,452$$

The sale price of each apartment necessary to obtain a zero NPV is therefore:

$$£150,000 - £3,452 = £146,548$$

This represents a fall in the estimated price of 2.3 per cent.

(c) These calculations indicate that the auction price would have to be about 6 per cent above the estimated price before a zero NPV is obtained. The margin of safety is therefore not very high for this factor. In practice, this should not represent a real risk because the business could withdraw from the bidding if the price rises to an unacceptable level.

The other two variables represent more real risks. Only after the project is at a very late stage can the business be sure as to what actual price per apartment will prevail. It would be unusual to be able to have fixed contracts for sale of all of the apartments before the auction. The calculations reveal that the price of the apartments would have to fall by only 2.3 per cent from the estimated price before the NPV is reduced to zero. Hence, the margin of safety for this variable is very small.

The cost of capital is less sensitive to changes and there would have to be an increase from 12 per cent to 17.4 per cent before the project produced a zero NPV. It may be possible to raise finance for the project at a fixed rate before the auction of the house. However, even if the funding cost cannot be fixed in advance, the cost of capital does not seem to be a sensitive variable.

It appears from the calculations that the sale price of the apartments is the key sensitive variable to consider. A careful re-examination of the market value of the apartments seems appropriate before a final decision is made.

Real World 5.4 describes the evaluation of a mining project that incorporated sensitivity analysis to test the robustness of the findings.

Real World 5.4

A sensitive matter

Savannah Resources plc undertook a scoping study for mining spodumene lithium at Mina do Barroso in northern Portugal. Lithium is a mineral that has many uses including the production of mobile phones, batteries and medicines.

The base case (most likely outcome) for the project revealed a positive net present value of $356 million. The study estimated that, from approximately 14 million tonnes mined, a recovery rate of 1.1 per cent of Li_2O (lithium oxide) would be achieved.

As part of the study, sensitivity analysis was carried out to find out the effect of changes in key variables on the pre-tax net present value of the project. Figure 5.5 shows the outcome of this analysis.
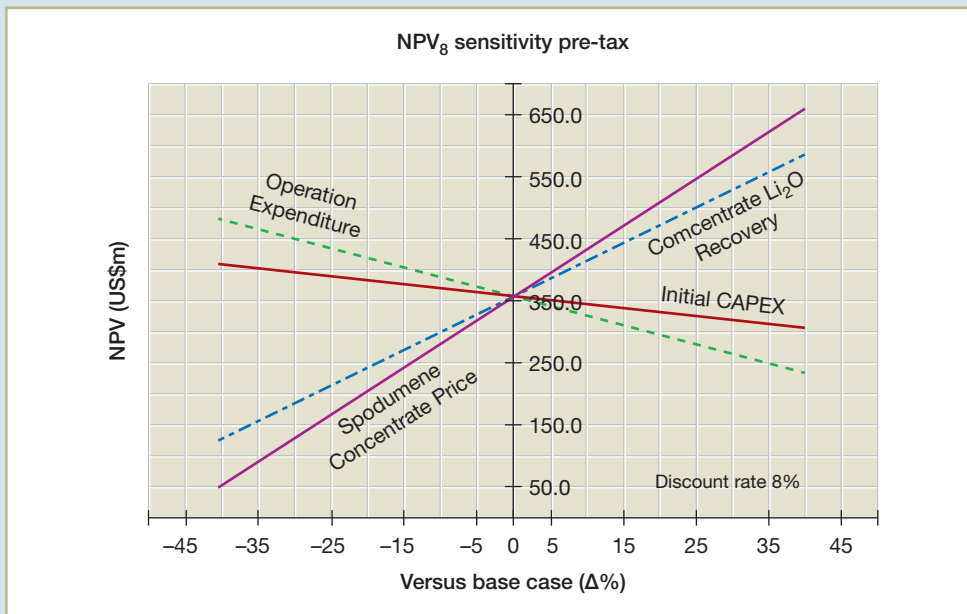
Figure 5.5 Pre-tax NPV sensitivity analysis

Source: Based on 'Scoping Study for the Mina do Barroso Lithium Project Delivers NPV of US$356m Solid Basis to Fast Track the Project to a Feasibility Study', Figure 9, p. 23. Savannah Resources plc, 2018.

We can see that that spodumene price has the strongest influence on the net present value results, followed by concentrate Li_2O (lithium oxide) recovery.

Activity 5.9

A business has the opportunity to invest £12 million immediately in new plant and equipment in order to produce a new product. The product will sell at £80 per unit and it is estimated that 200,000 units of the product can be sold in each of the next four years. Variable costs are £56 a unit and additional fixed costs (excluding depreciation) are £1.0 million in total. The residual value of the plant and machinery at the end of the life of the product is estimated to be £1.6 million.

The business has a cost of capital of 12 per cent.

(a) Calculate the NPV of the investment proposal.
(b) Carry out separate sensitivity analysis to indicate by how much the following factors would have to change in order to produce an NPV of zero:

    (i)   initial outlay on plant and machinery
    (ii) discount rate
    (iii) residual value of the plant and machinery.

(a) Annual operating cash flows are as follows:

	£m	£m
Sales (200,000 × £80)		16.0
Less		
Variable costs		
(200,000 × £56)	11.2	
Fixed costs	1.0	12.2
		3.8

Estimated cash flows are as follows:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m
Plant and equipment	(12.0)				1.6
Operating cash flows		3.8	3.8	3.8	3.8
	(12.0)	3.8	3.8	3.8	5.4

The NPV of the project is:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m
Cash flows	(12.0)	3.8	3.8	3.8	5.4
Discount rate (12%)	1.0	0.89	0.80	0.71	0.64
Present value	(12.0)	3.38	3.04	2.70	3.46
NPV	0.58				

(b) (i)   The increase required in the initial outlay on plant and equipment to achieve an NPV of zero will be £0.58 million (as the plant and equipment are already expressed in present value terms). This represents a 4.8 per cent increase on the current estimated figure of £12 million ((0.58/12) × 100)

(ii)   Using a discount rate of 14 per cent, the NPV of the project is:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m
Cash flows	(12.0)	3.8	3.8	3.8	5.4
Discount rate (14%)	1.0	0.88	0.77	0.68	0.59
Present value	(12.0)	3.34	2.93	2.58	3.19
NPV	0.04				

This is very close to an NPV of zero and so 14 per cent is the approximate figure. It is 16.7 per cent higher than the cost of capital (((14 − 12)/12) × 100).

(iii)   The fall in the residual value of the plant and equipment (R) that will lead to a zero NPV is:

(R × discount factor at the end of four years) − NPV of the project = 0

By rearranging this equation, we have:

(R × discount factor at the end of four years) = NPV of the project

$$R \times 0.64 = £0.58 \text{ million}$$

$$R = £0.58 \text{ million}/0.64$$

$$= £0.9 \text{ million}$$

This represents a 43.8 per cent decrease in the current estimated residual value (((1.6 − 0.9)/1.6) × 100).

Sensitivity chart

It is possible to portray the effect of changes to key variables on the NPV of a project by preparing a **sensitivity chart**. To illustrate how this chart is prepared, we can use the following information from the answer to Activity 5.9:

- the NPV of the project is estimated as £0.58m
- an NPV of zero will occur where there is a:
  - 4.8 per cent increase in initial outlay
  - 16.7 per cent increase in the cost of capital
  - 43.8 per cent decrease in the residual value of the plant and equipment.

In Figure 5.6, the NPV of the project is shown on the vertical axis and the percentage change in estimates on the horizontal axis. By using two coordinates – the estimated NPV without any change and the percentage change required to produce a zero NPV – a line can be drawn for each variable to show its sensitivity to change. The steeper the slope of the line, the more sensitive the particular variable is to change. The visual representation in Figure 5.6 can help managers to see more clearly the sensitivity of each variable.

We can see that a 4.8 per cent increase in initial outlay, a 16.7 per cent increase in the cost of capital and a 43.8 per cent decrease in the residual value of plant and equipment will each result in a zero NPV. The slope of the line of each variable indicates sensitivity to change: the steeper the slope, the more sensitive the variable is to change.
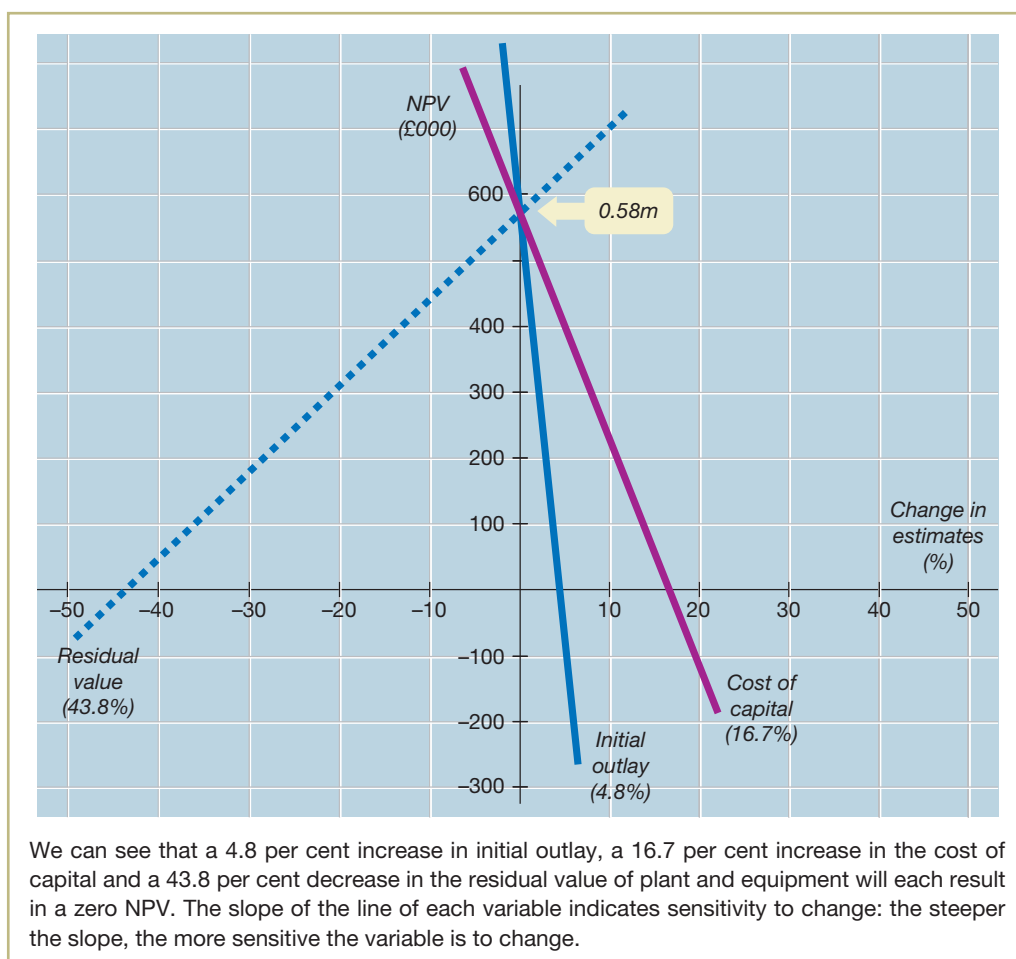
Figure 5.6 Sensitivity chart

Strengths and weaknesses of sensitivity analysis

Sensitivity analysis should help in the following ways:

- Managers can see the margin of safety for each key variable. This should help them to identify highly sensitive variables that require more detailed information. The collection, reporting and evaluation of information can be costly and time-consuming. The more managers can focus their efforts on the critical aspects of a decision, the better.

- It can provide a basis for planning. Where a project outcome has been identified as highly sensitive to changes in a key variable, managers can formulate plans to deal with possible deviations from the estimated outcome.

Although sensitivity analysis is undoubtedly a useful tool, it has some major drawbacks:

- It does not give clear decision rules concerning acceptance or rejection of the project. There is no single-figure outcome to indicate whether a project is worth undertaking. This means that managers must rely on their own judgement.
- It is a static form of analysis. Only one variable is considered at a time while the rest are held constant. In practice, however, it is likely that more than one variable will differ in value from the best estimates provided.
- Sensitivities relating to different factors are not directly comparable. Assume, for example, the NPV of a machine project is highly sensitive to the cost of the machine but not so sensitive to the life of the machine. This does not necessarily mean that the machine cost poses more of a problem. The cost may be incurred immediately and established with a high degree of certainty. As a result, the machine project can be abandoned at a very early stage if the estimate of the machine cost proved incorrect. However, the life of the machine may be highly uncertain and may be impossible to establish with any degree of certainty until very late into the project.

Real World 5.5 below provides some impression of the use of sensitivity analysis in practice.

Real World 5.5

Sensitivity analysis – a survey

The KPMG survey (see Real World 2.3) asked 272 businesses in Germany, Austria and Switzerland about the use of sensitivity analysis in evaluating future cash flows and the cost of capital, when making investment decisions. Figure 5.7 reveals the extent to which it is used.
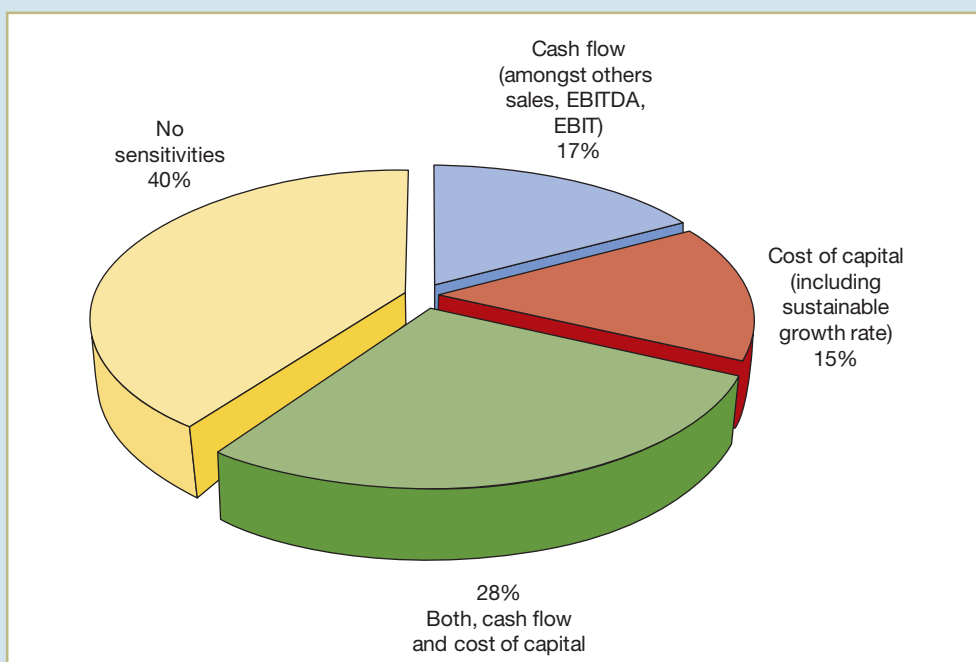
Figure 5.7 Consideration of sensitivities

Source: Adapted from Cost of Capital Study 2018, KPMG, Figure 6, p. 11, 2018. https://assets.kpmg/content/dam/kpmg/ch/pdf/cost-of-capital-study-2018.pdf

We can see that the majority of businesses use this technique to evaluate cash flows, the cost of capital or both. However, a significant minority (41 per cent for 2017/18) undertake no form of sensitivity analysis.

SCENARIO ANALYSIS

A slightly different approach, which overcomes the problem of dealing with a single variable at a time, is *scenario analysis*. This method was also briefly discussed in Chapter 2. We may recall that a number of variables are changed simultaneously so as to provide a particular 'state of the world', or scenario. A number of internally consistent 'states of the world' can be presented to managers, with each drawing attention to variables that are vital to a project's success. A popular form of scenario analysis is to provide:

- an optimistic view of likely future events
- a pessimistic view of likely future events
- a 'most likely' view of future events.

This approach has been criticised because it does not indicate the likelihood of each scenario occurring, nor does it identify other possible scenarios that might occur. Nevertheless, the portrayal of optimistic and pessimistic scenarios may be useful in providing managers with some feel for the 'downside' risk and 'upside' potential associated with a project.

Real World 5.6 provides an example of a business that created alternative scenarios to develop some idea of likely financial outcomes from a proposed mining project.

Real World 5.6

Making a scene

In November 2018, IAMGOLD Corporation announced the results of a feasibility study for a proposed gold mine. The business undertook scenario analysis to derive the likely financial outcomes from this venture. Two possible scenarios were considered. These were a base (most likely) case and an extended case, which added a further two years to the assumed life of the mine.

Some of the key assumptions employed for each scenario were as follows:

Assumption	Base case	Extended case
Life of the mine	16 years	18 years
Total cash costs per ounce of gold over mine life	$594	$606
Total costs per ounce of gold over mine life	$694	$703
Initial capital expenditure	$1,147 million	$1,147 million
Average annual production	367,000 ounces	372,000 ounces
Gold price per ounce	$1,250	$1,250
Cost of capital	5%	5%

→

The predicted financial outcomes from the two scenarios were calculated as follows:

Scenario	After-tax NPV	After-tax IRR	Payback Period
Base case	$795 million	15.2%	4.4 years
Extended case	$905 million	15.4%	4.4 years

We can see that only the NPV calculations are significantly affected by extending the life of the mine.

Source: Based on information in *Feasibility Study for Côté Gold Yields Significantly Improved Project Economics (2018)*. http://www.iamgold.com/English/investors/news-releases/news-releases-details/2018/Feasibility-Study-for-Ct-Gold-Yields-Significantly-Improved-Project-Economics/default.aspx 1 November

RISK PREFERENCES OF INVESTORS

So far, the methods discussed have sought to identify the level of risk associated with a project. However, this is not, of itself, enough. The attitude of investors towards risk should also be determined. Unless we know how investors are likely to react to the presence of risk in investment opportunities, we cannot really make an informed decision.

In theory, investors fall into one of the following categories based on their attitude towards risk:

- **Risk-seeking investors**. Some investors enjoy a gamble. Given two projects with the same expected return but with different levels of risk, the risk-seeking investor would choose the project with the higher level of risk.
- **Risk-neutral investors**. Some investors are indifferent to risk. Thus, given two projects with the same expected return but with different levels of risk, the risk-neutral investor would have no preference. Both projects provide the same expected return and the fact that one project has a higher level of risk would not be an issue.
- **Risk-averse investors**. Some investors are averse to risk. Given two projects with the same expected return but with different levels of risk, a risk-averse investor would choose the project that has a lower level of risk.

Activity 5.10

In which of the above categories do you think most investors will fall?

While some investors may be risk seekers and some investors may be indifferent to risk, the evidence suggests that the vast majority of investors are risk-averse.

This does not mean, however, that most investors will not be prepared to take on risky investments. Rather, it means that they will require compensation in the form of higher returns from projects that have higher levels of risk. An explanation as to why this is the case can be found in utility theory.

Risk and utility theory

To describe utility theory, let us assume you can measure the satisfaction, or utility, you receive from money in the form of 'utils of satisfaction' and let us also assume that you are penniless. If a rich benefactor gives you £1,000, this may bring you a great deal of

satisfaction as it would allow you to buy many things that you have yearned for. Let us say it provides you with 20 utils of satisfaction. If the benefactor gives you a further £1,000, this may also bring you a great deal of satisfaction, but not as much as the first £1,000 as your essential needs have now been met. Let us say, therefore, it provides you with 10 utils of satisfaction. If the benefactor then gives you a further £1,000, the additional satisfaction received from this additional sum may reduce to, say, 6 utils, and so on. (The expression *diminishing marginal utility of wealth* is often used to describe the situation where the additional satisfaction received from wealth declines with each additional amount of wealth received.)

The relationship between the level of satisfaction received and the amount of wealth received can be expressed in the form of a **utility function**. For a risk-averse individual, the utility function, when shown graphically, would take the shape of a curve such as that shown in Figure 5.8. We can see clearly from this graph that each increment in wealth provides a diminishing level of satisfaction for the individual. We can also see that the increase in satisfaction from gaining additional wealth is not the same as the decrease in satisfaction from losing the same amount of wealth.

The figure shows the concave shape of the utility function for a risk-averse individual. We can see that each additional amount of wealth received provides a diminishing amount of satisfaction for the individual. The greater the aversion to risk, the more concave the utility function will become.
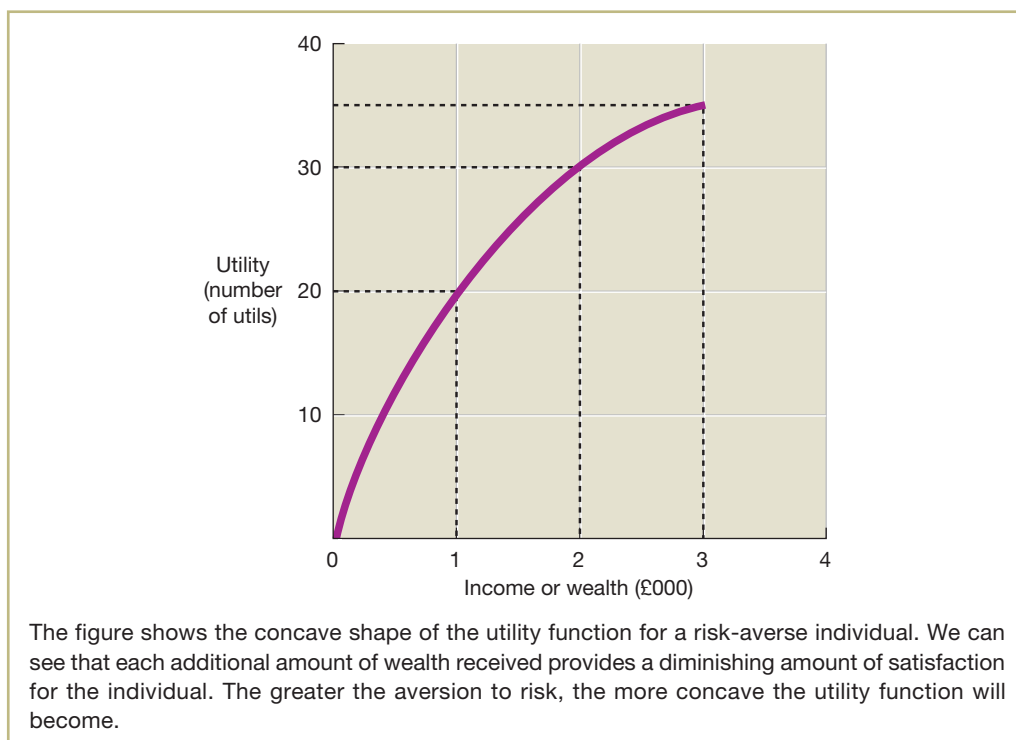
Figure 5.8 Utility function for a risk-averse individual

An individual with wealth of, say, £2,000 would receive satisfaction from this amount of 30 utils. If, however, the wealth of that individual fell by £1,000 for some reason, the loss of satisfaction would be greater than the satisfaction gained from receiving an additional £1,000. We can say that the loss of satisfaction from a fall in wealth of £1,000 would be 10 utils, whereas the gain in satisfaction from receiving an additional £1,000 would be only 6 utils. As the satisfaction, or happiness, lost from a fall in wealth is greater than the satisfaction, or happiness, gained from acquiring an equivalent amount of wealth, the

individual will be averse to risk and will be prepared to undertake risk only in exchange for the prospect of higher returns.

The particular shape of the utility curve will vary between individuals. Some individuals are likely to be more risk-averse than others. The more risk-averse an individual is, the more concave the shape of the curve will become. However, this general concave curve shape will apply to all risk-averse individuals.

For an individual who is indifferent to risk, the marginal satisfaction, or utility, of wealth will not diminish as described above. Instead, it will remain constant. This means the individual's utility function will look quite different from that of a risk-averse individual.

Activity 5.11

Try to draw a graph that plots the utility of wealth against wealth for an individual who is indifferent to risk. Explain the shape of the graph line.

An individual who is indifferent to risk would have a utility function that can be plotted in the form of a straight line, as shown in Figure 5.9.
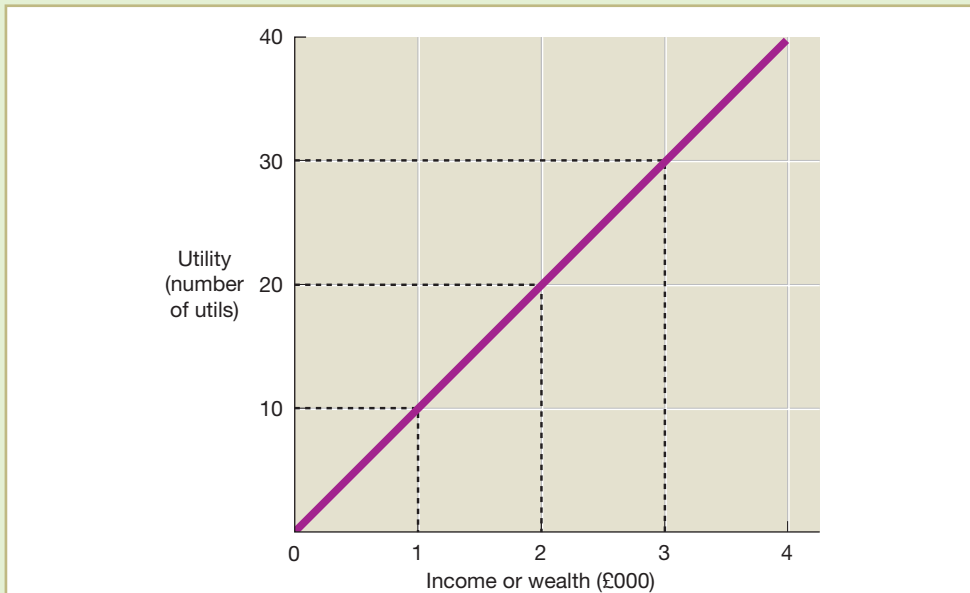
The figure shows the utility function for a risk-neutral individual. The straight line indicates that each additional util of wealth received will produce the same amount of satisfaction.

Figure 5.9 Utility function for a risk-neutral individual

This indicates that the satisfaction, or happiness, lost from a fall in wealth will be equal to the satisfaction, or happiness, gained from acquiring an equivalent amount of wealth.

For a risk-seeking individual, the marginal satisfaction, or utility, of wealth will increase rather than decrease, or remain constant. This means that the shape of a risk-seeking individual's utility function, when displayed in the form of a graph, will be quite different from the two described above.

Activity 5.12

Draw a graph plotting the utility of wealth against wealth for an individual who is risk seeking, and explain the shape of the graph line.

The graph for a risk-seeking individual will be as shown in Figure 5.10. We can see from the graph that the curve is upwards-sloping. The satisfaction, or happiness, gained from an increase in wealth would be greater than the satisfaction, or happiness, lost from a decrease in wealth of an equivalent amount. This means the individual will be prepared to take on risks in order to obtain additional wealth.

The figure shows the convex shape of the utility function for a risk-seeking individual. We can see that each additional amount of wealth received provides an increasing amount of satisfaction for the individual. The greater the attraction to risk, the more convex the utility function will become.
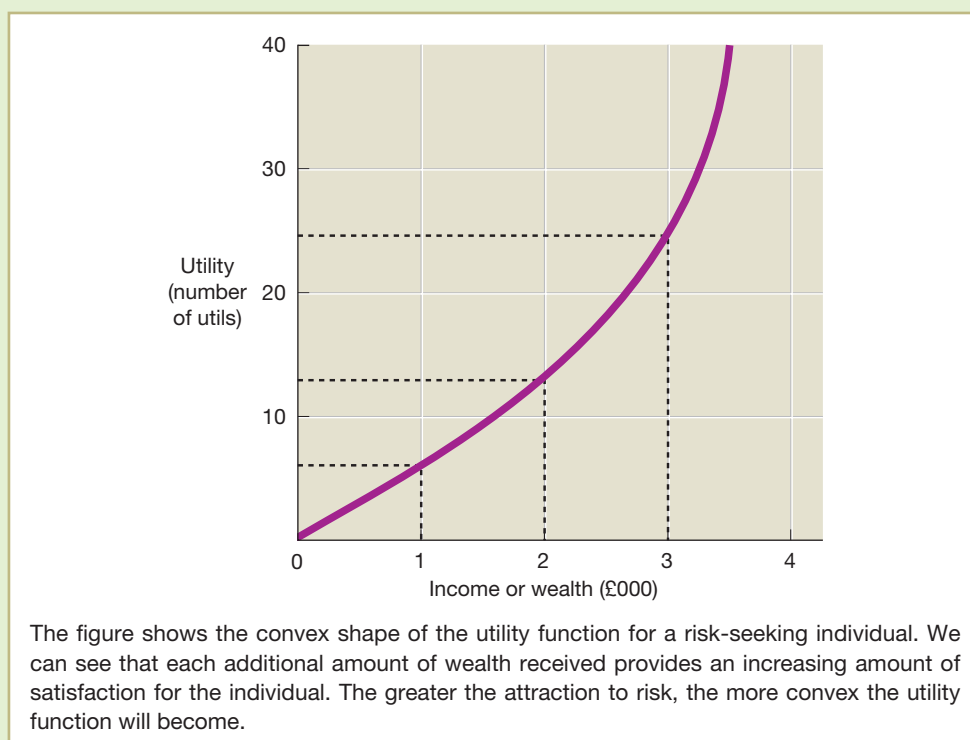
Figure 5.10 Utility function for a risk-seeking individual

Although utility theory helps us to understand why investors are risk-averse, it would not be possible to identify the utility functions of individual investors and then combine these in some way so as to provide a guide for management decisions. The practical value of this theory is therefore limited. In the real world, managers may make decisions based on their own attitudes towards risk rather than those of investors, or may make assumptions about the risk preferences of investors.

RISK-ADJUSTED DISCOUNT RATE

We have seen from the section above that there is a relationship between risk and the rate of return required by investors. The reaction of a risk-averse individual will be to require a higher rate of return for risky projects. The higher the level of risk associated with a project,

the higher the required rate of return. The **risk-adjusted discount rate** is based on this simple relationship between risk and return. Thus, when evaluating investment projects, managers will increase the NPV discount rate in the face of increased risk. In other words, a *risk premium* will be required for risky projects: the higher the level of risk, the higher the risk premium.

The risk premium is usually added to a 'risk-free' rate of return in order to derive the total return required. The risk-free rate may be assumed to be equivalent to the rate of return from government bonds (a point to which we shall return in Chapter 8). In practice, a business may divide projects into risk categories (for example, low, medium and high risk) and then assign a risk premium to each risk category. The cash flows from a particular project will then be discounted using a rate based on the risk-free rate plus the appropriate risk premium. Since all investments are risky to some extent, all projects will have a risk premium linked to them.

This relationship between risk and return, which we first discussed in Chapter 1, is illustrated in Figure 5.11.

It is possible to take account of the riskiness of projects by changing the discount rate. A risk premium is added to the risk-free rate in order to derive the appropriate discount rate. A higher return will normally be expected from projects where the risks are higher. Thus, the more risky the project, the higher will be the risk premium.
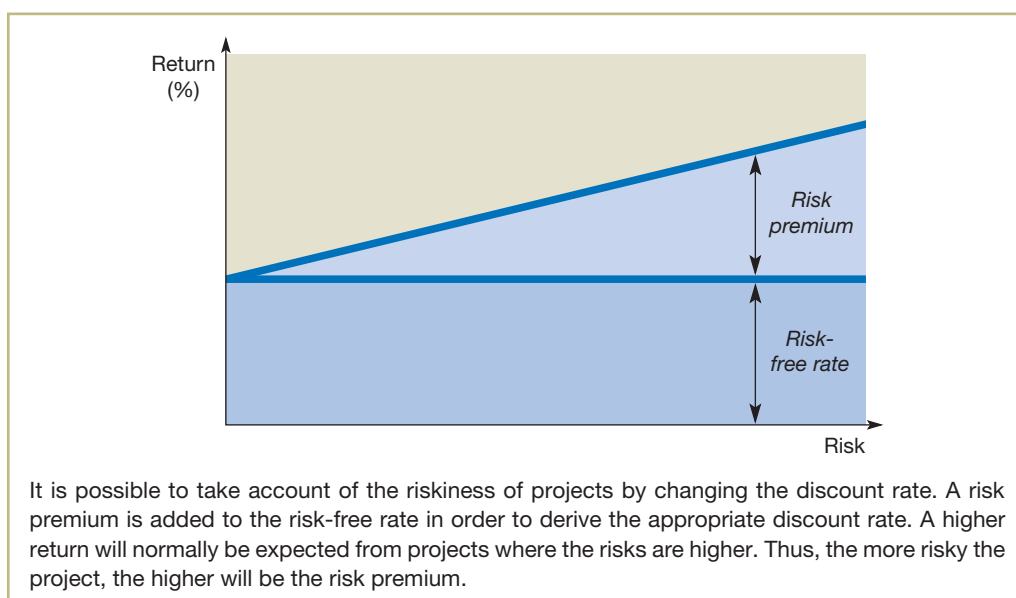
Figure 5.11 Relationship between risk and return

The use of a risk-adjusted discount rate in investment appraisal provides a single-figure outcome that can be used to decide whether to accept or to reject a project. Often, managers have an intuitive grasp of the relationship between risk and return and so may feel comfortable with this technique. However, there are practical difficulties with implementing this approach.

Activity 5.13

Can you think what the practical problems with this approach might be?

Subjective judgement is required when assigning an investment project to a particular risk category and then in assigning a risk premium to each category. The choices made will reflect the personal views of the managers responsible and these may differ from the views of the shareholders they represent. Nevertheless, the choices made can make the difference between accepting and rejecting a particular project.

We shall see in Chapter 8 that there is a more sophisticated approach to deriving a risk premium that does not rely on subjective judgement.

EXPECTED NET PRESENT VALUE (ENPV)

Another means of assessing risk is through the use of statistical probabilities. It may be possible to identify a range of feasible values for a particular input variable, such as net cash flows, and to assign a probability of occurrence to each of these values. Using this information, we can derive an **expected value**, which is a weighted average of the possible outcomes where the probabilities are used as weights. An **expected net present value (ENPV)** can then be derived using these expected values.

To illustrate this method in relation to an investment decision, let us consider Example 5.4.

Example 5.4

Patel Properties Ltd has the opportunity to acquire a lease on a block of apartments that has only two years remaining before it expires. The cost of the lease would be £1,000,000. The occupancy rate of the block of apartments is currently around 70 per cent and the apartments are let almost exclusively to naval personnel. There is a large naval base located nearby and there is little other demand for the apartments. The occupancy rate of the apartments will change in the remaining two years of the lease depending on the outcome of a defence review.

The navy is considering three options for the naval base:

- *Option 1.* Increase the size of the base by closing down a naval base in another region and transferring the naval personnel to the base located near to the apartments.
- *Option 2.* Close down the naval base near to the apartments and leave only a skeleton staff there for maintenance purposes. The personnel would be moved to a base in another region.
- *Option 3.* Leave the naval base open but reduce staffing levels by 50 per cent.

The directors of Patel Properties Ltd have estimated the following net cash flows for each of the two years under each option and the probability of their occurrence:

	£	Probability
Option 1	800,000	0.6
Option 2	120,000	0.1
Option 3	400,000	0.3
		1.0

Note: The sum of the probabilities is 1.0 (that is, it is certain that one of the possible options will arise).

The business has a cost of capital of 10 per cent.

Should the business purchase the lease on the block of apartments?

Solution

To answer the question, the ENPV of the proposed investment can be calculated. To do this, the weighted average of the possible outcomes for each year must first be calculated.

This involves multiplying each cash flow by its probability of occurrence (as the probabilities are used as weights). The expected annual net cash flows will be:

	Cash flows (a)	Probability (b)	Expected cash flows (a × b)
	£		£
Option 1	800,000	0.6	480,000
Option 2	120,000	0.1	12,000
Option 3	400,000	0.3	120,000
Expected net cash flows in each year			612,000

Having derived the expected net cash flows in each year, they can be discounted using a rate of 10 per cent to reflect the cost of capital.

	Expected cash flows	Discount rate 10%	Expected present value
	£		£
Year 1	612,000	0.909	556,308
Year 2	612,000	0.826	505,512
			1,061,820
Less Initial investment			(1,000,000)
Expected net present value (ENPV)			61,820

We can see that the ENPV is positive. Hence, the wealth of shareholders is expected to increase by purchasing the lease. (However, the size of the ENPV is small in relation to the initial investment and so the business may wish to check carefully the key assumptions used in the analysis before a final decision is made.)

The ENPV approach has the advantage of producing a single-figure outcome and of having a clear decision rule to apply (that is, if the ENPV is positive, the business should invest; if it is negative, it should not). However, this approach produces an average figure.

Activity 5.14

Can you see a problem with producing an average figure? Look back at Example 5.4. What strikes you about the average figure that has been calculated?

An average figure may not be capable of actually occurring. This point was illustrated in Example 5.4 where the expected value of the net cash flows does not correspond to any of the stated options.

Using an average figure can also obscure the underlying risk associated with the project. Simply deriving the ENPV, as in Example 5.4, can be misleading. Without some idea of the individual possible outcomes and their probability of occurring, managers are in the dark. If either of Options 2 and 3 were to occur, the NPV of the investment would be negative (wealth destroying). It is 40 per cent probable that one of these options will occur, so this is a significant risk. Only if Option 1 were to occur (60 per cent probable) would investing in the apartments represent a good decision. Of course, in advance of making the investment, which option will actually occur is not known.

None of the above should be taken to mean that the investment in the apartment block should not be made, simply that the managers are better placed to make a judgement where information on the possible outcomes is available. Thus, where the ENPV approach is being used, it is usually a good idea to reveal to managers the different possible outcomes and the probability attached to each outcome. By so doing, the managers will be able to gain an insight into the 'downside risk' attached to the project. This point is further illustrated by Activity 5.15.

The ENPV of Project A is:

Probability	NPV £	Expected value £
0.8	(500,000)	(400,000)
0.1	1,000,000	100,000
0.1	5,500,000	550,000
	ENPV	250,000

The ENPV of Project B is:

Probability	NPV £	Expected value £
0.2	125,000	25,000
0.3	250,000	75,000
0.5	300,000	150,000
	ENPV	250,000

Although the ENPV of each project in Activity 5.15 is identical, this does not mean that the business will be indifferent about which project to undertake. Project A has a high probability of making a loss, whereas Project B is not expected to make a loss under any possible outcome. If we assume that investors are risk-averse, they will prefer the business to take on Project B. This will provide the same level of expected return as Project A but will have a lower level of risk.

It can be argued that the problem identified above may not be significant where the business is engaged in several similar projects. This is because a worse-than-expected outcome on one project may well be balanced by a better-than-expected outcome on another project. However, in practice, investment projects may be unique events and so this argument will not hold. Also, where the project under consideration is large in relation to other projects undertaken, the argument does not apply. There is also the problem that something that causes one

project to have an adverse outcome may also adversely affect other projects. For example, a large unexpected increase in the price of oil may adversely affect all the investment projects of a particular business.

EVENT TREE DIAGRAMS

Where several possible outcomes arise from a particular investment opportunity, it is helpful to identify each of them by preparing an **event tree diagram** (or *decision tree diagram*). This diagram, as the name implies, is shaped like a tree where each branch represents a possible event, or outcome. Probabilities may be assigned to each of the events, or outcomes, identified. Where individual outcomes could occur in different combinations, the probability of each combination can be derived by multiplying together the probabilities of each outcome.

Example 5.5 illustrates how a simple event tree diagram may be prepared for an investment project with different possible outcomes that can combine in different ways.

Example 5.5

Zeta Computing Services Ltd has recently produced some software for a client organisation. The software has a life of two years and will then become obsolete. The cost of developing the software was £60,000. The client organisation has agreed to pay a licence fee of £80,000 a year for the software if it is used in only one of its two divisions and £120,000 a year if it is used in both of its divisions. The client may use the software for either one or two years in either division but will definitely use it in at least one division in each of the two years.

Zeta Computing Services Ltd believes there is a 0.6 chance that the licence fee received in any one year will be £80,000 and a 0.4 chance that it will be £120,000.

Produce an event tree diagram for the project.

Solution

The four possible outcomes attached to this project and their probability of occurrence (p) are as follows:

	Outcome	Probability
1	Year 1 cash flow £80,000 ($p = 0.6$) and Year 2 cash flow £80,000 ($p = 0.6$). The probability of both years having cash flows of £80,000 will be (0.6×0.6).	0.36
2	Year 1 cash flow £120,000 ($p = 0.4$) and Year 2 cash flow £120,000 ($p = 0.4$). The probability of both years having cash flows of £120,000 will be (0.4×0.4).	0.16
3	Year 1 cash flow £120,000 ($p = 0.4$) and Year 2 cash flow £80,000 ($p = 0.6$). The probability of this sequence of cash flows occurring will be (0.4×0.6).	0.24
4	Year 1 cash flow £80,000 ($p = 0.6$) and Year 2 cash flow £120,000 ($p = 0.4$). The probability of this sequence of cash flows occurring will be (0.6×0.4).	<u>0.24</u>
		<u>1.00</u>

This information can be displayed in the form of an event tree diagram, as shown in Figure 5.12.
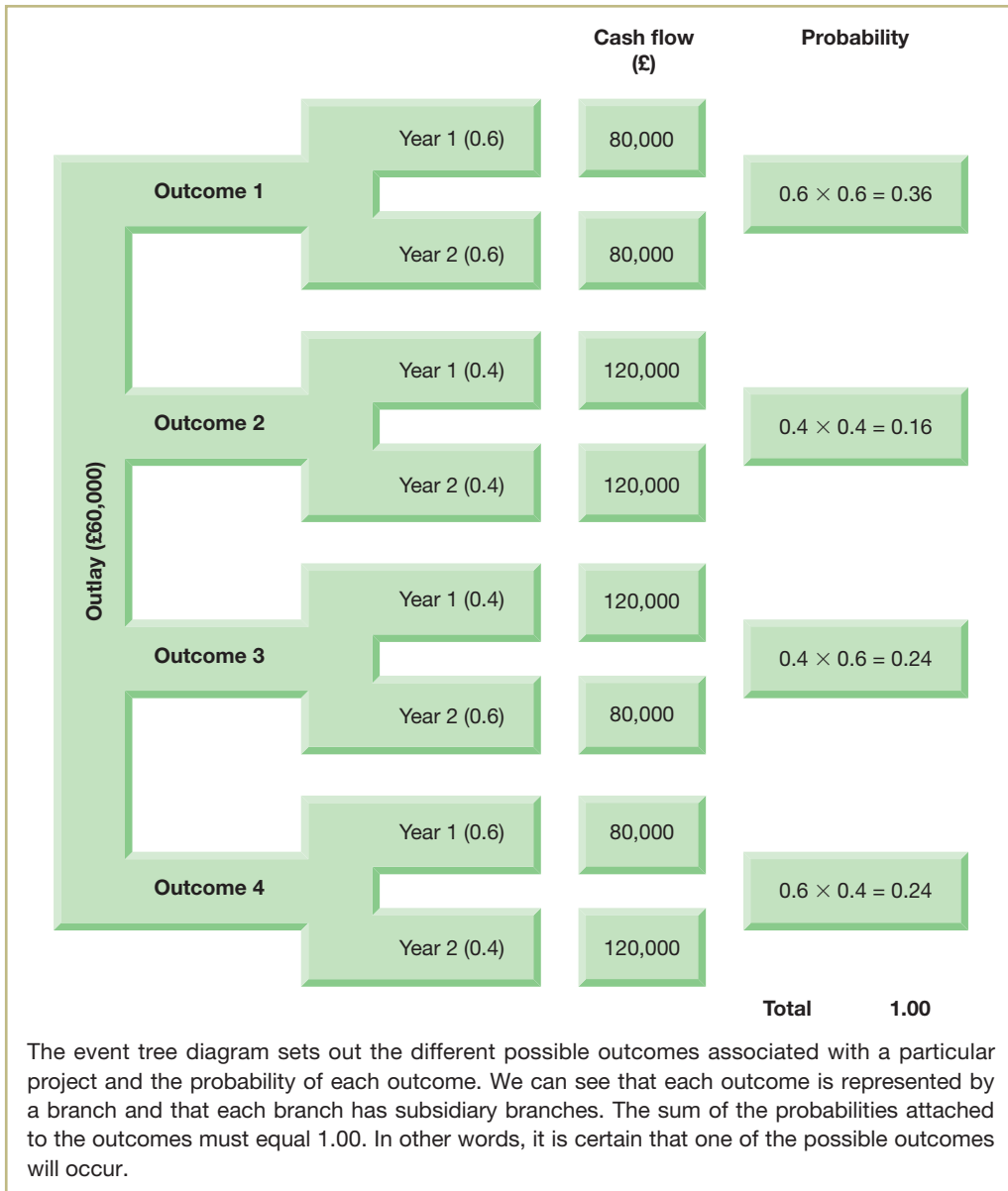
Figure 5.12 Event tree diagram showing different possible project outcomes

The event tree diagram sets out the different possible outcomes associated with a particular project and the probability of each outcome. We can see that each outcome is represented by a branch and that each branch has subsidiary branches. The sum of the probabilities attached to the outcomes must equal 1.00. In other words, it is certain that one of the possible outcomes will occur.

Activity 5.16

Kernow Ltd provides street-cleaning services for a small town. The work is currently labour intensive and few machines are employed. However, the business has recently been considering the purchase of a fleet of street-cleaning vehicles at a total cost of £540,000. The vehicles have a life of four years and are likely to result in a considerable saving of labour costs. Estimates of the likely labour savings and their probability of occurrence are set out below:

→

	Estimated savings	Probability of occurrence
	£	
Year 1	80,000	0.3
	160,000	0.5
	200,000	0.2
Year 2	140,000	0.4
	220,000	0.4
	250,000	0.2
Year 3	140,000	0.4
	200,000	0.3
	230,000	0.3
Year 4	100,000	0.3
	170,000	0.6
	200,000	0.1

Estimates for each year are independent of other years. The business has a cost of capital of 10 per cent.

(a) Calculate the ENPV of the street-cleaning machines.
(b) Calculate the NPV of the worst possible outcome and the probability of its occurrence.

(a) The first step is to calculate the expected annual cash flows:

Year 1	£	Year 2	£
£80,000 × 0.3	24,000	£140,000 × 0.4	56,000
£160,000 × 0.5	80,000	£220,000 × 0.4	88,000
£200,000 × 0.2	40,000	£250,000 × 0.2	50,000
	144,000		194,000

Year 3	£	Year 4	£
£140,000 × 0.4	56,000	£100,000 × 0.3	30,000
£200,000 × 0.3	60,000	£170,000 × 0.6	102,000
£230,000 × 0.3	69,000	£200,000 × 0.1	20,000
	185,000		152,000

The ENPV can now be calculated as follows:

Year	Expected cash flow	Discount rate	Expected PV
	£	10%	£
0	(540,000)	1.000	(540,000)
1	144,000	0.909	130,896
2	194,000	0.826	160,244
3	185,000	0.751	138,935
4	152,000	0.683	103,816
		ENPV	(6,109)

(b) The worst possible outcome can be calculated by taking the lowest values of savings each year, as follows:

Year	Cash flow	Discount rate	PV
	£	10%	£
0	(540,000)	1.000	(540,000)
1	80,000	0.909	72,720

Year	Cash flow £	Discount rate 10%	PV £
2	140,000	0.826	115,640
3	140,000	0.751	105,140
4	100,000	0.683	68,300
		NPV	(178,200)

The probability of occurrence can be obtained by multiplying together the probability of each of the worst outcomes above, that is, $(0.3 \times 0.4 \times 0.4 \times 0.3) = 0.014$ (or 1.4 per cent).

Thus, the probability of occurrence is 1.4 per cent, which is very low.

Real World 5.7 below describes how ENPV and event tree diagrams were used to evaluate the feasibility of a gas exploitation opportunity in the North Sea.

Real World 5.7

Ready to exploit

Xodus Group produced a report for Cluff Natural Resources plc on the economic feasibility of exploiting gas fields in the North Sea. An analysis was carried out of similar gas fields in the region to establish the volume and quality of reservoirs and economic returns that might be expected from such exploitation. A best case NPV was calculated, along with an ENPV for two prospects – Basset and Cadence.

For the Basset prospect, the best-case scenario for three possible volumes of the gas reservoir (P90, P50 and P10) was as follows:

	Reservoir volume		
	P90	P50	P10
NPV (£m)	3.0	41.8	183.1

The ENPV for Basset was calculated to be £12.9m but, if there was a successful exploration well outcome, this increased to £69.0m. An event tree diagram was prepared, which sets out the probability (in percentage terms) for each identified branch of the Basset prospect. (See Figure 5.13.) Event outcomes in the diagram include:

1 Whether the exploration well is dry, or whether there is a gas discovery. (In the latter case, a decision would be made to drill an appraisal well.)
2 The volume of gas discovered (P90, P50 or P10).
3 Whether there are prohibitively high levels of carbon dioxide in the gas resulting in additional investment outlay.
4 The combination of different wells (low, medium, high) required to extract the gas.
5 Options for gas processing and transportation (freeflow to Teeside, transportation via Pegasus, transportation via a dedicated pipeline).

→

Exploration well

Discovery (29%) — Appraisal well | Dry (71%) — Stop

(20%) P10 — Same as for P50

(60%) P50
- No CO₂ (90%) → No Extra Costs
- CO₂ (10%) → Spend extra £23m on Amino Plant
  - (33.3%) 2 High, 1 Medium wells
  - (33.3%) 2 High, 3 Low wells
  - (33.3%) 2 Low, 3 Medium wells
    - (85%) Compression via Breagh
    - (15%) Freeflow Teeside

(20%) P90
- No CO₂ (90%) → Develop
  - (33.3%) 1 High well
  - (33.3%) 1 Medium well
  - (33.3%) 2 Low wells
    - (20%) Compression no Pegasus
    - (65%) Compression via Pegasus
    - (15%) Freeflow Teeside
- CO₂ (10%) → Stop

Figure 5.13 Event tree diagram for Basset gas prospect

Source: Adapted from Xodus Group (2017), P2248 Economic Feasibility Final Report, www.cluffnaturalresources.com, 18 April. Diagram from Appendix B, p. 2.

RISK AND THE STANDARD DEVIATION

In the problems discussed so far, the number of possible outcomes relating to a particular project has been fairly small. Perhaps only two or three possible outcomes have been employed to illustrate particular principles. In reality, however, there may be a large number of outcomes that could occur. Indeed, a project may have thousands of possible outcomes, each with its own probability of occurrence. Although it would not be very realistic, let us suppose a particular project has a large number of possible outcomes and that we are able to identify each possible outcome and to assign a probability to it. This would mean that we could plot a probability distribution of the outcomes that could take the form of a continuous curve, such as the one shown in Figure 5.14.

The particular shape of the curve is likely to vary between investment projects. Variations in the shape of the curve can occur even where projects have identical expected values. To illustrate this point, the probability distribution for two separate projects that have the same expected value is shown in Figure 5.15. We can see, however, that Project A has a range of possible values that is much more tightly distributed around the expected value than Project B.

This difference in the shape of the two probability distributions can provide us with a useful indicator of risk. The graph shows that the tighter the distribution of possible future values, the greater the chance that the actual value will be close to the expected value. This means there is less 'downside' risk associated with the particular investment project (but also less 'upside' potential). We can say, therefore, that *the tighter the probability distribution of outcomes, the lower the risk associated with the investment project*. The graph in Figure 5.15 shows that the possible outcomes for Project A are much less spread out than those of Project B. Hence, Project A will be considered a less risky venture than Project B.

The figure shows the probability distribution of outcomes for a single investment project. We can see that the range of possible outcomes forms a continuous curve. The particular shape of the curve will vary according to the nature of the project.
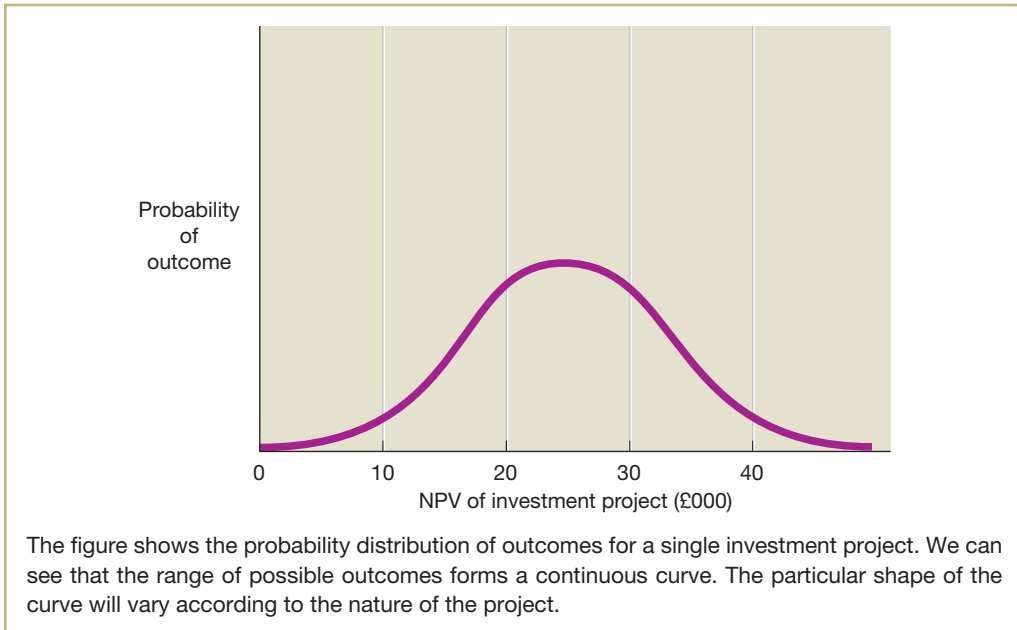
Figure 5.14 Probability distribution of outcomes for a single investment project

The figure shows the probability distribution for two projects that have the same expected value. We can see that the distribution for each project around the expected value is quite different. Project A has a much tighter distribution than Project B. This means that Project A has less 'downside' risk but also has less 'upside' potential.
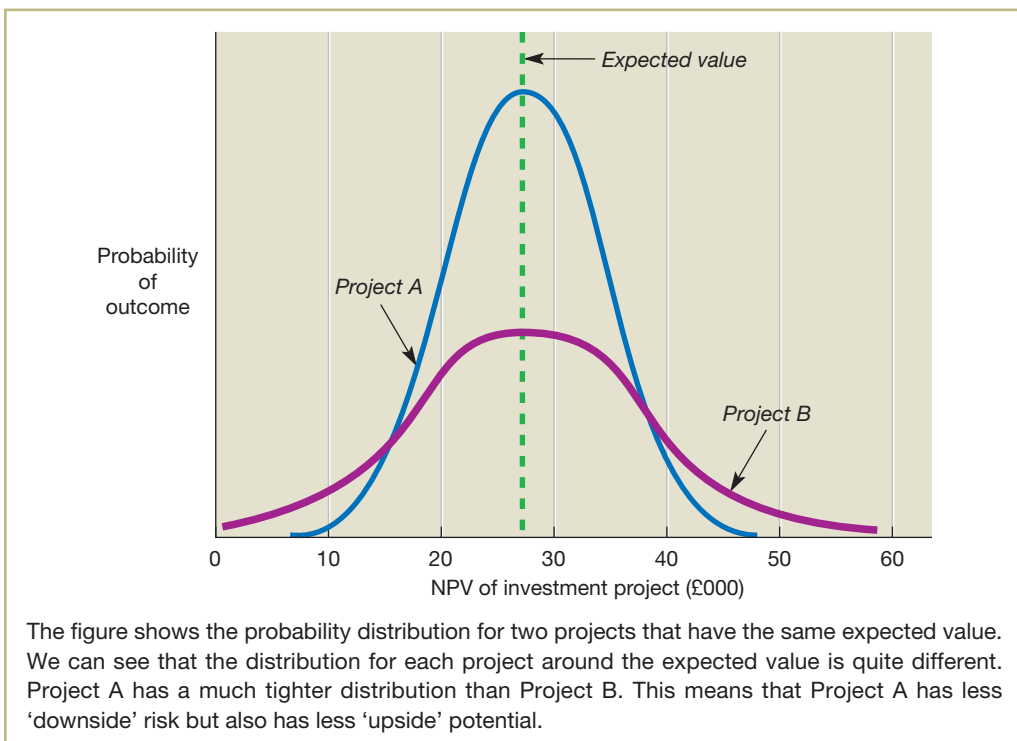
Figure 5.15 Probability distribution of two projects with the same expected value

The variability of possible future values associated with a project can be measured using a statistical measure called the **standard deviation**. This is a measure of spread that is based on deviations from the mean, or expected value. To demonstrate how the standard deviation is calculated, let us consider Example 5.6.

Example 5.6

Telematix plc is considering two mutually exclusive projects: Cable and Satellite. The possible NPVs for each project and their associated probabilities are as follows:

Cable		Satellite	
NPV £m	Probability of occurrence	NPV £m	Probability of occurrence
10	0.1	15	0.6
20	0.5	20	0.2
25	0.4	40	0.2

To calculate the standard deviation, the ENPV for each project must be calculated. In the case of the Cable project, the ENPV is as follows:

(a) NPV £m	(b) Probability of occurrence	(a × b) ENPV £m
10	0.1	1.0
20	0.5	10.0
25	0.4	10.0
		21.0

The next step is to calculate the deviations around the ENPV by deducting the expected NPV from each possible outcome. For the Cable project, the following set of deviations will be obtained:

(a) Possible NPV £m	(b) ENPV £m	(a − b) Deviation £m
10	21	−11
20	21	−1
25	21	4

The calculations reveal that two of the deviations are negative and one is positive. To prevent the positive and negative deviations from cancelling each other out, we can eliminate the negative signs by squaring the deviations. The sum of the squared deviations is referred to as the *variance*. The variance for the Cable project will be:

Deviations £m	Squared deviations £m
−11	121
−1	1
4	16
	Variance 138

The problem with the variance is that it provides a unit of measurement that is the square of the NPV deviations. In this case, the variance is 138 $(£m)^2$ which is difficult to interpret. To make things easier, it is a good idea to take the square root of the variance. The final step in calculating the standard deviation is to do just that. The standard deviation is:

$$\text{Standard deviation} = \sqrt{\text{Variance}}$$

For the Cable project, the standard deviation is:

$$\text{Standard deviation} = \sqrt{138 (\text{£m})^2}$$
$$= £11.75\text{m}$$

It was mentioned earlier that the standard deviation is a measure of spread. Thus, we can say that the higher the standard deviation for a particular investment project, the greater the spread, or variability, of possible outcomes.

Activity 5.17

Calculate the standard deviation for the Satellite project. Which project has the higher level of risk?

To answer this activity, the steps outlined above must be followed. Thus:

Step 1. Calculate the ENPV:

(a) *NPV* *£m*	*(b)* *Probability of occurrence*	*(a × b)* *ENPV* *£m*
15	0.6	9.0
20	0.2	4.0
40	0.2	8.0
		21.0

Step 2. Calculate the deviations around the ENPV:

(a) *Possible NPV* *£m*	*(b)* *ENPV* *£m*	*(a − b)* *Deviation* *£m*
15	21	−6
20	21	−1
40	21	19

Step 3. Calculate the variance (that is, sum the squared deviations):

Deviations *£m*	*Squared deviations* *£m*
−6	36
−1	1
19	361
Variance	398

Step 4. Find the square root of the variance (that is, the standard deviation):*

$$\text{Standard deviation} = \sqrt{398 (\text{£m})^2}$$
$$= £19.95\text{m}$$

The Satellite project has the higher standard deviation and therefore the greater variability of possible outcomes. Hence, it has the higher level of risk.

*Computer software or calculators with statistical functions can be used to calculate the standard deviation and so this manual approach need not be used in practice. It is shown here for illustrative purposes.

THE STANDARD DEVIATION AND THE NORMAL DISTRIBUTION

If the distribution of possible outcomes has a symmetrical bell shape when plotted on a graph, it is referred to as a **normal distribution**. In Figure 5.16 we can see an example of a normal distribution. Note that this kind of distribution has a single peak and that there is an equal tapering off from the peak to each tail. In practice, distributions of data often display this pattern. Where a normal distribution occurs, it is possible to identify the extent to which possible outcomes will deviate from the mean or expected value. The following rules will apply:

■ Approximately 68 per cent of possible outcomes will fall within one standard deviation from the mean or expected value.
■ Approximately 95 per cent of possible outcomes will fall within two standard deviations from the mean or expected value.
■ Approximately 100 per cent of possible outcomes will fall within three standard deviations from the mean or expected value.

Even when the possible outcomes do not form a precise symmetrical bell shape, or normal distribution, these rules can still be reasonably accurate. We shall see below how these rules may be useful in interpreting the level of risk associated with a project.

The figure shows the probability of an outcome being one, two and three standard deviations from the mean or expected value. Note that approximately 100 per cent of possible outcomes will fall within three standard deviations of the mean (assuming a normal distribution). There is only a very small probability of an outcome being more than three standard deviations from the mean.
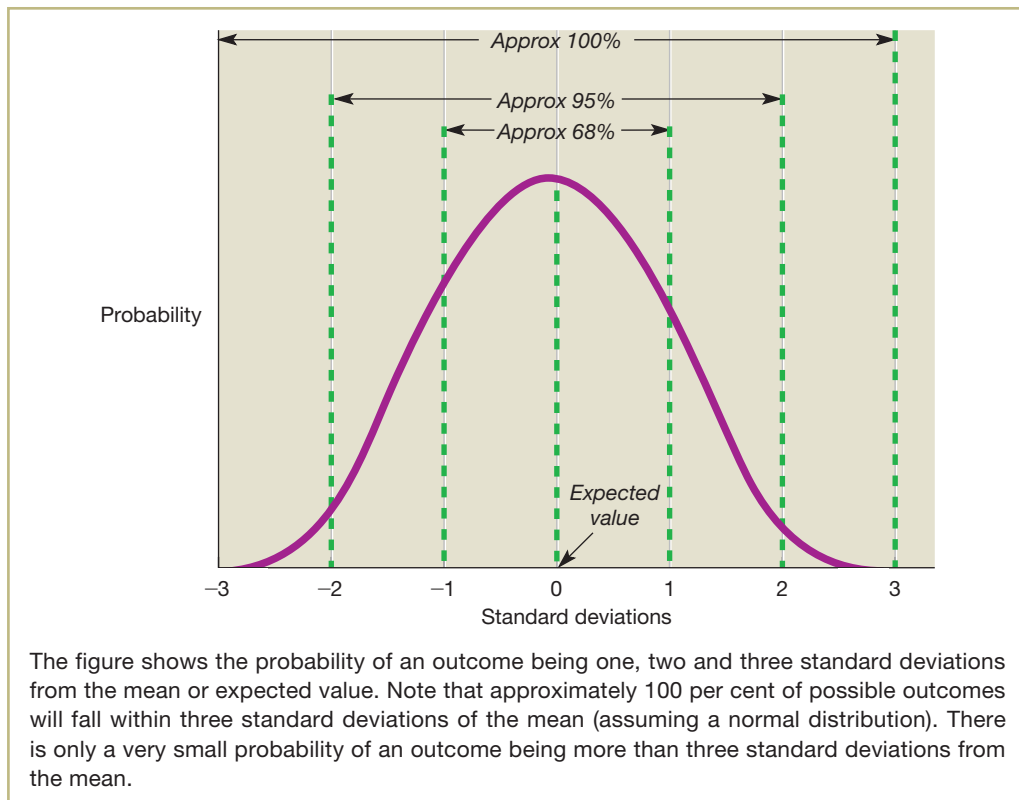
Figure 5.16 Normal distribution and standard deviations

THE EXPECTED VALUE–STANDARD DEVIATION RULE

Where the expected value of the returns of investment opportunities and their standard deviation are known, we have both a measure of return and a measure of risk that can be used for making decisions. If investors are risk-averse, they will be seeking the highest level of return for a given level of risk (or the lowest level of risk for a given level of return). The following decision rule can therefore be applied where the possible outcomes for investment projects are normally distributed.

Where there are two competing projects, X and Y, Project X should be chosen when:

■ *either* the expected return of Project X is equal to, or greater than, that of Project Y and the standard deviation of Project X is lower than that of Project Y
■ *or* the expected return of Project X is greater than that of Project Y and the standard deviation of Project X is equal to, or lower than, that of Project Y.

The **expected value–standard deviation rule**, as it is known, does not cover all possibilities. For example, the rule cannot help us discriminate between two projects where one has both a higher expected return and a higher standard deviation. Nevertheless, it provides some help for managers.

Activity 5.18

Refer back to Example 5.6. Which project should be chosen and why? (Assume the possible outcomes are normally distributed.)

We can see from our earlier calculations that the Cable and Satellite projects have an identical expected net present value. However, the Cable project has a much lower standard deviation, indicating less variability of possible outcomes. Applying the decision rule mentioned above, this means that the Cable project should be selected; or to put it another way, a risk-averse investor would prefer the Cable project as it provides the same expected return for a lower level of risk.

SIMULATIONS

The **simulation** approach recognises that all key variables influencing an investment decision are subject to uncertainty. Furthermore, there can be a wide range of possible values for each variable, with each having its own probability of occurrence. To provide an informed picture of the likely NPV, or IRR, from an investment project, this range of values must be taken into account.

The simulation approach involves six main steps:

1 *Model the investment project.* This involves identifying the key variables influencing the project and their interrelationships. These interrelationships are expressed in the form of equations (for example, Sales revenue $=$ Selling price per unit $\times$ (Market share $\times$ Market size)).
2 *Produce estimates.* Estimate the range of values for each of the key variables (selling price, sales volume, initial outlay, residual value and so on), and assign to each value a probability of occurrence.
3 *Make a selection.* Using a computer, select one of the possible values for each variable on a random basis. Then generate outcomes for NPV, or IRR, based on the selected value for each variable. This process represents a single trial.

4 *Repeat the process.* This is done using a different value for each variable until many possible combinations of values for the key variables have been produced. In practice, this could mean millions of trials being carried out.

5 *Produce a range of outcomes.* Use the results from repeated sampling to produce a range of possible outcomes (from the best to the worst) for NPV, or IRR.

6 *Generate a probability distribution.* This will be a probability distribution of the values for the NPV, or IRR, of the investment. The greater the number of times that a combination of values for key variables results in a particular NPV, or IRR, the greater the probability that this outcome will occur. The expected NPV or IRR, will be the average of all outcomes weighted by the probability of each outcome occurring.

The main steps in the simulation process, based on NPV as the investment appraisal method, are summarised in Figure 5.17.

The figure sets out the sequence of steps involved in carrying out a simulation exercise.
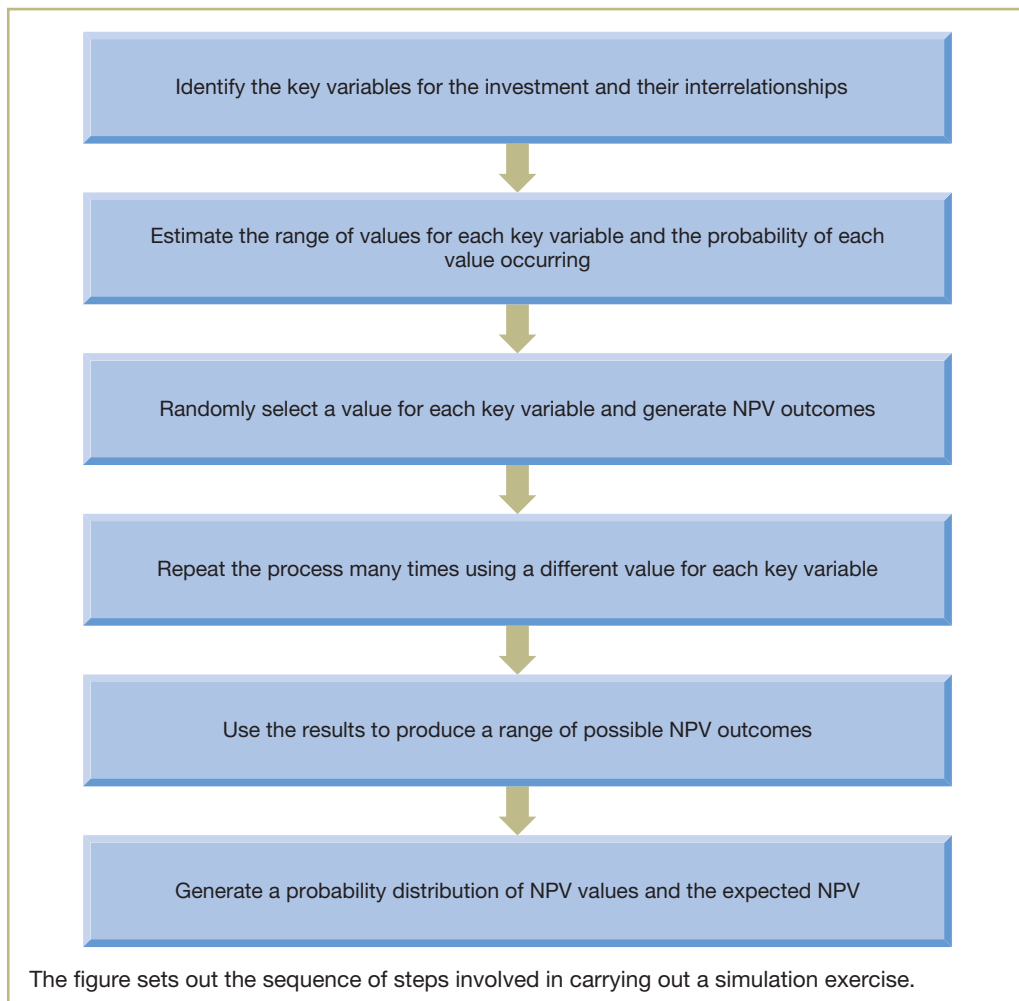
Figure 5.17 The main steps in simulation

An advantage claimed for the simulation approach is that the process of modelling an investment project helps managers to understand more clearly its nature and the issues to be resolved. To save management time, however, modelling may be undertaken by support staff, in which case, this advantage will be lost. Modelling the relationship between key variables and in establishing the probability of occurrence for each variable may also pose technical problems. The more complex the investment project, the more complex these problems are likely to be.

Carrying out endless simulations can also result in a mechanical approach to dealing with uncertainty. Emphasis may be placed on carrying out trials and producing the results, with insufficient attention given to underlying assumptions and issues.

Real World 5.8 provides evidence of the use of both scenario analysis and simulations in practice.

Real World 5.8

Surveying the scene

The KPMG survey (see Real World 2.3) asked 272 businesses in Germany, Austria and Switzerland about the extent to which scenario analysis and simulation are used in investment decisions. Figure 5.18 provides a breakdown of the results.
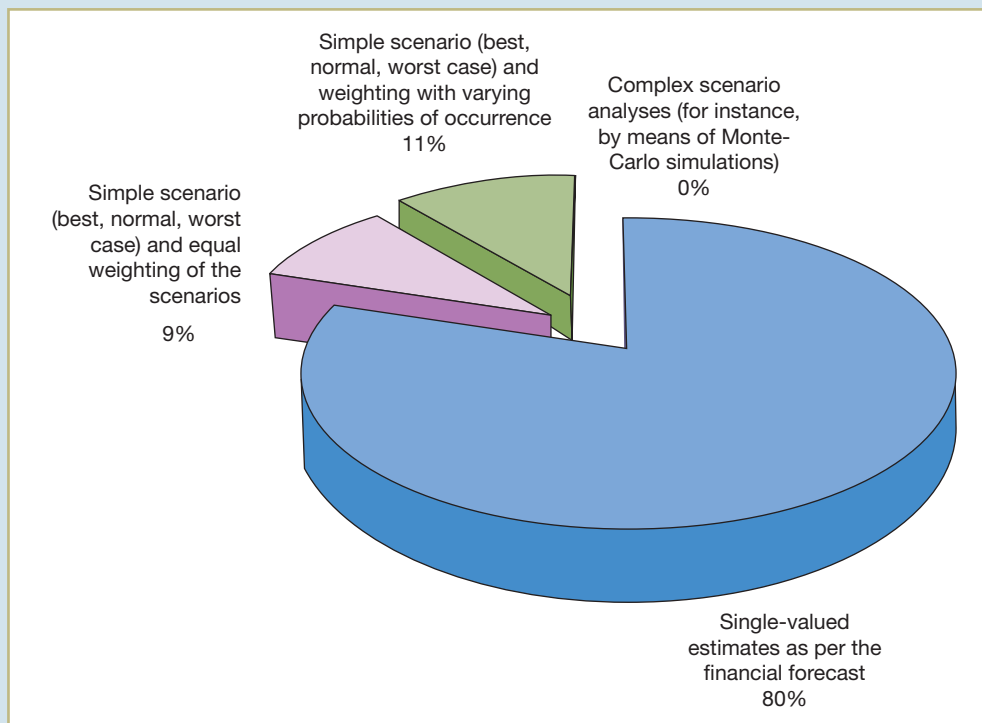
Figure 5.18 Usage of scenario analysis and simulations

Source: Figure adapted from KPMG Cost of Capital Study 2018 https://assets.kpmg/content/dam/kpmg/ch/pdf/cost-of-capital-study-2018.pdf, Figure 13, p. 15.

We can see that only a small percentage of businesses employ scenario analysis. Note that some businesses attach subjective probabilities to each scenario. As there are usually many different variables to consider for each scenario, each with its own probability of occurrence, this is an 'heroic' task. Note also that simulations are used by an even smaller percentage of businesses.

MEASURING PROBABILITIES

Probabilities may be derived using either an objective or a subjective approach. **Objective probabilities** are based on information gathered from experience. For example, the transport manager of a business operating a fleet of motor vans may be able to provide information concerning the possible life of a newly purchased van based on the record of similar vans acquired in the past. From the information available, probabilities may be developed for different possible life spans. However, past experience may not always be a reliable guide to the future, particularly during a period of rapid change. In the case of the motor vans, for example, changes in design and technology, or changes in the purpose for which the vans are being used, may undermine the validity of using past data.

Subjective probabilities are based on opinion and will be used where past data are either inappropriate or unavailable. The opinions of independent experts may provide a useful basis for developing subjective probabilities, although even these may contain bias, which will affect the reliability of the judgements made.

The limits of probability analysis

Probability analysis is now a widely accepted method of dealing with risk and uncertainty. It is worth striking a note of caution, however. Assigning probabilities to possible outcomes can be fraught with difficulties. We have seen that there may be several possible outcomes arising from a particular event. To identify each outcome and then assign a probability to it, may prove impossible.

Even so, we may still believe that a particular outcome, such as a 10 per cent fall in the price of oil, will occur. In arriving at this belief, we often use a narrative rather than a probabilistic approach. That is, we either create, or are won over by, a compelling story. In **Real World 5.9**, John Kay argues that this approach, which has long been used in reaching courtroom judgments, is highly relevant when dealing with complex business decisions.

Real World 5.9

Tell me a story

Narrative reasoning is the most effective means humans have developed of handling complex and ill-defined problems. A court can rarely establish a complete account of the probabilities of the events on which it is required to adjudicate. Similarly, an individual cannot know how career and relationships will evolve. A business must be steered into a future of unknown and unknowable dimensions.

So while probabilistic thinking is indispensable when dealing with recurrent events or histories that repeat themselves, it often fails when we try to apply it to idiosyncratic events and open-ended problems. We cope with these situations by telling stories, and we base decisions on their persuasiveness. Not because we are stupid, but because experience has told us it is the best way to cope. That is why novels sell better than statistics texts.

FT *Source*: Kay, J. (2013) A story can be more useful than maths, *Financial Times*, 26 February.
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Despite its limitations, we should not dismiss the use of probability analysis. It helps in the circumstances mentioned in Real World 5.7. It also helps to make explicit project risks so that managers can appreciate more fully the issues to be faced.

PORTFOLIO EFFECTS AND RISK REDUCTION

So far, our consideration of risk has looked at the problem from the viewpoint of an investment project being undertaken in isolation. However, in practice, a business will normally invest in a range, or *portfolio*, of investment projects rather than a single project. This approach to investment provides a potentially useful way of reducing risk. The problem with investing all available funds in a single project is, of course, that an unfavourable outcome could have disastrous consequences for the business. By investing in a spread of projects, an adverse outcome from a single project is less likely to have severe repercussions. The saying 'don't put all your eggs in one basket' neatly sums up the best advice concerning investment policy.

Investing in a range of different projects is referred to as **diversification**, and holding a diversified portfolio of investment projects can reduce the total risk associated with a business. Indeed, in theory, it is possible to combine two risky investment projects so as to create a portfolio of projects that is riskless. To illustrate this point let us consider Example 5.7.

Example 5.7

Frank N. Stein plc has the opportunity to invest in two investment projects in Transylvania. The possible outcomes from each project will depend on whether the ruling party of the country wins or loses the next election. (For the sake of simplicity, we shall assume the ruling party will either win or lose outright and there is no possibility of another outcome, such as a hung parliament.) The NPV from each project under each outcome is estimated as follows:

	Project 1 NPV £m	Project 2 NPV £m
Ruling party wins	(20)	30
Ruling party loses	40	(30)

What should the business do to manage the risks involved in each project?

Solution

If the business invests in *both* projects, the total NPV under each outcome will be as follows:

	Project 1 NPV £m	Project 2 NPV £m	Total returns £m
Ruling party wins	(20)	30	10
Ruling party loses	40	(30)	10

We can see that, whatever the outcome of the election, the total NPV for the business will be the same (that is, £10 million). Although the possible returns from each project vary according to the results of the election, they are inversely related and so the total returns will be stabilised. As risk can be diversified away in this manner, the relationship between the returns from individual investment projects is an important issue for managers.

The coefficient of correlation

A business may eliminate the variability in total returns by investing in projects whose returns are inversely related, such as in the example above. Ideally, a business should invest in a spread of investment projects so that when certain projects generate low (or negative) returns, other projects are generating high returns, and vice versa. It is possible to measure the degree to which the returns from individual projects are related by using the **coefficient of correlation**. This coefficient is an abstract measure that ranges along a continuum between +1 and −1.

When the coefficient for two projects, X and Y, is positive, it means that increases in the returns from Project X will be accompanied by increases in returns from Project Y: the higher the positive measure, the stronger the relationship between the returns of the two projects. A coefficient of +1 indicates a perfect positive correlation and this means that the returns are moving together in perfect step. In Figure 5.19, we see a graph showing the returns for two investment projects that have a perfect positive correlation.

The diagram shows the returns from two projects moving in perfect step with each other. The rises and falls in returns in one project are precisely matched by rises and falls in returns in the other project.
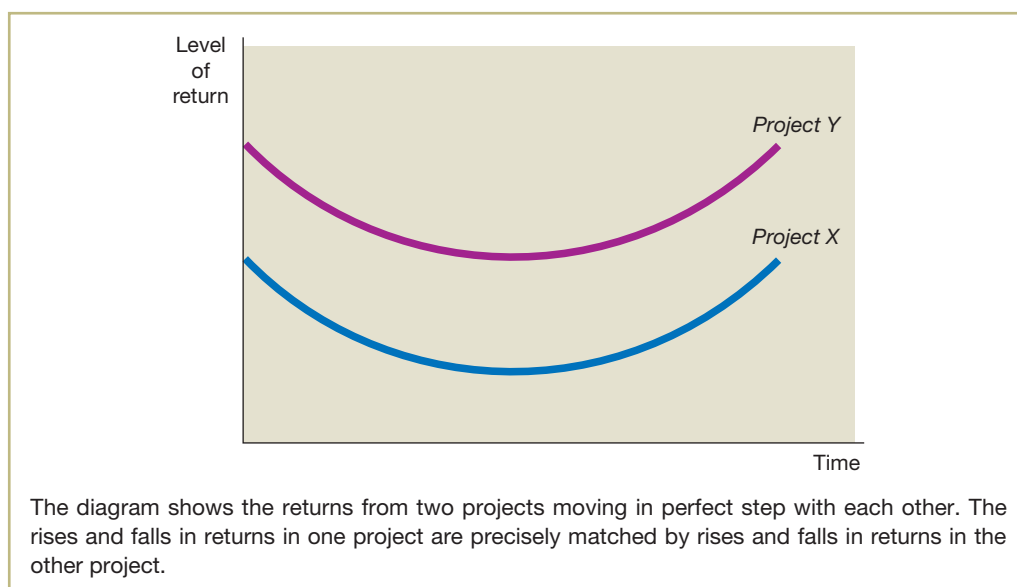
Figure 5.19 Two projects whose returns have a perfect positive correlation

If the coefficient of correlation is negative, increases in the returns from Project X will be accompanied by decreases in the returns from Project Y. A coefficient of −1 indicates a perfect negative correlation between two projects. In other words, the projects' returns will move together in perfect step, but in *opposite directions*.

Activity 5.20

Suppose the returns from Project Y had a perfect negative correlation with those of Project X. Draw a graph depicting the relationship between the two projects.

The graph for two investment projects whose returns are perfectly negatively correlated is shown in Figure 5.20.

The figure shows two projects whose returns have a perfect inverse relationship. When the returns from Project Y are low, the returns from Project X are high, and vice versa.

Figure 5.20 Two projects whose returns have a perfect negative correlation
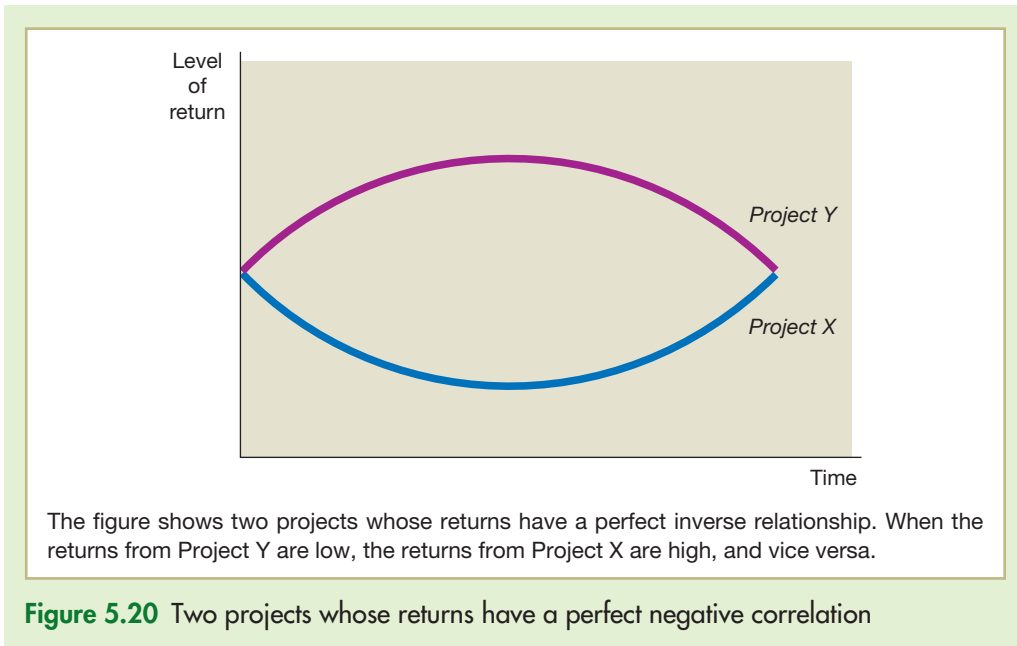
If the coefficient of correlation between the returns of two projects is 0, this means that the returns from Project X and Project Y move independently of one another and so there is no relationship between them.

To eliminate risk completely, a business should invest in projects whose returns are perfectly negatively correlated. This will mean that the variability in returns between projects will cancel each other out and so risk will be completely diversified away. So far, so good – unfortunately, however, it is rarely possible to do this. In the real world, projects whose returns are perfectly negatively correlated are extremely difficult to find. Nevertheless, risk can still be diversified away to some extent by investing in projects whose returns do not have a perfect positive correlation. Provided the correlation between projects is less than +1, some offsetting will occur. The further the coefficient of correlation moves away from +1 and towards −1 on the scale, the greater this offsetting effect will be.

Activity 5.21

Should the managers of a business seek project diversification as their main objective?

No. Even if two projects could be found whose returns had a perfect negative correlation, this does not necessarily mean that they should be pursued. The expected returns from the projects must also be considered when making any investment decision.

One potential problem of diversification is that a range of different projects can create greater project management problems. Managers will have to deal with a variety of projects with different technical and resource issues to resolve. The greater the number of projects, the greater the management problems are likely to be.

Real World 5.10 describes how a long-established bank benefited from diversifying its operations.

Banking on diversification

Franco-British investment bank Rothschild is brandishing a double-digit rise in annual revenues and underlying profits as proof that its strategy of diversifying from its core business of advising on UK and French mergers and acquisitions(M&A) is working. "We are perceived as a UK and a French firm and as an M&A specialist," said Olivier Pécoux, co-head of Rothschild. "But we are less and less dependent on the UK and French markets as other businesses grow. We are still dependent on M&A, but less and less so." The family-controlled investment bank, founded by Mayer Amschel Rothschild more than 200 years ago, has been bulking up its small American operations and recently completed its first sizeable acquisition to expand its private bank. The bank's diversification is designed to allow it to keep growing strongly even when the M&A market falls — as it did last year.

Rothschild's revenues grew 11 per cent to €1.77bn in the year to March. Net profit was up 43 per cent at €193m, after stripping out a one-off gain of almost €100m from selling its leasing business the previous year. Mr Pécoux said its performance was helped by 30 per cent revenue growth over three years at its American operation, where it recently opened offices in Chicago and San Francisco and hired six new managing directors.

The bank's overall M&A revenues rose 15 per cent to €875m, despite a fall in the global market. Mr Pécoux said Rothschild moved up from sixth to fifth position by global M&A revenues, based on data it collected from company filings. "Global advisory is a highly competitive industry and we believe that since 2015 there has been a compression of the business by value," said Mr Pécoux. "What has been announced today validates our approach. In a business environment that is not great and quite volatile, all our businesses are progressing.

Diversifiable and non-diversifiable risk

The benefits of risk diversification can be obtained by increasing the number of projects within the investment portfolio. As each investment project is added to the portfolio, the variability of total returns will diminish, provided that the projects are not perfectly correlated. However, there are limits to the benefits of diversification, due to the nature of the risks faced. The total risk relating to a particular project can be divided into two types: **diversifiable risk** and **non-diversifiable risk**. As the names suggest, it is only the former type of risk that can be eliminated through diversification.

The two types of risk can be described as follows:

- *Diversifiable risk* is that part of the total risk that is specific to the project, such as changes in key personnel, legal regulations, degree of competition and so on. By spreading available funds between investment projects, it is possible to offset adverse outcomes occurring in one project against beneficial outcomes in another. (Diversifiable risk is also referred to as avoidable risk, or unsystematic risk.)

- *Non-diversifiable risk* is that part of the total risk that is common to all projects and which, therefore, cannot be diversified away. This element of risk arises from general market conditions and will be affected by such factors as the rate of inflation, the general level of interest rates, exchange rate movements and the rate of growth within the economy. (Non-diversifiable risk is also referred to as unavoidable risk, or systematic risk.)

In Figure 5.21, the relationship between the level of portfolio risk and the size of the portfolio is shown. We can see that as the number of projects increases, the diversifiable element of total risk is reduced. This does not mean, necessarily, that a business should invest in a large number of projects. Most of the benefits from diversification can often be reaped from investing in a relatively small number of projects. In Figure 5.21, we can see the additional benefits from each investment project diminish quite sharply. This suggests that a business with a large portfolio of projects may gain very little from further diversification.

The figure shows that, as the size of the portfolio of projects is increased, the level of total risk is reduced. However, the rate of reduction in the level of total risk decreases quite sharply and soon reaches a point where investing in further projects to reduce risk is of little or no value.
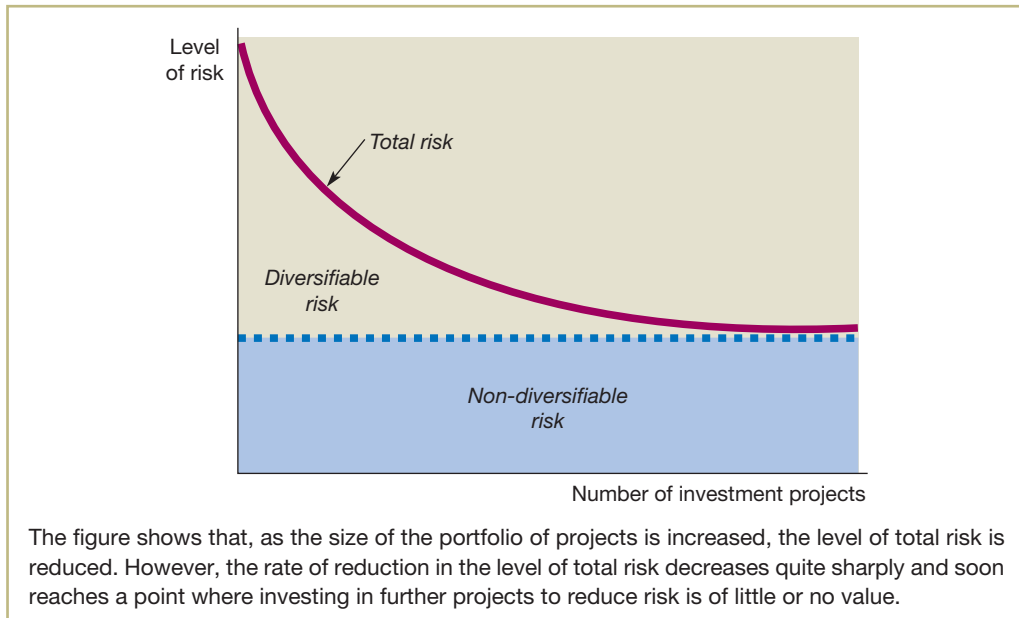
Figure 5.21 Reducing risk through diversification

Non-diversifiable risk is based on general economic conditions and therefore all businesses will be affected. However, certain businesses are more sensitive to changes in economic conditions than others. During a recession, for example, some types of businesses will be seriously affected, whereas others will be only slightly affected.

Activity 5.22

Provide two examples of businesses that are likely to be:

(a) seriously affected by an economic recession
(b) slightly affected by an economic recession.

(a) Businesses that are likely to be badly hit by recession include those selling expensive or luxury goods and services such as:

- hotels and restaurants
- travel companies
- house builders and construction companies
- airlines
- jewellers.

➜

(b) Businesses that are likely to be only slightly affected by recession include those selling essential goods and services such as:

- gas and electricity suppliers
- water suppliers
- basic food retailers and producers
- undertakers.

Businesses that are likely to be badly affected by an economic recession tend to have a cyclical pattern of profits. Thus, during a period of economic growth, they may make large profits, and during periods of recession they may make large losses. Businesses that are likely to be slightly affected by economic recession tend to have a fairly stable pattern of profits over the economic cycle.

The distinction between diversifiable and non-diversifiable risk is an important issue to which we shall return when considering the cost of capital in Chapter 8.

Risk assessment in practice

Surveys of businesses in North America and Western Europe indicate that risk assessment methods have become more widely used over time. These surveys also indicate that sensitivity analysis and scenario analysis are the most popular methods. **Real World 5.11** sets out evidence from a survey of 214 listed Canadian manufacturing businesses that is consistent with these general findings.

Real World 5.11

Risk matters

The survey asked respondents to indicate using a 5-point scale, ranging from 1 (never) to 5 (always), the types of decisions for which risk analysis techniques were employed. The table below sets out the results.

Use of discounted risk methods

Statement	% of often or always	Response mean				
			Business size		CEO with MBA	
		Full sample	Large	Small	Yes	No
Judgement	76.9	3.11	3.36	3.00	3.22	3.11
Sensitivity analysis	73.5	2.90	3.08	2.88	3.14	2.88
Scenario analysis/ decision trees	31.9	1.56	1.72	1.55	1.36	1.61
Change the required return	27.5	1.29	1.86	1.11*	1.59	1.25
Simulation analysis	12.9	0.84	1.00	0.77	0.68	0.86

Measure risk in a portfolio context	13.1	0.76	1.08	0.67	0.95	0.73
Adjust the payback period	8.6	0.66	0.43	0.72*	0.36	0.72
Mathematical programming	4.3	0.40	0.55	0.28**	0.14	0.47
Certainty equivalents	0.9	0.22	0.20	0.23	0.09	0.24

* and ** Statistically significant at the 0.05 and 0.01 levels respectively.

We can see that the most common approach to dealing with risk is the use of judgement. This is closely followed, however, by sensitivity analysis. Overall, scenario analysis/decision tree analysis is ranked third but trails some way behind in terms of popularity. These findings, however, are broadly consistent with the findings of earlier studies insofar that they reveal that sensitivity analysis and scenario analysis are preferred over other techniques.

Source: Kent Baker, H., Dutta, S. and Saadi, S. (2011) 'Corporate finance practices in Canada: where do we stand?', *Multinational Finance Journal*, vol. 15, pp 157–92.

Self-assessment question 5.1

The directors of Tocantins Co. are considering whether to invest in two separate projects: one is small while the other is large. They are also trying to decide between two other competing projects. Details of all four projects are set out below.

Project 1
The directors are considering buying a new photocopier, which should lead to cost savings. Two machines that are suitable for the business are on the market. These machines have the following outlays and expected cost savings:

	Lo-tek	Hi-tek
	£	£
Initial outlay	(10,000)	(15,000)
Cost savings		
1 year's time	4,000	5,000
2 years' time	5,000	6,000
3 years' time	5,000	6,000
4 years' time	–	5,000

The business will have a continuing need for whichever machine is chosen.

Project 2
The directors are also considering building a new factory in Qingdao, China to produce clothing for the Western European market. To date, the company has invested £500,000 in researching the proposal and in obtaining the licences necessary to build the factory. The factory will cost £16 million to build and will take one year to complete. Payments for building the factory will be made in 12 monthly instalments during the first year of the investment project.

→

The factory will be operational in the second year and estimates of the likely cash flows from the factory and their probability of occurrence are as follows:

	Estimated net cash flows £m	Probability of occurrence
Year 2	4.5	0.2
	5.0	0.4
	6.0	0.4
Year 3	5.0	0.3
	6.5	0.4
	8.0	0.3
Year 4	5.0	0.2
	7.0	0.6
	9.0	0.2
Year 5	2.0	0.5
	2.5	0.4
	3.0	0.1

Estimates for each year are independent of each other.

Projects 3 and 4
The directors have to decide between two competing projects. Their details are as follows:

	Expected net present value £m	Standard deviation £m
Project 3	14.0	2.0
Project 4	14.0	2.8

The company has a cost of capital of 12 per cent.

Required:

Project 1
(a) Evaluate each photocopier using both the shortest-common-period-of-time approach and the equivalent-annual-annuity approach.
(b) Which machine would you recommend and why?

Project 2
(c) Calculate the expected net present value of the project.
(d) Calculate the net present value of the worst possible outcome and the probability of its occurrence.
(e) State, with reasons, whether or not the business should invest in the new factory.

Projects 3 and 4
(f) State, with reasons, which of the two projects should be accepted.

The solution to this question can be found at the back of the book on pp. 638–40.

SUMMARY

The main points of this chapter may be summarised as follows:

Investment decisions when funds are limited

- Where projects are divisible, managers should maximise the present value per £ of scarce finance.
- The profitability index provides a measure of the present value per £ of scarce finance.
- Where funding requirements extend beyond a single period, linear programming can be used to maximise NPV.

Comparing projects with unequal lives

- Can be done by assuming each project forms part of a repeat chain of replacement and then by making comparisons using the shortest-common-period-of-time approach.
- As an alternative, the equivalent-annual-annuity approach converts the NPV of a project into an annual annuity stream over its expected life.

The problem of inflation

- Inflation may be included by adjusting the annual cash flows and the discount rate to take account of price increases.
- Inflation may be excluded by adjusting the cash flow to real terms and by using a 'real' discount rate.

Risk

- Is important because of the long timescales and amounts involved in investment decisions.
- Various methods of dealing with risk are available, including sensitivity analysis, scenario analysis, simulation, risk-adjusted discount rate and the expected net present value method.

Sensitivity analysis

- Provides an assessment, by taking each input variable in turn, of how much each one can vary from estimate before a project is not viable.
- Is a static form of analysis that does not indicate the likelihood of each variation occurring.
- Does not give a clear decision rule and sensitivities for the various factors are not directly comparable.

Scenario analysis

- Changes a number of variables simultaneously to provide a particular 'state of the world'.
- Often three different states – optimistic, pessimistic and most likely – are portrayed.
- Does not indicate the likelihood of each state occurring, or other possible states that may occur.

→

Risk preferences of investors

■ Given a choice between two projects with the same expected return but with different levels of risk:

  ■ risk-seeking investors will choose the project with the higher level of risk
  ■ risk-neutral investors will have no preference
  ■ risk-averse investors will choose the project with the lower level of risk.

■ Most investors appear to be risk-averse.

■ Risk-averse investors require higher returns from projects with higher risks. The explanation for this can be found in utility theory.

Risk-adjusted discount rate

■ Risk-averse investors require a risk premium for risky projects.

■ A risk-adjusted discount rate, where a risk premium is added to the risk-free rate, can be used for NPV calculations.

■ Determining the appropriate risk premium is problematic.

Expected net present value (ENPV) approach

■ Assigns probabilities to possible outcomes.

■ Expected value is the weighted average of the possible outcomes where their probabilities are used as weights.

■ Provides a single value outcome and a clear decision rule.

■ Outcome may obscure the riskiness of a project and so additional information on the range of possible outcomes should be provided.

■ Probabilities may be either subjective (based on opinion) or objective (based on evidence).

The standard deviation

■ Is a measure of spread based on deviations from the mean (average) or expected value.

■ Provides a measure of risk.

■ The expected value–standard deviation rule may be used when comparing projects where possible outcomes for each project are normally distributed.

Simulations

■ Involve identifying the key variables of the investment project and their interrelationships.

■ Probabilities are assigned to each possible value relating to each variable. A computer is then used to select one of the possible values for each variable on a random basis to produce an NPV, or IRR.

■ The process is repeated many times to obtain a range of possible NPVs, or IRRs.

■ A probability distribution of possible outcomes, based on the number of times a combination of values results in a particular NPV, or IRR, can then be produced.

■ Can be costly and time-consuming.

Portfolio effect

- By holding a diversified portfolio of investment projects, a business can reduce the total risk associated with its projects.
- The coefficient of correlation measures the degree to which returns from individual projects are related.
- Ideally, a business should hold a spread of projects, such that when certain projects generate low returns, others generate high returns.
- Risk relating to a particular project can be divided into two categories: diversifiable risk and non-diversifiable risk.

KEY TERMS

Profitability index p. 201
Linear programming p. 203
Shortest-common-period-of-time approach p. 205
Annuity p. 207
Equivalent-annual-annuity approach p. 207
Sensitivity chart p. 216
Risk-seeking investors p. 220
Risk-neutral investors p. 220
Risk-averse investors p. 220
Utility function p. 221
Risk-adjusted discount rate p. 224
Expected value p. 225

Expected net present value (ENPV) p. 225
Event tree diagram p. 228
Standard deviation p. 233
Normal distribution p. 236
Expected value–standard deviation rule p. 237
Simulation p. 237
Objective probabilities p. 240
Subjective probabilities p. 240
Diversification p. 241
Coefficient of correlation p. 242
Diversifiable risk p. 244
Non-diversifiable risk p. 244

For definitions of these terms, see the Glossary, pp. 685–94.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Arnold G. and Lewis D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 5, 6 and 7.

Brealey, R., Myers, S. and Marcus, A. (2017) *Fundamentals of Corporate Finance*, 9th edn, McGraw-Hill Education, Chapters 10 and 11.

Drury, C. (2018) *Management and Cost Accounting*, 10th edn, Cengage Learning EMEA, Chapter 14.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 6, 7 and 8.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on p. 652.

5.1 Some businesses fail to take account of inflation in investment decisions. Does it matter given that, in recent years, the level of inflation has been low? What would be the effect of dealing with inflation incorrectly on NPV calculations (that is, would NPV be overstated or understated) by (a) discounting cash flows that include inflation at real discount rates and (b) discounting real cash flows at market discount rates that include inflation?

5.2 Should objective probabilities be preferred to subjective ones? Discuss the advantages of each.

5.3 In what way is the term 'expected value' a misnomer?

5.4 Explain why the standard deviation may be useful in measuring risk. Under what circumstances might the standard deviation fail to be a reliable measure of risk?

EXERCISES

Exercises 5.5 to 5.7 are more advanced than 5.1 to 5.4. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

5.1 Lee Caterers Ltd is about to make an investment in new kitchen equipment. It is considering whether to replace its existing kitchen equipment with cook/freeze or cook/chill technology. The following cash flows are expected from each form of technology:

	Cook/chill £000	Cook/freeze £000
Initial outlay	(200)	(390)
1 year's time	85	88
2 years' time	94	102
3 years' time	86	110
4 years' time	62	110
5 years' time	–	110
6 years' time	–	90
7 years' time	–	85
8 years' time	–	60

The business would expect to replace the new equipment purchased with similar equipment at the end of its life. The cost of capital for the business is 10 per cent.

Required:
Which type of equipment should the business invest in? Use both approaches to dealing with this problem, which were described in the chapter, to support your conclusions.

5.2 D'Arcy (Builders) Ltd is considering three possible investment projects: A, B and C. The expected pattern of cash flows for each project is:

	Project cash flows		
	A	B	C
	£m	£m	£m
Initial outlay	(17)	(20)	(24)
1 year's time	11	12	9
2 years' time	5	7	9
3 years' time	7	7	11
4 years' time	6	6	13

The business has a cost of capital of 10 per cent and the investment budget for next year is £25 million.

Required:
Which investment project(s) should the business undertake assuming each project is:

(a) divisible
(b) indivisible?

5.3 Simonson Engineers plc is considering the building of a new plant in Indonesia to produce products for the South-East Asian market. To date, £450,000 has been invested in market research and site surveys. The cost of building the plant will be £9 million and it will be in operation and paid for in one year's time. Estimates of the likely cash flows from the plant and their probability of occurrence are set out as follows:

	Estimated cash flows	Probability of occurrence
	£m	
Year 2	2.0	0.2
	3.5	0.6
	4.0	0.2
Year 3	2.5	0.2
	3.0	0.4
	5.0	0.4
Year 4	3.0	0.2
	4.0	0.7
	5.0	0.1
Year 5	2.5	0.2
	3.0	0.5
	6.0	0.3

Estimates for each year are independent of each other. The cost of capital for the business is 10 per cent.

Required:

(a) Calculate the expected net present value of the proposed plant.
(b) Calculate the net present value of the worst possible outcome and the probability of its occurrence.
(c) Should the business invest in the new plant? Why?

5.4 Helena Chocolate Products Ltd is considering the introduction of a new chocolate bar into its range of chocolate products. The new chocolate bar will require the purchase of a new piece of equipment costing £30,000 which will have no other use and no residual value on completion of the project. Financial data relating to the new product are as follows:

	Per bar (£)
Selling price	0.60
Variable costs	0.22

Fixed costs of £20,000 a year will be apportioned to the new product. These costs represent a 'fair share' of the total fixed costs of the business. The costs are unlikely to change as a result of any decision to introduce new products into the existing range. Other developments currently being finalised will mean that the new product will have a life of only three years and the level of expected demand for the new product is uncertain. The marketing department has produced the following levels of demand and the probability of each for all three years of the product's life.

Year 1		Year 2		Year 3	
Sales (units)	Probability	Sales (units)	Probability	Sales (units)	Probability
100,000	0.2	140,000	0.3	180,000	0.5
120,000	0.4	150,000	0.3	160,000	0.3
125,000	0.3	160,000	0.2	120,000	0.1
130,000	0.1	200,000	0.2	100,000	0.1

A rival business has offered to buy the right to produce and sell the new chocolate bar for £100,000.

The cost of capital is 10 per cent and interest charges on the money borrowed to finance the project are expected to be £3,000 per year.

Required:

(a) Compute the expected net present value of the product.

(b) Advise the directors on the appropriate course of action. Give reasons.

5.5 Devonia (Laboratories) Ltd has recently carried out successful clinical trials on a new type of skin cream, which has been developed to reduce the effects of ageing. Research and development costs incurred to date for the new product amount to £190,000. To gauge the market potential of the new product, an independent firm of market research consultants was hired at a cost of £35,000. The market research report submitted by the consultants indicates that the skin cream is likely to have a product life of four years and could be sold to retail chemists and large department stores at a price of £20 per 100 ml container. For each of the four years of the new product's life, sales demand has been estimated as follows:

Probability of occurrence	Number of 100 ml containers sold
0.3	11,000
0.6	14,000
0.1	16,000

If the business decides to launch the new product, it is possible for production to begin at once. The equipment necessary to produce the product is already owned by the business and originally cost £150,000. At the end of the new product's life it is estimated that the equipment could be sold for £35,000. If the business decides against launching the new product the equipment will be sold immediately for £85,000 as it will be of no further use to the business.

The new skin cream will require one hour's labour for each 100 ml container produced. The cost of labour for the new product is £8.00 an hour. Additional workers will have to

be recruited to produce the new product. At the end of the product's life the workers are unlikely to be offered further work with the business and redundancy costs of £10,000 are expected. The cost of the ingredients for each 100 ml container is £6.00. Additional overheads arising from production of the product are expected to be £15,000 a year.

The new skin cream has attracted the interest of the business's competitors. If the business decides not to produce and sell the skin cream it can sell the patent rights to a major competitor immediately for £125,000.

Devonia (Laboratories) Ltd has a cost of capital of 12 per cent. Ignore taxation.

Required:

(a) Calculate the ENPV of the new product.
(b) State, with reasons, whether or not Devonia (Laboratories) Ltd should launch the new product.
(c) Discuss the strengths and weaknesses of the ENPV approach for making investment decisions.

5.6 Nimby plc is considering two mutually exclusive projects: Delphi and Oracle. The possible NPVs for each project and their associated probabilities are as follows:

Delphi		Oracle	
NPV	Probability of occurrence	NPV	Probability of occurrence
£m		£m	
20	0.2	30	0.5
40	0.6	40	0.3
60	0.2	65	0.2

Required:

(a) Calculate the expected net present value and the standard deviation associated with each project.
(b) Which project would you select and why? State any assumptions you have made in coming to your conclusions.
(c) Discuss the limitations of the standard deviation as a measure of project risk.

5.7 Plato Pharmaceuticals Ltd has invested £500,000 to date in developing a new type of insect repellent. The repellent is now ready for production and sale, and the marketing director estimates that the product will sell 150,000 bottles a year over the next five years. The selling price of the insect repellent will be £5 a bottle and variable costs are estimated to be £3 a bottle. Fixed costs (excluding depreciation) are expected to be £200,000 a year. This figure is made up of £160,000 additional fixed costs and £40,000 fixed costs relating to the existing business which will be apportioned to the new product.

In order to produce the repellent, machinery and equipment costing £520,000 will have to be purchased immediately. The estimated residual value of this machinery and equipment in five years' time is £100,000. The business calculates depreciation on a straight-line basis.

The business has a cost of capital of 12 per cent. Ignore taxation.

Required:

(a) Calculate the net present value of the product.
(b) Undertake sensitivity analysis to show by how much the following factors would have to change before the product ceased to be worthwhile:
   (i)   the discount rate
   (ii) the initial outlay on machinery and equipment
   (iii) the net operating cash flows
   (iv) the residual value of the machinery and equipment.

Chapter 6

FINANCING A BUSINESS 1: SOURCES OF FINANCE

INTRODUCTION

This is the first of two chapters that examine the financing of businesses. In this chapter, we identify the main sources of finance available to businesses and discuss the main features of each source. We also consider the factors to be taken into account when choosing between the various sources of finance available.

In the following chapter, we go on to examine capital markets. We shall discuss the role and efficiency of the London Stock Exchange and the ways in which share capital can be issued. We shall also discuss how smaller businesses, which do not have access to the London Stock Exchange, may raise finance.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Identify the main sources of external finance available to a business and explain their main features.

■ Identify the main sources of internal finance available to a business and explain their main features.

■ Outline the advantages and disadvantages of each source of finance.

■ Discuss the factors to be taken into account when choosing an appropriate source of finance.
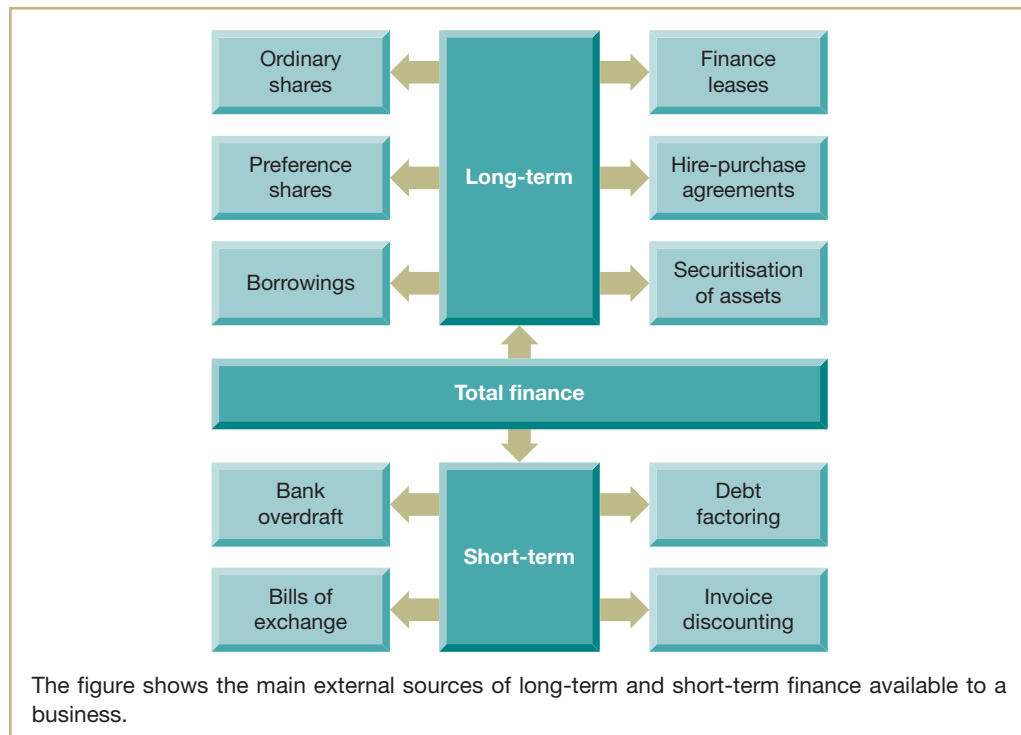
SOURCES OF FINANCE

When considering the various sources of finance available, it is useful to distinguish between *external* and *internal* sources of finance. By external sources we mean those requiring the agreement of other parties beyond the directors of the business. An injection of finance from an issue of new shares is, therefore, an external source as the agreement of potential share-holders will be needed. Internal sources of finance, on the other hand, arise from decisions of the directors' that do not require agreement from other parties. Thus, retained earnings are a source of internal finance as directors have the power to retain earnings without the agreement of shareholders (even though they have a claim on those earnings).

Within each of these categories, we can further distinguish between *long-term* and *short-term* finance. There is no agreed definition concerning each of these terms, but for the purpose of this chapter, a source of long-term finance will be defined as one that is expected to provide finance for one year or more. Sources of short-term finance, therefore, provide finance for less than a year. As we shall see, sources that are seen as short term when first used by the business may end up being used for the long term.

We will begin by considering the external sources of finance available and then go on to consider the internal sources.

EXTERNAL SOURCES OF FINANCE

Figure 6.1 summarises the main external sources of long-term and short-term finance.

The figure shows the main external sources of long-term and short-term finance available to a business.

Figure 6.1 The major external sources of finance

EXTERNAL SOURCES OF LONG-TERM FINANCE

As Figure 6.1 reveals, the major external sources of long-term finance are:

- ordinary shares
- preference shares
- borrowings
- finance leases, including sale-and-leaseback arrangements
- hire purchase
- securitisation of assets.

We shall now look at each of these sources in turn.

Ordinary shares

Ordinary (equity) shares represent the risk capital of a business and form the backbone of a business's financial structure. There is no fixed rate of dividend and ordinary shareholders will receive a dividend only if earnings available for distribution remain after other investors (preference shareholders and lenders) have received their dividend or interest payments. If the business is wound up, ordinary shareholders will only receive the proceeds from asset disposals after lenders and creditors, and, in some cases, preference shareholders, have received their entitlements. Because of the high risks associated with this form of investment, ordinary shareholders will normally expect a relatively high rate of return.

Although the ordinary shareholders' potential losses are limited to the amount that they have invested, or agreed to invest, the potential returns are unlimited. After preference shareholders and lenders have received their returns, all earnings that remain will accrue to the ordinary shareholders. Thus, while their 'downside' risk is limited, their 'upside' potential is not. Ordinary shareholders control the business through their voting rights, which give them the power to elect the directors and to remove them from office.

From the business's perspective, ordinary shares can be a useful source of financing when compared with borrowing. It may be possible to avoid paying a dividend, whereas it is not usually possible to avoid interest payments.

Activity 6.1

Under what circumstances might a business wish to avoid paying a dividend?

Two possible circumstances that spring to mind are when the business is:

- expanding and wishes to retain funds in order to fuel future growth
- in difficulties and needs the funds to meet its operating costs and debt obligations.

In the UK, a business does not obtain tax relief on dividends paid to shareholders, whereas interest on borrowings is tax deductible. This makes it more expensive for a business to pay £1 of dividend than £1 of interest.

Preference shares

Preference shares offer investors a lower level of risk than ordinary shares. Provided there are sufficient earnings available, preference shares will normally be given a fixed rate of dividend each year. Furthermore, preference dividends will be the first slice of any dividend paid. If the business is wound up, preference shareholders may be given priority over the claims of ordinary shareholders. (The business's own particular documents of incorporation will state the precise rights of preference shareholders in this respect.)

Preference shareholders are not usually given voting rights, although these may be granted where preference dividends are in arrears. Both preference shares and ordinary shares are, in effect, redeemable. The business is allowed to buy back the shares from shareholders at any time.

Preference shares are no longer an important source of new finance. A major reason for this is that dividends paid to preference shareholders, like those paid to ordinary shareholders, are not allowable against taxable profits. Loan interest, on the other hand, is an allowable expense. From the business's point of view, preference shares and loans are often seen as fulfilling a similar function. The tax benefits of loan interest can, therefore, tip the balance in favour of borrowing. In addition, interest rates on borrowing have been at historically low levels in recent years.

Borrowings

Most businesses rely on borrowings (loans) as well as share capital to finance operations. Lenders enter into a contract with the business in which the interest (coupon) rate, dates of interest payments, capital repayments and security for the loan are clearly stated. If a business is successful, lenders will not benefit beyond the fact that their claim becomes more secure. If, however, the business experiences financial difficulties, there is a risk that the agreed interest payments and capital repayments will not be paid.

To protect themselves against this risk, lenders often seek some form of **security** from the business. This may take the form of assets pledged either by a **fixed charge**, or by a **floating charge**. A fixed charge will fix on particular assets held by the business, whereas a floating charge will 'float' over all of the business's assets. It will only fix on particular assets in the event that the business defaults on its obligations.

Activity 6.4

Can you think of a reason why a business may prefer a floating charge rather than a fixed charge on its assets?

A floating charge will allow managers greater flexibility in their day-to-day operations. Individual assets can be exchanged, or sold, without seeking approval from the lenders.

Not all assets are acceptable to lenders as security. They must normally be non-perishable, easy to sell and of high value relative to their size. (Property usually meets these criteria and so is often favoured by lenders.) In the event of default, lenders have the right to seize the assets pledged and to sell them. Any surplus from the sale, after lenders have been repaid, will be passed to the business. In some cases, security offered may take the form of a personal guarantee by the business owners or, perhaps, some third party. This most often occurs with small businesses.

Lenders may seek further protection through the use of **loan covenants**. These are obligations, or restrictions, placed on the business and form part of the loan contract. Covenants may impose:

- the right of lenders to receive regular financial reports from the business
- an obligation to insure the assets offered as security
- a restriction on the right to issue further loan capital without prior permission from existing lenders
- a restriction on the right to sell certain assets held
- a restriction on the amount dividend payments and/or payments made to directors
- minimum levels of liquidity and/or maximum levels of gearing.

Any breach of these covenants can have serious consequences. Lenders may demand immediate repayment of the loan in the event of a material breach.

Real World 6.1 describes the financial covenants attached to the borrowings of one large business.

Real World 6.1

Borrowing with strings attached

Rentokil-Initial plc, a leader in business services, states on its website that its borrowing facilities have financial covenants:

> requiring that EBITDA: Interest should be at least 4.0:1.0 and that Net Debt: Adjusted EBITDA* should be no greater than 3.5:1.0 at each semi-annual reporting date.

> *EBITDA means earnings before interest, taxation, depreciation and amortisation.

The business also states that it is compliant with these covenants.

Note that the covenants focus on two gearing ratios of the business. The first is a coverage ratio, which is similar to the interest coverage ratio discussed in Chapter 3. The second ratio compares the level of borrowing to the earnings, or profits, generated.

Source: www.rentokil-initial.com, accessed 5 February 2019.

Loan covenants and the offer of security help lower the risk to which lenders are exposed. This can make the difference between a successful and an unsuccessful issue of loan capital. It can also lower the cost of loan capital to the business. The required rate of return by lenders will depend on the perceived level of risk to which they are exposed.

It is possible for a business to issue loan capital that is subordinated to (that is, ranked below) other loan capital already in issue. Holders of subordinated loan capital will not receive interest payments or capital repayments until the claims of more senior loan holders (that is, lenders ranked above them) are met. Restrictive covenants imposed by senior loan holders concerning the issue of further loan capital often ignore the issue of **subordinated loans** as it poses no threat to their claims. Subordinated loan holders normally expect to receive a higher return than senior loan holders because of the higher risks.

Activity 6.5

Would you expect the returns from loans to be higher or lower than those from preference shares?

Investors are usually prepared to accept a lower rate of return from loans. This is because they normally view loans as being less risky than preference shares. Lenders have priority over any claims from preference shareholders, and will usually have security for their loans.

The risk/return characteristics of loan, preference share and ordinary share finance, *from an investor's viewpoint*, are shown graphically in Figure 6.2. Note that from the viewpoint of the business (the existing shareholders), the level of risk associated with each form of finance is in reverse order. Thus, borrowing carries the highest risk because it exposes shareholders to the legally enforceable obligation to make regular interest payments and, usually, repayment of the amount borrowed.

The higher the level of risk associated with a particular form of long-term finance, the higher will be the expected returns from investors. Ordinary shares are the most risky and have the highest expected return and, as a general rule, loan capital is the least risky and has the lowest expected return.
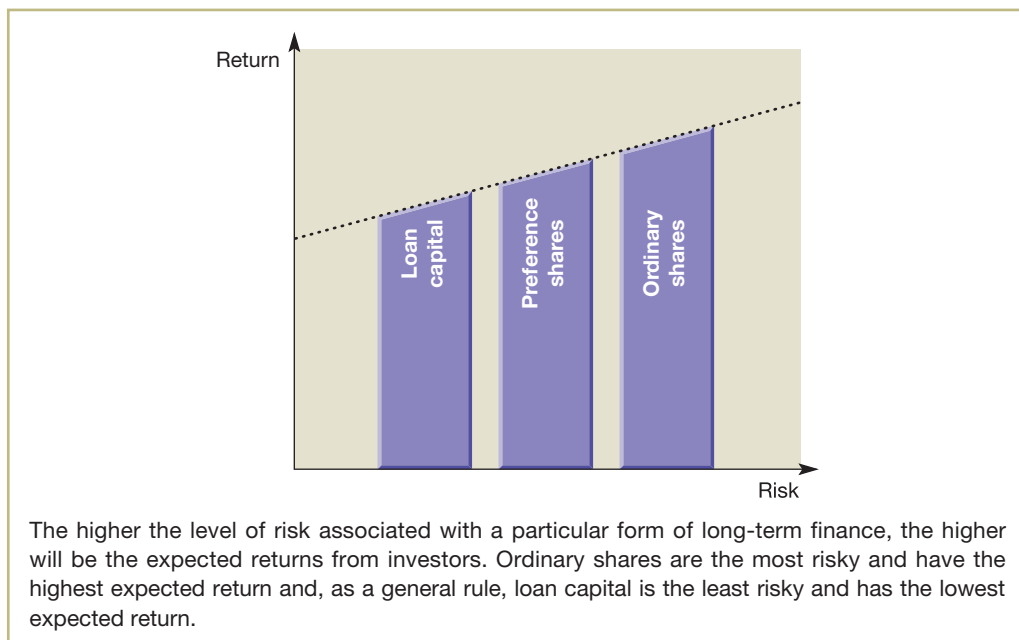
Figure 6.2 The risk/return characteristics of sources of long-term finance

What factors might a business take into account when deciding between preference shares and loans as a means of raising new finance? Try to think of at least two.

The main factors are as follows:

- Preference shares have a higher rate of return than loans. This is because, from the investor's point of view, preference shares offer higher risk. The amount invested cannot be secured and the return is paid after returns paid to lenders.
- A business has a legal obligation to pay interest and make capital repayments on loans at the agreed dates. It will usually make every effort to meet its obligations, as failure to do so can have serious consequences. Failure to pay a preference dividend, on the other hand, is less important. There is no legal obligation to pay if profits are not available for distribution. Thus, failure to pay a preference dividend may simply prove an embarrassment and nothing more. (It may, however, prove difficult to persuade investors to take up future preference share issues.)
- Interest on loans can be deducted from profits for taxation purposes, whereas preference dividends cannot. As a result, the cost of servicing loans is, £ for £, usually cheaper for a business than the cost of servicing preference shares.
- Borrowing may result in managers having to accept some restrictions on their freedom of action. Loan agreements often contain covenants that can be onerous. No such restrictions, however, can be imposed by preference shareholders.

A further point, not covered so far, is that any preference shares issued form part of the permanent capital base of the business. If they are redeemed, UK law requires that they be replaced, either by a new issue of shares or by a transfer from revenue reserves. By doing this, the business's capital base stays intact. Loans, however, are not viewed in the same way. There is no legal requirement to replace those that have been redeemed.

We end this section by considering the wisdom of Warren Buffett, one of the world's most successful investors. He is also chairman and chief executive officer of Berkshire Hathaway, a diversified business that has generated spectacular returns over many years. Mr. Buffett warns of the dangers of borrowing in **Real World 6.2** below.

Life and debt

Companies with large debts often assume that these obligations can be refinanced as they mature. That assumption is usually valid. Occasionally, though, either because of company-specific problems or a worldwide shortage of credit, maturities must actually be met by payment. For that, only cash will do the job. Borrowers then learn that credit is like oxygen. When either is abundant, its presence goes unnoticed. When either is missing, that's *all* that is noticed. Even a short absence of credit can bring a company to its knees.

Source: Buffett, W. (2011) Shareholder letter, Berkshire Hathaway Inc, www.berkshirehathaway.com, 26 February, p. 22.

Forms of borrowing

Borrowings may take various forms and we shall now consider some of the more important of these.

Term loans

A **term loan** is a type of loan offered by banks and other financial institutions that can be tailored to the needs of the client business. The amount of the loan, time period, repayment terms and interest rate are all open to negotiation and agreement – which has its advantages. Where, for example, the whole amount borrowed is not required immediately, a business may agree with the lender that sums are drawn only when required. This means interest will be paid only on amounts actually drawn rather than the whole amount borrowed. Term loans tend to be cheap to set up (from the borrower's perspective) and quite flexible as to conditions. For these reasons, they tend to be popular in practice.

Loan notes (or loan stock)

Loan notes (or *loan stocks*) are another form of long-term loan finance. Loan notes are frequently divided into units (rather like share capital) and investors are invited to purchase the number of units they require. Loan notes may be redeemable or irredeemable. The loan notes of listed businesses are often traded on the Stock Exchange, and their listed value will fluctuate according to the fortunes of the business, movements in interest rates and so on.

Loan notes are usually referred to as **bonds** in the USA and, increasingly, in the UK.

Activity 6.7

Would you expect the market price of ordinary shares or of loan notes to be the more volatile? Why?

Price movements will normally be much less volatile for loan notes than for ordinary shares. The price of loan notes and ordinary shares will reflect the expected future returns from each. Interest from loan notes is fixed by contract over time. Returns from ordinary shares, on the other hand, are less certain.

Activity 6.8

Would you expect the returns on loan notes to be higher or lower than those of ordinary shares? Why?

Loan note holders will expect to receive a lower level of return than ordinary shareholders. This is because of the lower level of risk associated with this form of investment.

Eurobonds

Eurobonds are unsecured loan notes denominated in a currency other than the home currency of the business that issued them. They are issued by listed businesses (as well as other large organisations) in various countries and the finance is raised on an international basis. They are often denominated in US dollars, but can be issued in other major currencies. They are bearer bonds (that is, the owner of the bond is not registered and the holder of the bond certificate is regarded as the owner) and interest is normally paid annually without deduction of tax.

Eurobonds form part of an international capital market that is not restricted by regulations imposed by authorities in particular countries. This partly explains why the cost of servicing Eurobonds is usually lower than the cost of similar domestic bonds. Eurobonds are made

available to financial institutions, which may retain them as an investment or sell them to clients. Various banks and other financial institutions throughout the world have created a market for Eurobonds. Some Eurobonds, however, are held for a long time and are not frequently traded.

Businesses are often attracted to Eurobonds because of the size of the international capital market. Access to a wider pool of potential investors can increase the chances of a successful issue.

Real World 6.3 provides an example of Eurobond financing by a well-known business.

Deep discount bonds

A business may issue redeemable loan notes that offer a rate of interest below the market rate. In some cases, the loan notes may have a zero rate of interest. These loans are issued at a discount to their redeemable value and are referred to as **deep discount bonds**. Thus, loan notes may be issued at, say, £80 for every £100 of nominal value. Although lenders will receive little or no interest during the period of the loan, they will receive a £20 gain when it is finally redeemed at the full £100. The effective rate of return over the life of their loan (known as the redemption yield) can be quite high and often better than returns from other forms of lending with the same level of risk.

Deep discount bonds may have particular appeal to businesses with short-term cash flow problems. They receive an immediate injection of cash and there are no significant cash outflows associated with the loan notes until the maturity date. From an investment perspective, the situation is reversed. Deep discount bonds are likely to appeal to investors that do not have short-term cash flow needs since a large part of the return is received on maturity of the loan. However, deep discount bonds can often be traded on the London Stock Exchange, which will not affect the borrower but will enable the lender to turn the bonds into cash.

Convertible loan notes

Convertible loan notes (or *convertible bonds*) give investors the right to convert loan notes into ordinary shares at a specified price at a given future date (or range of dates). The share price specified, which is known as the *exercise price*, will normally be higher than the market price of the ordinary shares at the time of the loan notes issue. In effect, the investor swaps the

loan notes for a particular number of shares. The investor remains a lender to the business, and will receive interest on the amount of the loan notes, until such time as the conversion takes place. There is no obligation to convert to ordinary shares. This will be done only if the market price of the shares at the conversion date exceeds the agreed conversion price.

An investor may find this form of investment a useful 'hedge' against risk (that is, it can reduce the level of risk). It may be particularly useful when investment in a new business is being considered. Initially, the investment can take the form of loan notes and regular interest payments is then received. If the business is successful, the investor can convert the investment into ordinary shares.

A business may also find this form of financing useful. If the business is successful, the loan notes become self-liquidating (that is, no cash outlay is required to redeem them) as investors will exercise their option to convert. It may also be possible to offer a lower rate of interest on the loan notes because of the expected future benefits arising from conversion. However, there will be some dilution of control and possibly a dilution of earnings for existing shareholders if holders of convertible loan notes exercise their option to convert. (Dilution of earnings available to shareholders will not automatically occur as a result of the conversion of loan capital to share capital. There will be a saving in interest charges that will have an offsetting effect.)

Real World 6.4 consists of extracts from a *Financial Times* article that discusses the large amounts of cash being raised through convertible bonds in the US.

Real World 6.4

Preaching to the convertibles

There are plenty of signs the credit cycle is advancing into its later stages and one more can be added to the list – companies are issuing more convertible debt (which has features of both bonds and equities) for their financing needs. Twitter Inc. is the latest member of this group. Last week's news that the social media platform would be added to the S&P 500 index* sparked a share price rally of almost 9 per cent, as the benchmark is widely followed by passive investors.

Perhaps to celebrate the institutional stamp of approval, the company went to market with $1 billion of securities that could dilute the current shareholders' stake in the company. When the notes, which yield 0.25 per cent, reach maturity in June 2024, owners will have the option to exchange them for either their cash principal or shares of Twitter at $57.14.

The market is heating up for convertible debt, which was created in the US during the late-1800s railroad financing boom and pays regular coupons like a bond. But in exchange for a lower interest rate – and often, subordination to other bondholders in a default – investors can choose whether to exchange them for stock at a pre-determined price.

'What we're seeing is a huge amount of new issuance,' said Odell Lambroza, a portfolio manager at Advent Capital. 'I think companies are trying to get ahead of rising interest rates and using convertibles as growth capital.'

So far this year, companies have issued 62 convertible bonds worth $22.9 billion, according to Dealogic, putting the market on pace for the highest volume of issuance since the financial crisis. This is, in part, because the Federal Reserve is raising interest rates, a defining feature of the late stages of the US credit cycle. Convertible bonds are more appealing to corporate treasurers during periods of rising rates because the lower coupons reduce the costs of interest payments.

While the company (Twitter) has reported two consecutive quarters of growth, investors may still have hesitated to buy equity – those were the only two quarters of positive earnings it has reported in the nearly five years it has spent as a public company. That is part

of the reason why convertible bonds are especially popular among companies like Twitter, which aim for high growth and experience variable cash flows. But those types of companies tend to be more speculative bets than other issuers. And it is important to note convertible bonds historically have had poor recovery rates in cases of default. In the case of a tech bust, investors could end up losing money. The tech sector is the biggest issuer of convertible debt by far. At about 40 per cent of the market, its share is more than twice as large as any other sector, according to ICE BofAML data. That constitutes a significant amount of shareholder dilution if the tech boom continues.

Shareholders may be able to take heart from a statistic reported by Goldman Sachs. During periods of rising rates going back to 2003, convertible bonds have outperformed high-yield bonds but underperformed the S&P 500.

* The S&P 500 is a US stock market index, similar to the FTSE index in the UK.

Loan notes and default risk

A number of credit-rating agencies, including Moody's Investor Services and Standard & Poor's Corporation (S&P), categorise loan notes issued by businesses according to their perceived default risk. The lower the risk of default, the higher will be the rating category assigned to the loan notes. To arrive at an appropriate rating, various sources of information may be relied on including published and unpublished reports, interviews with directors and visits to the business's offices and factories. The ratings used by the two leading agencies are very similar.

Real World 6.5 sets out the main debt-rating categories for Standard & Poor.

Real World 6.5

The main debt-rating categories for Standard & Poor

AAA	The lowest risk category. The capacity of the business to pay interest and repay the principal is extremely strong.
AA	High-quality debt. The capacity to pay interest and repay the principal differs only to a small degree from those in the AAA category.
A	A strong capacity to pay interest and repay the principal but the business is more susceptible to adverse effects of changing circumstances and economic conditions.
BBB	Medium-quality debt. There is adequate capacity to pay the interest and repay the principal.
BB, B, CCC, CC and C	These categories are more speculative forms of debt. Although likely to have some qualities, these may be outweighed by large uncertainties or major exposure to adverse conditions.
BB	Less vulnerable to non-payment than other speculative forms of debt but still facing major uncertainties or exposure to adverse economic conditions.
B	More vulnerable to non-payment than those rated 'BB', but the business currently maintains the capacity to meet its financial commitments
CCC	Vulnerable to non-payment, and dependent upon favourable business, financial and economic conditions to meet commitments.

→

| CC | Currently highly vulnerable to non-payment. Although default has not yet occurred, default is expected to be a virtual certainty. |
| C | Currently highly vulnerable to non-payment and expected to have lower ultimate recovery than those in the previous category. |

It should be mentioned that the track record of the credit rating agencies has been far from flawless. Some years ago, they provided good ratings for loan notes, or bonds, backed by US sub-prime residential mortgages. These ratings helped to ensure their successful take up by institutional investors. In 2006, the US housing boom ended abruptly and the initial bond debt ratings were revealed as excessively optimistic. Many sub-prime mortgage owners defaulted. The consequences were disastrous for the financial institutions holding the bonds and provoked the 2007–8 financial crisis.

Source: Table adapted from 'Standard & Poor's Ratings Definitions', www.standardandpoors.com, 20 November 2014.

Loan notes, or bonds, falling within any of the first four categories identified in Real World 6.5 is considered to be of high quality and is referred to as *investment grade*. Some institutional investors are restricted by their rules to investing only in investment-grade loans. For this reason, many businesses strive to ensure that their loan notes achieve, or maintain, investment-grade status.

Once loan notes have been assigned to a particular category, they remain in that category unless there is a significant change in circumstances.

Junk (high-yield) bonds

Loan notes rated below the first four categories identified in Real World 6.5 are often given the rather disparaging name of **junk bonds**. In some cases, loan notes with a junk bond rating began life with an investment-grade rating. Because of a decline in the business's fortunes, however, they have since been downgraded. (This type of loan note is known as a 'fallen angel'.)

Activity 6.9

Does it really matter if the loan notes of a business are downgraded to a lower category?

A downgrade is usually regarded as serious as it will normally increase the cost of borrowing. Investors are likely to seek higher returns to compensate for the perceived increase in default risk.

In addition to increasing the cost of borrowing, a downgrade to junk bond status may cast doubt over the financial viability of the business. This may, in turn, affect its relationship with existing, or potential, customers. For example, a business that is bidding for a long-term government contract may find itself at a disadvantage when competing with other, better-capitalised businesses.

Not all junk bonds start life with an investment-grade rating. Since the 1980s, loan notes with an initial low rating have been issued by US businesses. This type of borrowing provides investors with high interest rates to compensate for the high level of default risk (hence their alternative name, high-yield bonds). Businesses that issue junk bonds, or high-yield bonds, are usually less financially stable than those offering investment-grade bonds. The junk bonds issued may also provide lower levels of security and weaker loan covenants than those normally associated with standard loan agreements.

Junk bonds became popular in the USA as they allowed some businesses to raise finance that was not available from other sources. Within a fairly short space of time, a market for this form of borrowing developed. Normally, businesses use junk bonds to finance everyday needs such as investment in inventories, receivables and non-current assets; however, they came to public attention through their use in financing hostile takeovers. There have been cases where a small business borrows heavily, through the use of junk bonds, to finance a takeover of a much larger business. Following the takeover, non-core assets of the larger business were then sold to repay the junk bond holders.

The junk bond market in the USA has enjoyed a turbulent history. It has suffered allegations of market manipulation, the collapse of a leading market maker and periods when default levels on junk bonds have been very high. While these events have shaken investor confidence, the market has proved more resilient than many had expected. Nevertheless, there is always the risk that, in a difficult economic climate, investors will make a 'flight to quality' and the junk bond market will become illiquid.

Historically, European investors have shown less interest in junk bonds than their US counterparts. Perhaps this is because they tend to view ordinary shares as a high-risk/high-return investment and view loan capital as a form of low-risk/low-return invest-ment. Junk bonds are a hybrid form of investment lying somewhere between ordinary shares and conventional loan notes. It can be argued that the same results as from junk bonds can be achieved through holding a balanced portfolio of ordinary shares and conventional loan notes.

Mortgages

A **mortgage** is a form of loan that is secured on an asset, frequently property. Financial institutions such as banks, insurance businesses and pension funds are often prepared to lend to businesses on this basis. The mortgage may be over a long period (20 years or more).

Real World 6.6 describes the extent to which one well-known business uses mortgages to finance its main assets.

Real World 6.6

Flying with a heavy load

At 31 March 2018 Ryanair, the budget airline, reported aircraft held at a carrying amount (that is cost less depreciation) of €8,052.2m. It also reported that aircraft with a carrying amount of €2,934.9m were mortgaged to lenders as security for loans. Under the financial security arrangements for the newly acquired Boeing 737-800 next-generation aircraft, Ryanair does not hold the legal title to these aircraft while the loan amounts remain outstanding.

Source: Ryanair Holdings plc, Annual Report 2018, www.ryanair.com, pp.163–4.

Borrowing and interest payments

Floating and fixed rates of interest

Interest rates on loan notes may be either floating or fixed. A **floating interest rate** means that the rate of return will rise and fall with market rates of interest. (But it is possible for a floating rate loan note to be issued that sets a maximum rate of interest and/or a minimum rate of interest payable.) The market value of the loan notes, however, is likely to remain fairly stable over time.

The converse will normally be true for loan notes with **fixed interest rates**. Interest payments will remain unchanged with rises and falls in market rates of interest, but the value of the loan notes will fall when interest rates rise, and will rise when interest rates fall.

Activity 6.10

Why do you think the value of fixed-interest loan notes will rise and fall with rises and falls in interest rates?

It is because investors will be prepared to pay less for loan notes that pay a rate of interest below the market rate of interest and will be prepared to pay more for loan notes that pay a rate of interest above the market rate.

Managing interest rate risk

Movements in interest rates can be a significant issue for businesses with high levels of borrowing. A business with a floating rate of interest may find that rate rises place huge strains on cash flows and profitability. Conversely, a business that has a fixed rate of interest will find that, when rates are falling, it will not enjoy the benefits of lower interest charges. To reduce or eliminate these risks, a business may enter into a **hedging arrangement**.

To hedge against the risk of interest rate movements, various devices may be employed. One popular device is the **interest rate swap**. This is an arrangement between two businesses whereby each business assumes responsibility for the other's interest payments. Typically, it involves a business with a floating-interest-rate loan note swapping interest payment obligations with a business with a fixed-interest-rate loan note. A swap agreement can be undertaken through direct negotiations with another business, but it is usually easier to negotiate through a bank or other financial intermediary. Although there is an agreement to swap interest payments, the legal responsibility for these payments still rests with the business that entered into the original loan note agreement. Thus, the borrowing business may continue to make interest payments to the lender in line with the loan note agreement. However, at the end of an agreed period, a compensating cash adjustment between the two parties to the swap agreement will be made.

A swap agreement can be a useful hedging device where there are different views concerning future movements in interest rates. For example, a business with a floating-rate agreement may believe that interest rates are going to rise, whereas a business with a fixed-rate agreement may believe that interest rates are going to fall.

Real World 6.7 sets out the policies of one large business for dealing with interest rate risk.

Real World 6.7

Hedging interest rate risk

South West Water Ltd, the water utility business, describes its approach to interest rate risk as follows:

> Interest rate swaps and fixed rate borrowings are used to manage the mix of fixed and floating rates to ensure at least 50%, after the effect of interest rate swaps, of net borrowings is at fixed rate. At 31 March 2018, 60% (31 March 2017: 65%) of net borrowings was at fixed rate.
>
> At 31 March 2018 interest rate swaps to swap from floating to fixed rate and hedge financial liabilities with a notional value of £878.0m existed, with a weighted average maturity of 2.3 years (31 March 2017: £978.0m, with 3.0 years). The weighted average interest rate of the swaps was 1.96% (31 March 2017: 2.05%).

Source: South West Water Ltd, Annual Report and Financial Statements 2018, note 19, p. 132.

Swap agreements may also be used to exploit imperfections in the capital markets. It may be the case that one business has an advantage over another when negotiating interest rates for a fixed loan note agreement, but would prefer a floating loan note agreement, whereas the other business is in the opposite position. When this occurs, both businesses can benefit from a swap agreement.

Islamic finance and the payment of interest

The increasing economic importance of those who follow the Islamic faith has led to greater attention being paid to their needs concerning the financing of businesses. Many of these individuals are citizens of Islamic states, but many others are nationals of the USA and Western European countries, particularly the UK and France.

A key feature of Islamic finance is the belief, based on the teachings of the Islamic holy book (the Quran), that charging pure interest is wrong. This stems from the notion that it is immoral to gain income (in the form of interest) merely because money has been lent. Sharia law, which guides Islamic practice, is not against free enterprise capitalism; it is the lack of risk taking that is the problem. It is probably fair to say that Sharia does not object to profits earned through hard work and enterprise but is opposed to gains from pure financing and speculation.

It is clear that normal interest-bearing loans to businesses, such as term loans and loan notes, are contrary to Sharia law. All investors, not just equity investors, are required to bear some of the risk associated with operating a business. In recent years, special types of bonds have emerged to accommodate this requirement. This enabled Tesco plc, the supermarket business, to make an issue of Sharia-compliant bonds in Malaysia.

Borrowing and share warrants

Holders of **warrants** have the right, but not the obligation, to buy ordinary shares in a business at a given price (the 'exercise' price). As with convertible loan notes, the price at which shares are eventually bought is usually higher than their market price at the time the warrants are issued. The warrant will usually state the number of shares that the holder may buy and the time limit within which the option to buy can be exercised. Occasionally, perpetual warrants are issued that have no set time limits. Warrants do not confer voting rights, or entitle the holders to make claims on the assets of the business.

Share warrants may be sold to investors, thereby providing a valuable source of finance to the business. Often, however, they are given away 'free' as a 'sweetener' to accompany the issue of loan notes. In other words, they act as an incentive to potential lenders. Issuing warrants in this way may enable the business to offer lower rates of interest on the loan notes or to negotiate less restrictive loan conditions.

Warrants enable investors to benefit from any future increases in the business's ordinary share price, without having to buy the shares themselves. But if the share price remains below the exercise price, the warrant will not be used and the investor will lose out.

Activity 6.11

Under what circumstances will the holders of share warrants exercise their option to buy?

Holders will exercise this option only if the market price of the shares exceeds the exercise price within the specified time period. If the exercise price is higher than the market price, it will be cheaper for the investor to buy the shares in the market.

Share warrants may be detachable, which means that they can be sold separately from the loan notes. For listed businesses, share warrants may be listed on the Stock Exchange, thereby providing investors with a ready market for buying and selling.

Issuing warrants to lenders can be very useful for businesses engaged in risky projects. Potential lenders may feel that such projects offer them an opportunity for loss but no opportunity for gain. By attaching share warrants to the loan issue, they are given the opportunity to participate in future gains. This should increase their appetite for risk and, by so doing, make the issue more attractive.

Share warrants are a speculative form of investment. They have a gearing element, which means that changes in the value of the underlying shares can lead to a disproportionate change in value of the warrants. To illustrate this gearing element, let us suppose that a share has a current market price of £2.50 and that an investor is able to exercise an immediate option to purchase a single share for £2.00. In theory, the value of the warrant is £0.50 (that is, £2.50 – £2.00). Let us further suppose that the price of the share rises by 10 per cent, to £2.75, before the warrant option is exercised. The value of the warrant should now rise to £0.75 (that is, £2.75 – £2.00).), which represents a 50 per cent increase in value. This gearing effect can, of course, operate in the opposite direction as well.

It is worth noting the difference in status within a business between holders of convertible loan notes and holders of loan notes with share warrants attached, where both groups decide to exercise their right to convert. Convertible loan note holders will become ordinary shareholders and will no longer be lenders to the business. The value of their loan notes will be converted into shares. Loan note holders with warrants attached will, by converting their warrants, also become shareholders. However, their status as lenders is unaffected. They will be both ordinary shareholders and lenders to the business.

Both convertible loans and share warrants are examples of **financial derivatives**. These are any form of financial instrument, based on share or loan capital, which can be used by investors to increase their returns or reduce risk.

ATTITUDES TOWARDS THE LEVEL OF BORROWING

In practice, the level of borrowing adopted by a business will be determined by the attitude of owners, managers and lenders. The factors that influence the attitude of each of these groups are considered below.

Owners

The attitude of owners (shareholders) is likely to be influenced by the following:

- *Risk.* Risk-averse shareholders will only accept more risk where there is the opportunity for higher rates of return. Higher gearing must therefore offer the prospect of higher returns.
- *Returns.* Where shareholders experience poor returns, they will be reluctant to commit further funds. Instead, they may require managers to boost equity returns through higher levels of gearing.
- *Control.* Shareholders may object to further share issues where it results in a dilution of control. Loan capital may, therefore, be seen as a better option.

- *Flexibility.* Loan capital can often be raised more quickly than share capital. This can be important where a business operates in a fast-changing environment.
- *Debt capacity.* Where existing levels of borrowing are already high, the capacity for future borrowing is limited.
- *Exerting financial discipline.* Shareholders may require high levels of borrowing to prevent managers from misusing resources. Where a business is highly geared, the obligation to make substantial interest payments and capital repayments can exert a powerful financial discipline over managers.

Activity 6.12

What action might managers have to take in order to meet the borrowing commitments?

To ensure there is sufficient cash to pay lenders, costs will have to be tightly controlled, outstanding receivables collected quickly and any under-utilised assets sold.

The factors influencing the attitude of owners are summarised in Figure 6.3.
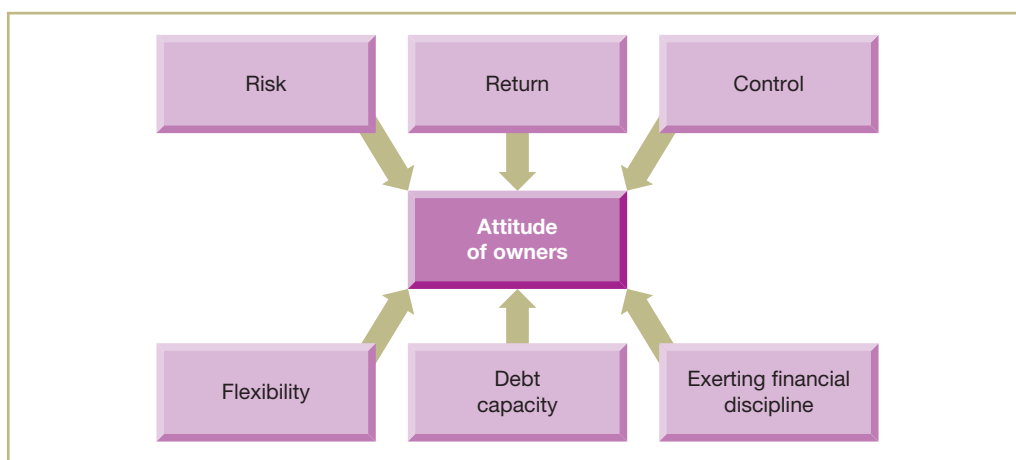
Figure 6.3 Factors influencing the attitude of owners towards borrowing

Managers

Managers may resist high levels of borrowing if they feel that it places their income and jobs at risk. They make a huge investment of 'human capital' in the business and become dependent on its continuing financial health. They cannot diversify this 'human capital' risk in the way that shareholders can diversify their financial capital risk.

Managers may also object to the tight financial discipline that loan capital imposes on them. They may feel under constant pressure to ensure that cash is available to cover interest payments and capital repayments. They may also feel that this prevents them from investing in value-creating projects. Incentives may have to be offered to encourage them to take on these additional risks and pressures.

Can you think of circumstances where managers may welcome the opportunity to take on higher gearing?

Managers struggling to achieve the required returns for shareholders may wish to employ gearing to boost profits.

When gearing is no longer needed to achieve the required returns, borrowing can be reduced.

Lenders

When deciding whether to provide loan finance, lenders will be concerned with the ability of the business to repay the amount borrowed and to pay interest at the due dates. Various factors will have a bearing on these issues including:

- *Profitability and cash flows.* Where a business has stable profits and strong and predictable cash flows, lenders may feel that there is less risk to their investment. The type of products sold, the competitive structure of the industry and so on, will affect the stability and predictability of profit and cash flows.
- *Security for the loan.* The nature and quality of assets held by a business will determine whether adequate security is available.
- *Level of fixed costs.* We saw in Chapter 2 that fixed costs, such as rents, increase risk as they have to be paid irrespective of the profits and cash flows generated. Where a business already has high fixed costs, an additional commitment to make interest payments may create an unacceptable level of risk.

Borrowing and industry characteristics

Levels of borrowing can vary significantly between industries. Generally speaking, they are higher in industries where profits and cash flows are stable (which lenders tend to prefer). Thus, higher borrowing is quite common in utilities such as electricity, gas and water businesses, which are less affected by economic recession, changes in consumer tastes and so forth.

Higher levels of borrowing may also be found in industries where the level of competition is not high. In a highly competitive environment, highly geared businesses are more vulnerable to lower-geared businesses temporarily reducing prices in order to eliminate competitors.

We end this section by looking at **Real World 6.8**. This describes how listed businesses are engaged in record borrowing for questionable reasons.

Real World 6.8

Sinking into debt

Debt at UK listed companies has soared to hit a record high of £390bn as companies have scrambled to maintain dividend payouts in response to shareholder demand despite weak profitability. UK plc's net debt has surpassed pre-crisis levels to reach

£390.7bn in the 2017–18 financial year, according to analysis from Link Asset Services, which assessed data from 440 UK listed companies. The data for net debt, which is total debt less cash, show that while companies cut their borrowings by a fifth in the two years immediately after the financial crisis, debt levels have jumped 69 per cent since 2010–11.

Most of the increase was used to fund dividends – against a backdrop of low interest rates – at a time of low profitability for UK companies, Link said. This 'credit binge' has accelerated recently, with the heaviest borrowing taking place over the past two years. 'The demands of shareholders help explain the pattern,' Link said in the report. 'During [the past two years], profit performance was disappointing across many sectors, but investment requirements continued, and most companies strived to maintain dividends.'

Across all sectors, debt at oil companies has grown the fastest in the wake of the 2015 oil price slump, up more than 450 per cent since 2008–9. BP and Royal Dutch Shell are among the most heavily indebted companies, accounting for £1 in every £7 of all UK plc's net debts in the latest financial year. Separate data released on Monday from UHY Hacker Young showed that the restaurant industry is also suffering, hit by slower consumer spending and higher business costs. The UK's biggest 100 restaurant groups grew their debt pile by 19 per cent in the past year to £1.96bn from £1.65bn, UHY said.

But there are signs that the debt burden is becoming more manageable as profitability began to improve this year and there were fewer asset write-downs. The collective gearing level – debt relative to equity capital – at UK plc shot up in tandem with rising debt levels, peaking at 83 per cent in 2015–16, but has since fallen to 73 per cent, Link said. The data also show that companies are now less dependent on short-term borrowings than at any time in the past decade.

Short-term debt accounted for 26 per cent of all borrowings in 2008–09 compared with 18 per cent today. 'It seems we may now have seen peak indebtedness. Two years ago, corporate borrowing soared higher, gearing levels approached those seen just before the credit crunch, and company profitability was still in the doldrums,' said Justin Cooper, chief executive of Link Market Services. 'Now, healthy global growth means higher profits. That has both brought gearing levels down, and means that interest costs and dividends are much more comfortably covered by profits.'

Smaller companies appear to be demonstrating the most prudence. The data found that larger companies, in the top 100, are now more highly geared than small-caps, where the inverse was true pre-crisis.

Other forms of long-term financing

Let us now take a look at other forms of long-term financing from external sources.

Finance leases

When a business needs a particular asset, such as a piece of equipment, instead of buying it direct from a supplier, the business may arrange for a bank (or other business) to buy it and then lease it to the business. The bank that owns the asset, and then leases it to the business, is referred to as the 'lessor'. The business that leases the asset from the bank and then uses it, is referred to as the 'lessee'.

A **finance lease**, as such an arrangement is known, is in essence a form of lending. This is because, had the lessee borrowed the funds in order to buy the asset, the effect would be much the same. The asset would be available for use within the business but there would also be a financial obligation – just as with a leasing arrangement.

With finance leasing, legal ownership of the asset remains with the lessor. However, the lease agreement transfers to the lessee virtually all the rewards and risks associated with the item being leased. A finance lease agreement will cover a substantial part of the life of the leased item, and often cannot be cancelled.

Real World 6.9 provides some impression of the importance of finance leasing over recent years.

Real World 6.9

Finance leasing in the UK

Figure 6.4 charts the amount of new finance leasing employed by businesses to acquire core assets such as machinery, equipment and purchased software.

New finance to acquire core assets provided through finance leasing by FLA members.
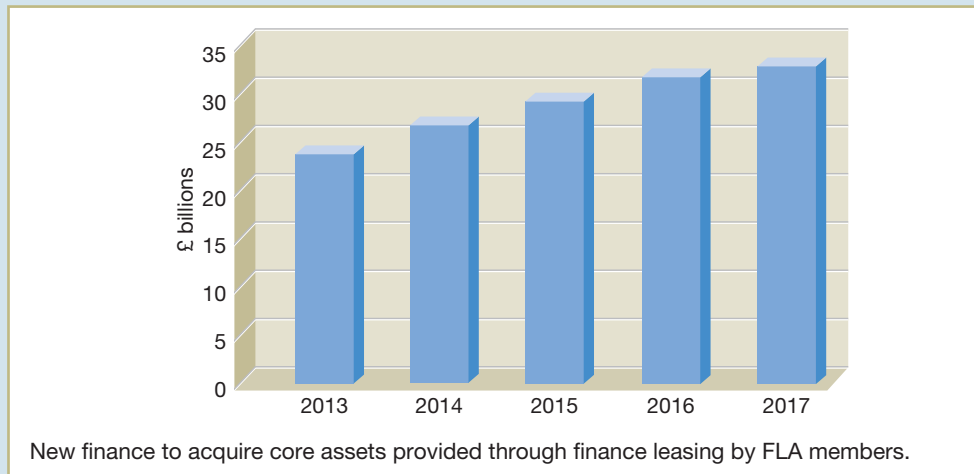
Figure 6.4 Asset finance 2013–17

The chart reveals a steady growth in the form of finance over the past five years. In 2017, £31.7 billion of finance was provided for finance leasing. This was a 5 per cent increase compared to the previous year and represented 34.4 per cent of total finance provided for UK machinery, equipment and purchased software. Of the £31.7 billion provided during 2017, £18.6 billion went to small and medium-size businesses.

Source: The Finance and Leasing Association, Annual Review 2018, www.fla.org.uk, p. 14.

Over the years, some important benefits associated with finance leasing have disappeared. Changes in the tax laws make it no longer such a tax-efficient form of financing, and changes in accounting disclosure requirements make it no longer possible to conceal this form of 'borrowing' from investors. Nevertheless, the popularity of finance leases has continued. Other

reasons must, therefore, exist for businesses to adopt this form of financing. These reasons are said to include the following:

■ *Ease of borrowing.* Leasing may be obtained more easily than other forms of long-term finance. Lenders normally require some form of security and a profitable track record before making advances to a business. However, a lessor may be prepared to lease assets to a new business without a track record and to use the leased assets as security for the amounts owing.

■ *Cost.* Leasing agreements may be offered at reasonable cost. As the asset leased is used as security, standard lease arrangements can be applied and detailed credit checking of lessees may be unnecessary. This can reduce administration costs for the lessor and so help in providing competitive lease rentals.

■ *Flexibility.* Leasing can help provide flexibility where there are rapid changes in technology. If an option to cancel can be incorporated into the lease, the business may wish to exercise this option in order to acquire new technology as it becomes available. This can help the business to avoid the risk of obsolescence. Avoiding this risk will, however, incur a cost to the lessee as the risk is now passed to the lessor.

■ *Cash flows.* Leasing, rather than buying an asset outright, means that large cash outflows can be avoided. The leasing option allows cash outflows to be smoothed out over the asset's life. It may even be possible to arrange for low lease payments in the early years of the asset's life, when cash inflows are low, and for these payments to increase over time as the asset generates stronger cash flows.

These benefits are summarised in diagrammatic form in Figure 6.5.

The four main benefits shown are discussed in this chapter.
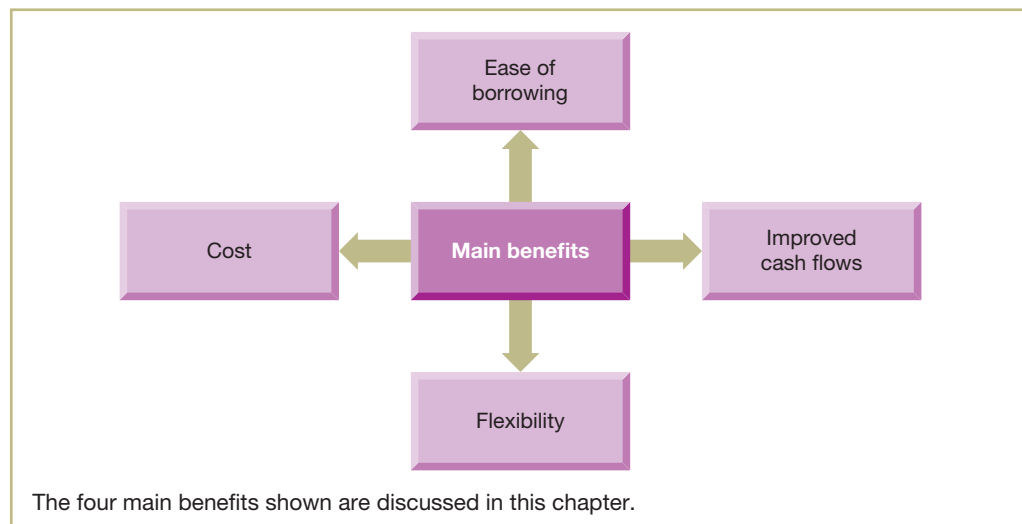
Figure 6.5 Benefits of finance leasing

A finance lease should not be confused with an **operating lease**. The latter is a form of rental agreement rather than a form of lending. The rewards and risks of ownership stay with the owner and the lease period is shorter than the life of the asset. An operating lease provides greater flexibility than a finance lease but is normally more expensive.

Operating leases can be found in many industries, including the airline industry. The operating lease period for an aircraft is often 3–5 years whereas the life of the leased aircraft may be 20 years or more. **Real World 6.10** gives an example of the use of finance and operating leases by a well-known airline.

Real World 6.10

Leased assets take off

The fleet of aircraft held by easyJet plc as at 30 September 2018 is shown below. The table reveals that 30 per cent of the aircraft fleet are held through some form of leasing arrangement. Only a small percentage, however, are held under finance leases.

Aircraft	Owned	Operating leases	Finance leases	Total
A319	79	53	–	132
A320 180 Seat	46	28	1	75
A320 186 seat	80	9	4	93
A320 neo	13	–	–	13
A321 neo	2	–	–	2
Total	220	90	5	315
% of total fleet	70	29	1	

Source: Adapted from easyJet plc, Annual Report and Accounts 2018, p. 19.

Sale-and-leaseback arrangements

A **sale-and-leaseback** arrangement involves a business raising finance by selling an asset to a financial institution. The sale is accompanied by an agreement to lease the asset back to the business to allow it to continue to use the asset. The lease rental payment is a business expense that is allowable against profits for taxation purposes.

There are usually rental reviews at regular intervals throughout the period of the lease, and the amounts payable in future years may be difficult to predict. At the end of the lease agreement, the business must either try to renew the lease or find an alternative asset. Although the sale of the asset will result in an immediate injection of cash for the business, it will lose benefits from any future capital appreciation on the asset. Where a capital gain arises on the sale of the asset to the financial institution, a liability for taxation may also arise.

Activity 6.14

Can you think which type of asset is often subject to a sale-and-leaseback arrangement?

Property is often the asset subject to such an arrangement.

Sale-and-leaseback arrangements can be used to help a business focus on its core areas of competence. In recent years, many hotel businesses have entered into sale-and-leaseback arrangements to enable them to become hotel operators rather than a combination of hotel operators and owners. Similarly, many UK high-street retailers (for example, Boots, Debenhams, Marks and Spencer, Tesco and Sainsbury) have sold off their store sites under sale-and-leaseback arrangements.

Some high-street retailers may well regret sale-and-leaseback arrangements made in earlier years. Can you think why?

High-street retailers have suffered a fall in sales and profits as a result of the onward march of online shopping. Those retailers committed to making lease payments are now finding them an increasing burden, particularly where regular rental reviews occur.

Real World 6.11 explains how a leading financial institution agreed a sale-and-leaseback arrangement for its headquarters.

Banking on a sale and leaseback

Goldman Sachs has agreed the £1.2bn sale and leaseback of its new London headquarters with Korea's National Pension Service in the latest sign of strong demand for property assets in the city. The US banking giant, which will move into the 826,000 square foot Plumtree Court office in the City financial district in the middle of next year, has taken a 25-year lease on the building, with the option to break it after 20 years.

Goldman said it will consolidate its 6,000 London staff spread across three existing locations into the 10-storey building, which has room for another 2,000 people. The building is designed so that the bank can also bring in other tenants, it said.

Scott Kim, head of global real estate at NPS, said the building was a 'high-quality asset which is well-aligned with our defensive strategy'. Goldman has routinely carried out sale-and-leasebacks on its buildings, including its current headquarters on nearby Fleet Street in 2005.
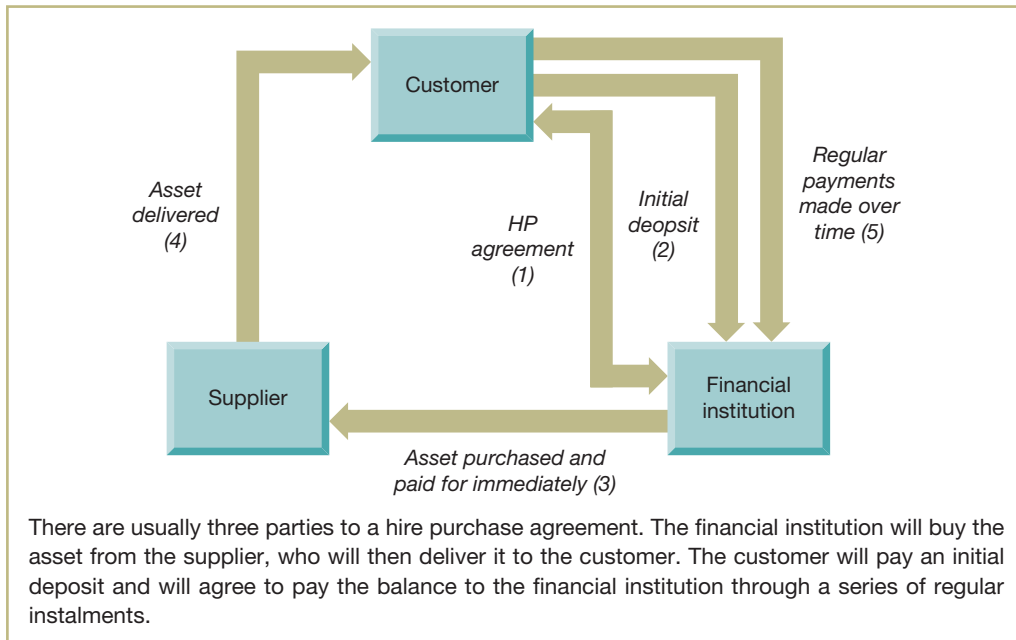
Hire purchase

Hire purchase (HP) is a form of credit used to acquire an asset. Under the terms of a hire purchase agreement a customer pays for an asset by instalments over an agreed period. Normally, the customer will pay an initial deposit (down payment) and then make instalment payments at regular intervals, perhaps monthly, until the balance outstanding has been paid. The customer will usually take possession of the asset after payment of the initial deposit, although legal ownership of the asset will not be transferred until the final instalment has been paid.

HP agreements will often involve three parties:

- the supplier
- the customer
- a financial institution.

Although the supplier will deliver the asset to the customer, the financial institution will buy the asset from the supplier and then enter into an HP agreement with the customer. This intermediary role played by the financial institution enables the supplier to receive immediate payment for the asset but allows the customer a period of extended credit. Figure 6.6 sets out the main steps in the hire purchase process.

There are usually three parties to a hire purchase agreement. The financial institution will buy the asset from the supplier, who will then deliver it to the customer. The customer will pay an initial deposit and will agree to pay the balance to the financial institution through a series of regular instalments.

Figure 6.6 The hire purchase process

Activity 6.16

In what way is an HP agreement:

(a) similar to
(b) different from

a finance lease?

HP agreements are similar to finance leases in so far as they allow a customer to obtain immediate possession of the asset without paying its full cost. HP agreements differ from finance leases because, under the terms of an HP agreement, the customer will eventually become the legal owner of the asset, whereas under the terms of a finance lease, ownership will stay with the lessor.

HP agreements are, perhaps, most commonly associated with private consumers acquiring large household items or cars. Nevertheless, it is also a significant form of financing for businesses. **Real World 6.12** shows the extent to which a large UK business uses hire purchase to finance one of its main assets.

Real World 6.12

Getting there by instalments

Stagecoach Group plc, the transport business, reported in its 2018 annual report, passenger service vehicles with a carrying amount of £805.3 million, of which £35.2 million related to assets purchased under HP agreements. This represents around 4 per cent of the total.

Source: Stagecoach Group plc, Annual Report 2018, note 13, p. 102.

Securitisation

Securitisation involves bundling together illiquid financial or physical assets of the same type so as to provide backing for an issue of bonds. This financing method was first used by US banks, which bundled together residential mortgage loans to provide asset backing for bonds issued to investors. (Mortgage loans held by a bank are financial assets that provide future cash flows in the form of interest receivable.)

Securitisation has spread beyond the banking industry and has now become an important source of finance for businesses in a wide range of industries. Future cash flows from a variety of illiquid assets are now used as backing for bond issues, including:

■ credit card receipts
■ water industry charges
■ rental income from university accommodation
■ ticket sales for football matches
■ royalties from music copyright
■ consumer instalment contracts
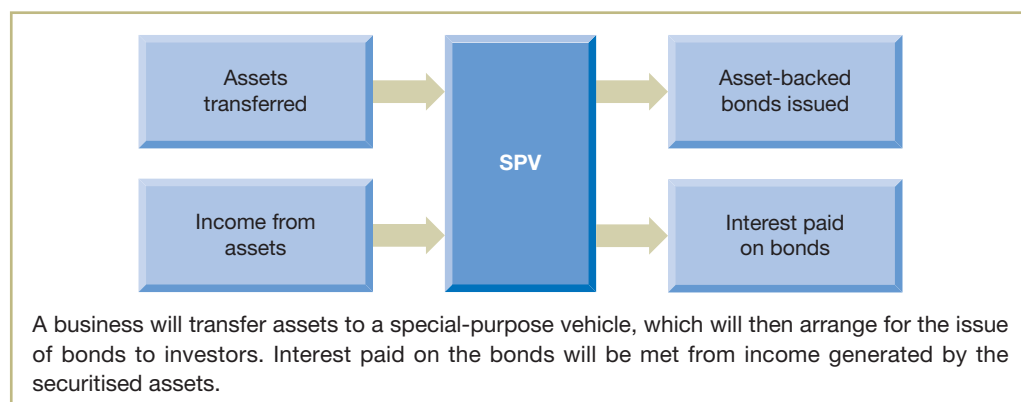■ beer sales to pub tenants.

The effect of securitisation is to capitalise future cash flows arising from illiquid assets. This capitalised amount is sold to investors, through the financial markets, to raise finance for the business holding these assets. Purchasers of securitised bonds are, in effect, buying a share of the future cash flows from the assets concerned, in much the same way as the buyer of any bond or equity share.

Securitisation usually involves setting up a special-purpose vehicle (SPV) to acquire the assets from the business wishing to raise finance. This SPV will then arrange the issue of bonds to investors. Income generated from the securitised assets is received by the SPV and used to meet the interest payable on the bonds. When the bonds mature, they may be repaid from receipts arising from one or more of the following:

■ the securitised assets (so long as the maturity dates coincide)
■ the issue of new bonds
■ surplus income generated by the securitised assets.

To reassure investors about the quality of the bonds, the securitised assets may be of a higher value than the value of the bonds (this is known as *overcollateralisation*). Alternatively, some form of credit insurance can be available from a third party, such as a bank.

The main elements of the securitisation process are set out in Figure 6.7.

A business will transfer assets to a special-purpose vehicle, which will then arrange for the issue of bonds to investors. Interest paid on the bonds will be met from income generated by the securitised assets.

Figure 6.7 The securitisation process

Securitisation may also be used to help manage risk. Where, for example, a bank has lent heavily to a particular industry, its industry exposure can be reduced by bundling together some of the outstanding loan contracts and making a securitisation issue.

Securitisation and the financial crisis

Securitising mortgage loan repayments became popular among US mortgage lenders during the early years of this century. Monthly repayments due from mortgage borrowers were 'securitised' and sold to major banks. Unfortunately, many of the mortgage loans were made to people on low incomes who were not good credit risks (sub-prime loans). When they began to default on their obligations, it became clear that the securitised mortgages, now owned by the banks, were worth much less than they had paid to the mortgage lenders. This led to the so-called 'sub-prime' crisis, which then triggered the worldwide economic problems during 2008. There is, however, no inherent reason why securitisation should be a problem and it is unfortunate that it is linked to the sub-prime crisis. It can be a legitimate and practical method of raising finance. It is not surprising, therefore, that securitisation is slowly regaining popularity.

EXTERNAL SOURCES OF SHORT-TERM FINANCE

Short term, in this context, is usually taken to mean up to one year. Figure 6.1 reveals that the major external sources of short-term finance are:

- bank overdrafts
- bills of exchange
- debt factoring
- invoice discounting.

Each of these sources is discussed below.

Bank overdrafts

A **bank overdraft** enables a business to maintain a negative balance on its bank account. It represents a very flexible form of borrowing as the size of an overdraft can (subject to bank approval) be increased or decreased more or less instantaneously. It is relatively inexpensive to arrange and interest rates are often very competitive. As with all loans, the rate of interest charged will vary according to how creditworthy the customer is perceived to be by the bank. An overdraft is fairly easy to arrange – sometimes it can be agreed by a telephone call to the bank. In view of these advantages, it is not surprising that an overdraft is an extremely popular form of short-term finance.

Banks prefer to grant overdrafts that are self-liquidating, that is, the funds are used in such a way as to extinguish the overdraft balance by generating cash inflows. The banks may ask for projected cash flow statements from the business to see when the overdraft will be repaid and how much finance is required. They may also require some form of security on amounts advanced.

One potential drawback with this form of finance is that it is repayable on demand. This may pose problems for a business that is illiquid. However, many businesses operate for many years using an overdraft, simply because the bank remains confident of their ability to repay and the arrangement suits the business. Thus, bank overdrafts, though in theory regarded as short term, can, in practice, become a source of long-term finance.

Bills of exchange

A **bill of exchange** is similar, in some respects, to an IOU. It is a written agreement that is addressed by one person to another, requiring the person to whom it is addressed to pay a particular amount at some future date. Bills of exchange, which carry no interest, are used in trading transactions. They are offered by a buyer to a supplier in exchange for goods. The supplier who accepts the bill of exchange may either keep the bill until the date the payment is due (this is usually between 60 and 180 days after the bill is first drawn up) or present it to a bank for payment. The bank will often be prepared to pay the supplier the face value of the bill, less a discount, and will then collect the full amount of the bill from the buyer at the specified payment date.

Activity 6.17

What advantages do you see, from both a buyer and supplier perspective, of drawing up a bill of exchange?

By drawing up a bill of exchange, a buyer is able to delay payment for goods purchased. It therefore provides a period of credit. The supplier, however, can receive immediate payment by discounting the bill with a bank.

Nowadays, bills of exchange are rarely used for trading transactions within the UK, but they may still be used for international trading.

Debt factoring

Debt factoring is a service offered by a financial institution (known as a factor). Many of the large factors are subsidiaries of commercial banks. Debt factoring involves the factor taking over the trade receivables collection for a business. In addition to operating normal credit control procedures, a factor may offer to undertake credit investigations and advise on the creditworthiness of customers. It may also offer protection for approved credit sales.

Two main forms of factoring agreement exist:

- *recourse factoring*, where the factor assumes no responsibility for bad debts arising from credit sales
- *non-recourse factoring*, where, for an additional fee, the factor assumes responsibility for bad debts up to an agreed amount.

Under both forms of factoring any goods returned by a customer becomes the responsibility of the business rather than the factor.
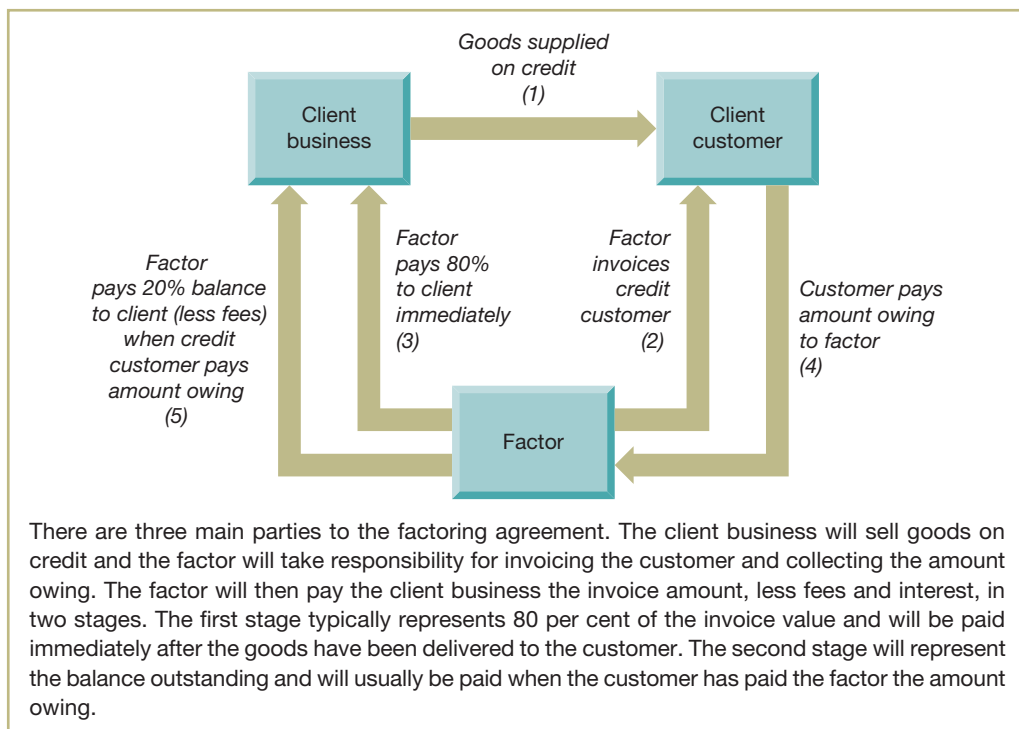
The factor is usually prepared to make an advance to the business of between 80 and 85 per cent of approved trade receivables (although it can sometimes be as high as 95 per cent). This advance is usually paid immediately after the goods have been supplied to the customer. The balance of the debt, less any deductions for fees and interest, will be paid after an agreed period, or when the debt is collected. The charge made for the factoring service is based on total sales revenue and is often between 0.5 and 3.0 per cent of sales revenue. Any advances made to the business by the factor will attract a rate of interest similar to the rate charged on bank overdrafts.

Debt factoring is, in effect, outsourcing trade receivables collection to a specialist subcontractor. Many businesses find a factoring arrangement very convenient. It can result in savings in credit management and can create more certain cash flows. It can also release the time of key personnel for more profitable ends. This can be extremely important for smaller businesses

that rely on the talent and skills of a few key individuals. In addition, the level of finance available will rise 'spontaneously' with the level of sales. The business can decide how much of the finance available is required and can use only that which it needs. There is a risk, however, that a factoring arrangement will be seen as a sign that the business is experiencing financial difficulties. If so, it can have an adverse effect on the confidence of customers, suppliers and staff. For this reason, some businesses try to conceal the factoring arrangement by collecting outstanding debts on behalf of the factor.

Businesses operating in certain sectors where trade disputes are part of the business culture, such as building contractors, may find that factoring arrangements are not available. Small businesses may also find themselves in the same position. While some factors are prepared to consider start-up businesses, a minimum sales revenue of £50,000 per year is often required. This is normally because of the set up costs involved.

Figure 6.8 shows the factoring process in diagrammatic form.

There are three main parties to the factoring agreement. The client business will sell goods on credit and the factor will take responsibility for invoicing the customer and collecting the amount owing. The factor will then pay the client business the invoice amount, less fees and interest, in two stages. The first stage typically represents 80 per cent of the invoice value and will be paid immediately after the goods have been delivered to the customer. The second stage will represent the balance outstanding and will usually be paid when the customer has paid the factor the amount owing.

Figure 6.8 The factoring process

When considering a factoring agreement, the likely costs and benefits need to be carefully weighed. Example 6.1 illustrates how this can be done.

Example 6.1

Balkan Ltd has annual credit sales revenue of £50 million, of which bad debts account for £0.2 million. The average settlement period for trade receivables is 80 days, which is causing some strain on the liquidity of the business.

Balkan Ltd is considering whether to use a debt factor to improve its liquidity position. The factor will advance an amount equivalent to 80 per cent of trade receivables (where the

trade receivables figure is based on an average settlement period of 30 days) at an interest rate of 10 per cent. In addition, the factor will collect the trade receivables and will charge a fee of 3 per cent of total sales revenue for doing so. The remaining 20 per cent of the trade receivables will be paid to Balkan Ltd, when the factor receives the cash. If the factor service is used, it is expected that the average settlement period for trade receivables will be reduced to 30 days, bad debts will be eliminated and credit administration savings of £320,000 will be gained.

The business currently has an overdraft of £10.0 million at an interest rate of 11 per cent a year.

In evaluating the factoring arrangement, it is useful to begin by considering the cost of the existing arrangements:

Existing arrangements

	£000
Bad debts written off each year	200
Interest cost of average receivables outstanding [(£50m × 80/365) × 11%].	1,205
Total cost of existing arrangement	1,405

The cost of the factoring arrangement can now be compared with this:

Factoring arrangement

	£000
Factoring fee (£50m × 3%)	1,500
Interest on factor loan (assuming 80% advance and reduction in average credit period) [(£40m × 30/365) × 10%]	329
Interest on overdraft (remaining 20% of receivables financed in this way) [(£10m × 30/365) × 11%]	90
	1,919
Savings in credit administration	(320)
Total cost of factoring	1,599

The net additional cost for the business from factoring would be £194,000 (that is, £1,599,000 less £1,405,000). Thus, all other things being equal, the business would continue with the existing arrangements.

Invoice discounting

Invoice discounting involves a factor, or other financial institution, providing a loan based on a proportion of the face value of a business's credit sales outstanding. The amount advanced is usually around 80–85 per cent of the value of the approved sales invoices outstanding and is secured by a fixed charge over the trade receivables of the business. The business must agree to repay the advance within a relatively short period – perhaps 60 or 90 days. Responsibility for collecting the trade receivables outstanding remains with the business and repayment of the advance is not dependent on the trade receivables being collected. Invoice discounters prefer to deal with larger, well-run businesses. Thus, a client business will normally be expected to generate sales revenue in excess of £250,000 per year and have efficient credit control procedures in place.

Invoice discounting will not result in such a close relationship developing between the business and the financial institution as occurs with factoring. It may be a short-term arrangement, whereas debt factoring usually involves a longer-term arrangement. Businesses can, however, become

reliant on the improved cash flows under invoice discounting and so become locked into a longer-term arrangement. Invoice discounters prefer to lend on the basis of commercial invoices. A business selling to the public on credit may, therefore, find it difficult to use this form of finance.

Nowadays, invoice discounting is a much more important source of funds to businesses than factoring. There are three main reasons for this:

- It is a confidential form of financing which the business's customers will know nothing about.
- The service charge for invoice discounting is around 0.2–0.5 per cent of sales revenue compared with around 0.5–3.0 per cent for factoring.
- A debt factor may upset customers by setting tough credit limits or by the way in which it collects debts. This may damage the relationship between the business and its customers.

Activity 6.18

Why do you think the service charge for factoring is higher than for invoice discounting?

The factor provides more services to the client business. We saw earlier that it will invoice trade credit customers and collect amounts owing.

Real World 6.13 shows the relative importance of invoice discounting and factoring.

Real World 6.13

The popularity of invoice discounting and factoring

Figure 6.9 charts the relative importance of invoice discounting and factoring in terms of the value of client sales revenue.

We can see that, client sales revenue from invoice discounting is much greater than client sales revenue for factoring.
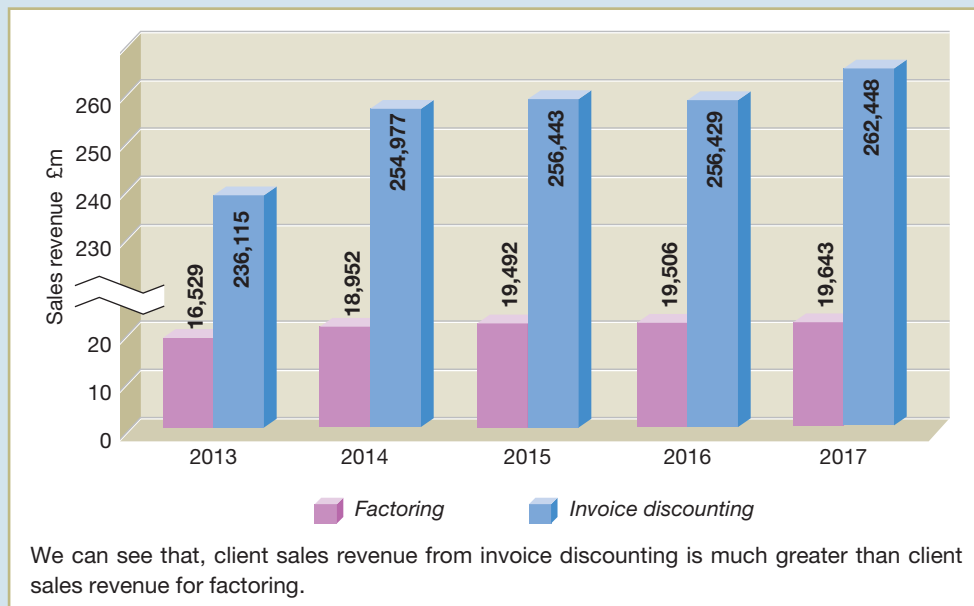
Figure 6.9 Client sales revenue: domestic invoice discounting and factoring, 2013–17

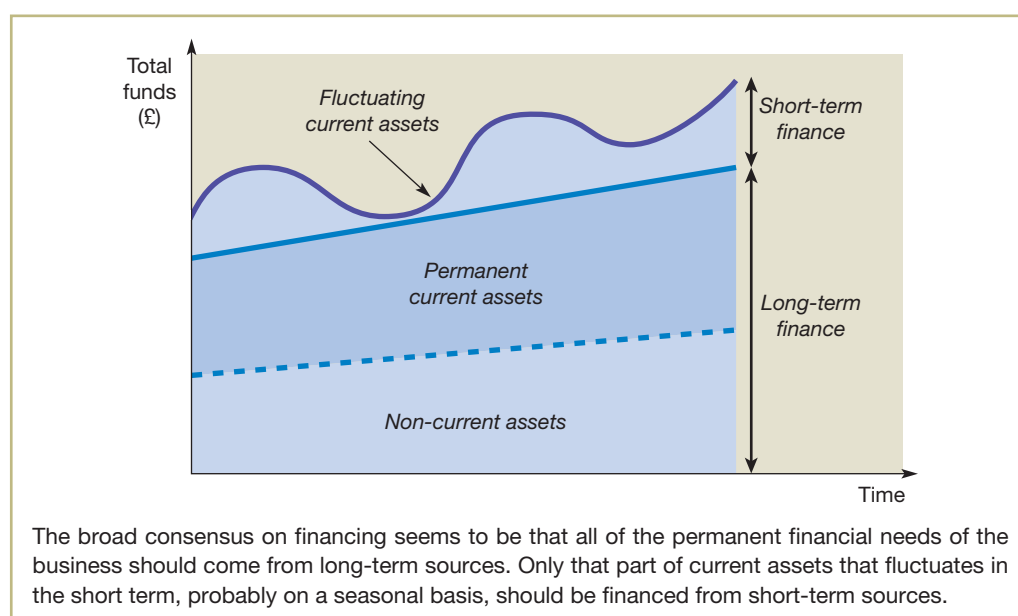*Source*: Chart constructed from data published by the Asset Based Finance Association, 2013–2017, www.abfa.org.uk.

Factoring and invoice discounting are forms of **asset-based finance** as the assets of receivables are, in effect, used as security for the cash advances received by the business.

LONG-TERM VERSUS SHORT-TERM BORROWING

Where it is clear that some form of borrowing is required to finance the business, a decision must be made as to whether long-term or short-term borrowing is more appropriate. There are various issues to be taken into account, which include:

■ *Matching.* The business may attempt to match the type of borrowing with the nature of the assets held. Thus, long-term borrowing may be used to finance assets that form part of the permanent operating base of the business. These normally include non-current assets and a certain level of current assets. This leaves assets held for a short period, such as current assets needed to meet seasonal demand, to be financed through short-term borrowing. This form of borrowing offers greater flexibility insofar that funds can be raised and repaid at short notice. Figure 6.10 shows this funding division graphically.

The broad consensus on financing seems to be that all of the permanent financial needs of the business should come from long-term sources. Only that part of current assets that fluctuates in the short term, probably on a seasonal basis, should be financed from short-term sources.

Figure 6.10 Short-term and long-term financing requirements

A business may wish to match the period of borrowing exactly with the asset life. This may not be possible, however, because of the difficulty of predicting the life of many assets.

■ *Flexibility.* Short-term borrowing may be used as a means of postponing a commitment to long-term borrowing. This may be desirable if interest rates are high but are forecast to fall in the future. Short-term borrowing does not usually incur a financial penalty for early repayment, whereas a penalty may arise if long-term borrowing is repaid early.

■ *Refunding risk.* Short-term borrowing has to be renewed more frequently than long-term borrowing. This may create problems for the business if it is in financial difficulties, or if there is a shortage of funds available for lending.

- *Interest rates.* Interest payable on long-term borrowing is often higher than that for short-term borrowing, as lenders may require a higher return where their funds are locked up for a long period. This fact may make short-term borrowing a more attractive source of finance for a business. However, there may be other costs associated with borrowing (arrangement fees, for example) to be taken into account. The more frequently borrowings are renewed, the higher these costs will be.
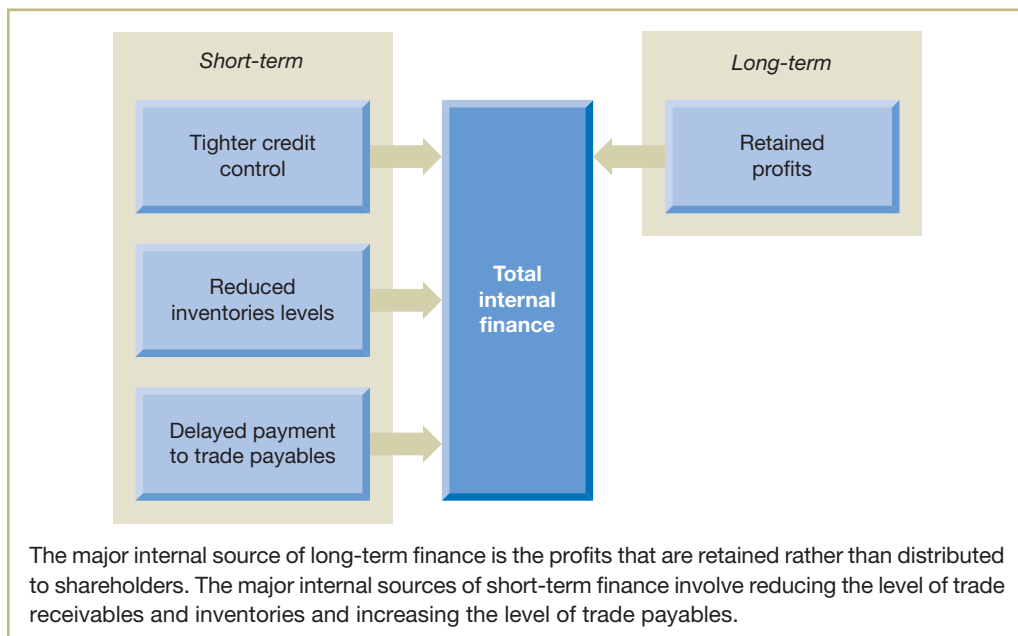
Activity 6.19

Some businesses may take up a less cautious financing position than that shown in Figure 6.10 and others may take up a more cautious one. How would the diagram differ under each of these options?

A less cautious position would mean relying on short-term finance to help fund part of the permanent asset base. A more cautious position would mean relying on long-term finance to help finance the fluctuating assets of the business.

INTERNAL SOURCES OF FINANCE

In addition to external sources of finance, there are certain internal sources of finance that a business may use to generate funds for particular activities. These sources usually have the advantage that they are flexible. They may also be obtained quickly – particularly working capital sources – and do not require the compliance of other parties. The main internal sources of funds are described below and summarised in Figure 6.11.

The major internal source of long-term finance is the profits that are retained rather than distributed to shareholders. The major internal sources of short-term finance involve reducing the level of trade receivables and inventories and increasing the level of trade payables.

Figure 6.11 The major internal sources of finance

INTERNAL SOURCES OF LONG-TERM FINANCE

Retained earnings

Earnings that are retained within the business, rather than distributed to shareholders in the form of dividends, represent by far the most important source of new finance for UK businesses in terms of value of funds raised.

Activity 6.20

Are retained earnings a free source of finance for the business? Explain.

No. This is because they have an opportunity cost to shareholders. If shareholders receive a dividend, they can use the cash to make other income-yielding investments. If the business retains the cash, shareholders are deprived of this potential income.

Given the opportunity cost involved, shareholders will expect a rate of return from retained earnings that is equivalent to that offered by another investment opportunity with the same level of risk.

Even though the reinvestment of earnings incurs a cost to the business, it may be preferable to raise finance from equity (ordinary share) investors in this way rather than by an issue of shares. There are a number of reasons why this may be so. No issue costs are incurred and the amount raised is certain, once the earnings have been generated. Where new shares are issued, issue costs may be substantial and the success of the issue may be uncertain. In addition, any new shares issued to outside investors will result in existing shareholders suffering some dilution of control.

Retaining earnings may be an easier option than asking investors to subscribe to a new share issue. These earnings are already held by the business and so there is no delay in receiving the funds. Moreover, there is often less scrutiny when earnings are retained for reinvestment purposes than when new shares are issued. Investors tend to examine closely the reasons for any new share issue. One problem with the use of earnings, however, is that their timing and amount may be difficult to determine. Thus, relying on earnings generated in the future to fund the business may prove to be risky.

Some shareholders may prefer earnings to be retained by the business rather than distributed in the form of dividends. Where a business reinvests its earnings, it will expand and share values may well increase as a result. Receiving increases in wealth in the form of increased share value rather than in the form of dividends may suit some shareholders. In the UK, dividends are treated as income for tax purposes and therefore attract income tax. Gains on the sale of shares attract capital gains tax. Generally speaking, capital gains tax bites less hard than income tax. (For example, the UK maximum capital gains tax rate for 2018/19 is 28 per cent compared to 45 per cent for income tax.) Furthermore, shareholders have a choice as to when to sell the shares and so realise the capital gain. (In the UK, it is only when the gain is realised that capital gains tax comes into play.)

Retained earnings and 'pecking order' theory

It has been suggested that businesses have a 'pecking order' when taking on long-term finance. This pecking order can be summarised as follows:

- Retained earnings will be used to finance the business if possible.
- Where retained earnings are insufficient, or unavailable, loan capital will be used.
- Where loan capital is insufficient, or unavailable, share capital will be used.

One explanation for such a pecking order is that the managers of the business have access to information that investors do not. Suppose that managers have reliable information indicating that the prospects for the business are better than predicted by the market. This would mean that the shares are currently undervalued. To raise finance by a further issue of shares will, therefore, involve selling them below their true worth. The result would be a transfer of wealth from existing shareholders to those who take up the new share issue. Consequently, managers, who are employed to act in the best interests of existing shareholders, may prefer to rely on retained earnings, followed by loan capital, instead.

Activity 6.21

Why shouldn't the managers simply release any inside information to the market to allow the share price to rise and so make it possible to issue shares at a fair price? Try to think of one reason.

There are at least two reasons why this may not be a good idea:

■ It may be time-consuming and costly to persuade the market that the prospects of the business are better than current estimates. Investors may not believe what the managers tell them.
■ It may provide useful information to competitors about future developments.

Now suppose the managers of a business have access to bad news about the future. If investors know that managers rely on retained earnings and loan capital when in possession of good news, they will assume that the issue of share capital means that managers are in possession of bad news. This may lead investors to believe that the shares are currently overvalued and so they be reluctant to subscribe to a new issue. (There is some evidence to show that the value of shares will fall when a share issue is announced.) Hence, managers will again be inclined to favour retained earnings followed by loan capital, with share capital as a last resort.

Pecking order theory may partly explain the heavy reliance of businesses on retained earnings. It does not, however, provide a complete explanation. Why, for example, do some businesses issue new equity shares even though they have the opportunity to issue loan capital? Clearly, there are other influences that come into play when making a financing decision. We shall pursue this point further in Chapter 8, where we consider the capital structure of businesses in some detail.

INTERNAL SOURCES OF SHORT-TERM FINANCE

Figure 6.11 reveals that the major internal forms of short-term finance are:

■ tighter credit control
■ reducing inventories levels
■ delaying payments to trade payables.

We saw in Chapter 2, in the context of projected cash flow statements, that increases and decreases in these working capital items will have a direct and immediate effect on cash. This effectively raises finance that can be used elsewhere in the business.

Tighter credit control

By exerting tighter control over amounts owed by credit customers, a business may be able to reduce the proportion of assets held in this form and so release funds for other purposes. Having funds tied up in trade receivables represents an opportunity cost insofar that those funds could be used for profit-generating activities. It is important, however, to weigh the benefits of tighter credit control against the likely costs of lost customer goodwill and lost sales. To remain competitive, a business must take account of the needs of its customers and the credit policies adopted by rival businesses. We consider this issue further in Chapter 10.

Activity 6.22 below involves weighing the costs of tighter credit control against likely future benefits.

Activity 6.22

Rusli Ltd provides a car valet service for car-hire businesses when their cars are returned from hire. Details of the service costs are as follows:

	Per car	
	£	£
Car valet charge		20
Less Variable costs	14	
Fixed costs	4	18
Profit		2

Sales revenue is £10 million a year and is all on credit. The average credit period taken by Rusli Ltd's customers is 45 days, although the terms of credit require payment within 30 days. Bad debts are currently £100,000 a year. Trade receivables are financed by a bank overdraft with an interest cost of 10 per cent a year.

The credit control department of Rusli Ltd believes it can eliminate bad debts and can reduce the average credit period to 30 days if new credit control procedures are implemented. These procedures will cost £50,000 a year and are likely to result in a reduction in sales of 5 per cent a year.

Should the business implement the new credit control procedures?
(*Hint:* To answer this activity it is useful to compare the current cost of trade credit with the costs under the proposed approach.)

The current cost of trade credit is:

	£
Bad debts	100,000
Overdraft interest ((£10m) $\times$ 45/365 $\times$ 10%)	123,288
	223,288

$\rightarrow$

The annual cost of trade credit under the new policy will be:

	£
Overdraft interest ((95% $\times$ £10m) $\times$ (30/365) $\times$ 10%))	78,082
Cost of control procedures	50,000
Net cost of lost sales ((£10m/£20 $\times$ 5%) $\times$ (20 − 14*))	150,000
	278,082

* The loss will be the contribution from valeting the car, that is, the difference between the valet charge and the variable costs. The fixed costs are ignored as they do not vary with the decision.

Thus, it seems that the new credit control procedures proposed will be more costly. The above figures reveal that the business will be worse off if the new policies are adopted.

Reducing inventories levels

This internal source of funds may prove attractive to a business. As with trade receivables, holding inventories imposes an opportunity cost on a business as the funds tied up cannot be used for other purposes. If inventories are reduced, funds become available for those purposes. However, a business must ensure there are sufficient inventories available to meet likely future sales demand. Failure to do so will result in lost customer goodwill and lost sales revenue.

The nature and condition of the inventories held will determine whether it is possible to exploit this form of finance. A business may have excessive inventories as a result of poor buying decisions. This may mean that a significant proportion of inventories held is slow-moving or obsolete and therefore cannot be liquidated easily. These issues are picked up again in Chapter 10.

Delaying payment to trade payables

By providing a period of credit, suppliers are in effect offering a business an interest-free loan. If the business delays payment, the period of the 'loan' is extended and funds are retained within the business. This can be a cheap form of finance for a business, although this is not always the case. If a business fails to pay within the agreed credit period, there may be significant costs: for example, the business may find it difficult to buy on credit when it has a reputation as a slow payer.

Where a very large business fails to pay its trade payables on time, its smaller suppliers often bear the cost. **Real World 6.14** describes the plight of smaller businesses struggling with late payments.

Real World 6.14

Credit where no credit is due

The UK's smallest businesses are facing a bill of £6.7bn to collect money they are owed by other companies, up from £2.6bn in 2017, as the late payments crisis continues. The annual research by Bacs Payment Schemes, which handles interbank transactions, will increase the pressure on ministers to tighten regulation. Bacs, part of retail payments authority Pay.UK, found that £13bn was outstanding to the country's 5.7m small and medium-sized businesses,

compared with £14bn last year. But the cost of recuperating it in staff time and interest on borrowing had grown, to an average of £9,000 for each business. And more than one-third are waiting two months beyond agreed terms for payment, up from a fifth last year.

Thirty days is seen as good payment practice but some big companies take 120 days to pay. Even then, they may pay late. More than a quarter of SME business owners, defined as employing fewer than 250 staff, who have been paid have in turn withheld payments to their own suppliers. A total of 28 per cent say they have had to cut their own salaries to conserve cash.

The number of SMEs experiencing late payments overall grew from 37 per cent in 2017 to 43 per cent in 2018. The average amount owed was £17,000. Paul Horlock, chief executive of Pay.UK, said: 'When smaller companies do well, so does UK plc; as the backbone of the whole economy, the significance of SMEs cannot be overstated. The Federation of Small Businesses, a lobby group, said late payments caused 50,000 company failures a year, and the annual economic cost was £2.4bn, a figure accepted by government.'

The government has taken a light-touch approach so far. From 2017 it has obliged all large companies and limited liability partnerships to publicly report, twice a year, on their payment practices and performance, including the average time taken to pay supplier invoices. However, the information is published as a spreadsheet on a website, with no 'naming and shaming'. Ministers also created the role of small business commissioner in November 2017 to help SMEs. In his first year in the post, Paul Uppal revealed he recouped £2.1m in unpaid invoices, a fraction of the amount outstanding. About 300 businesses had approached him.

A government consultation on what further measures were needed ended in November but Whitehall is reluctant to introduce penalty measures on companies. SMEs are often wary of complaining about late payers in case they lose business from them.

Activity 6.23 is concerned with the cash flow benefit of more efficient management of the working capital elements.

Activity 6.23

Trader Ltd is a wholesaler of imported washing machines. The business is partly funded by a bank overdraft and the bank is putting pressure on Trader Ltd to reduce this as soon as possible.

Sales revenue is £14.6 million a year and is all on credit. Purchases and cost of sales are roughly equal at £7.3 million a year. Current investment in the relevant working capital elements are:

	£m
Inventories	1.5
Trade receivables	3.8
Trade payables	0.7

Trader Ltd's accountant believes that much of the overdraft could be eliminated through better control of working capital. As a result, she has investigated several successful businesses that are similar to Trader Ltd and found the following averages:

Average inventories turnover period	22 days
Average settlement period for trade receivables	57 days
Average settlement period for trade payables	55 days

How much cash could Trader Ltd generate if it were able to bring its ratios into line with those of similar businesses?

➔

The cash that could be generated is as follows:

	£m	£m
Inventories		
Current level	1.5	
Target level: $^{7.3}/_{365} \times 22 =$	0.4	1.1
Trade receivables		
Current level	3.8	
Target level: $^{14.6}/_{365} \times 57 =$	2.3	1.5
Trade payables		
Current level	0.7	
Target level: $^{7.3}/_{365} \times 55 =$	1.1	0.4
Total		3.0

Some final points

The short-term sources described are seen as short term because they can be reversed at short notice. For example, a reduction in the level of trade receivables can be reversed within a couple of weeks. However, once a business has established a reduced receivables settlement period, a reduced inventories holding period and/or an expanded payables settlement period, it will tend to maintain these new levels.

In Chapter 10, we shall see how these three elements of working capital may be managed. We shall also see that, for many businesses, the funds invested in working capital items are vast. By exercising tighter control of trade receivables and inventories and by exploiting opportunities to delay payment to trade payables, it may be possible to release substantial amounts for other purposes.

Self-assessment question 6.1

Helsim Ltd is a wholesaler and distributor of electrical components. The most recent draft financial statements of the business included the following:

Income statement for the year

	£m	£m
Sales revenue		14.2
Cost of sales		
Opening inventories	3.2	
Purchases	8.4	
	11.6	
Closing inventories	(3.8)	(7.8)
Gross profit		6.4
Administration expenses		(3.0)
Distribution expenses		(2.1)
Operating profit		1.3
Finance costs		(0.8)
Profit before taxation		0.5
Tax		(0.2)
Profit for the period		0.3

Statement of financial position as at the end of the year

	£m
ASSETS	
Non-current assets	
Property, plant and equipment	
Land and buildings	3.8
Equipment	0.9
Motor vehicles	0.5
	5.2
Current assets	
Inventories	3.8
Trade receivables	3.6
Cash at bank	0.1
	7.5
Total assets	12.7
EQUITY AND LIABILITIES	
Equity	
Share capital	2.0
Retained earnings	1.8
	3.8
Non-current liabilities	
Loan notes (secured on property)	3.5
Current liabilities	
Trade payables	1.8
Short-term borrowings	3.6
	5.4
Total equity and liabilities	12.7

Notes:
1 Land and buildings are shown at their current market value. Equipment and motor vehicles are shown at cost less accumulated depreciation.
2 No dividends have been paid to ordinary shareholders for the past three years.

In recent months, trade suppliers have been pressing for payment. The chief executive has therefore decided to reduce the level of trade payables to an average of 40 days outstanding. To achieve this, he has decided to approach the bank with a view to increasing the overdraft (the short-term borrowings comprise only a bank overdraft). The business is currently paying 10 per cent a year interest on the overdraft.

Required:
(a) Comment on the liquidity position of the business.
(b) Calculate the amount of finance required to reduce trade payables, from the level shown on the statement of financial position, to an average of 40 days outstanding.
(c) State, with reasons, how you consider the bank would react to the proposal to grant an additional overdraft facility.
(d) Identify four sources of finance (internal or external, but excluding a bank overdraft) that may be suitable to finance the reduction in trade payables, and state, with reasons, which of these you consider the most appropriate.

SUMMARY

The main points of this chapter may be summarised as follows:

Sources of finance

- Long-term finance is for at least one year whereas short-term finance is for a shorter period.
- External sources of finance require the agreement of outside parties, whereas internal sources do not.
- The higher the risk associated with a source of finance, the higher the expected return from investors.

External sources of long-term finance

- Include ordinary shares, preference shares, borrowings, leases, hire purchase agreements and securitisation.
- From an investor's perspective, ordinary shares have the highest risk but provide the highest expected returns to investors.
- Preference shares offer investors a lower level of risk than ordinary shares. They are given the first slice of any dividend paid.
- Borrowings (loans) are normally the least risky and so provide the lowest expected returns to investors.
- Loans are relatively low risk because lenders usually have security for their loan. Loan covenants can further protect lenders.
- Types of loan capital include convertible loan notes, term loans, mortgages, Eurobonds, deep discount bonds and junk bonds.
- Credit-rating agencies categorise loans issued by businesses according to estimated default risk.
- Convertible loan notes offer the right of conversion to ordinary shares at a specified date and a specified price.
- Junk bonds are relatively high risk and fall outside the investment-grade categories established by credit-rating agencies.
- Warrants give holders the right, but not the obligation, to buy ordinary shares at a given price. They are often used as a 'sweetener' to accompany a loan issue.
- Interest rates may be floating or fixed.
- Interest rate risk may be reduced, or eliminated, through the use of hedging arrangements such as interest rate swaps.
- Islamic law rejects the idea of charging interest and instead requires all investors to bear some of the risk of a business venture.

Attitudes towards the level of borrowing

- The level of borrowing will be determined by the attitudes of:
  - shareholders
  - managers
  - lenders.
- These attitudes are influenced by a variety of factors.

Other forms of external long-term finance

■ A finance lease is really a form of lending that gives the lessee the use of an asset over most of its useful life in return for regular payments.

■ A sale-and-leaseback arrangement involves the sale of an asset to a financial institution accompanied by an agreement to lease the asset back to the business.

■ Hire purchase is a form of credit used to acquire an asset. Under the terms of a hire purchase (HP) agreement a customer pays for an asset by instalments over an agreed period.

■ Securitisation involves bundling together similar, illiquid assets to provide backing for the issue of bonds.

External sources of short-term finance

■ Include bank overdrafts, bills of exchange, debt factoring and invoice discounting.

■ Bank overdrafts are flexible and cheap but are repayable on demand.

■ Bills of exchange are similar to IOUs.

■ Debt factoring and invoice discounting use trade receivables as a basis for borrowing, with the latter more popular because of cost and flexibility.

Choosing between long-term and short-term borrowing

■ Important factors include matching the type of borrowing to the type of assets, flexibility, refunding risk and interest rates.

Internal sources of finance

■ Include retained earnings, tighter control of trade receivables, reducing inventories levels and delaying payments to trade payables.

■ Retained earnings are by far the most important source of new long-term finance (internal or external) for UK businesses.

■ They are not a free source of finance, as investors will require returns similar to those from ordinary shares.

KEY TERMS

For definitions of these terms, see the Glossary, pp. 685–94.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 11 and 12.

Lumby, S. and Jones, S. (2019) *Corporate Finance: Theory and Applications*, 10th edn, Cengage Learning EMEA, Chapter 14.

Ross, S., Westerfield, R., Jaffe, J. and Jordan, B. (2018) *Corporate Finance: Core Principles and Applications*, 5th edn, McGraw-Hill Higher Education, Chapters 18 and 19.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 15 and 16.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 652–53.

6.1 Why might a business decide to repay long-term loan capital earlier than the specified repayment date?

6.2 'Convertible loan notes are really a form of delayed equity.' Do you agree? Discuss.

6.3 Abyss plc intends to make a 1 for 4 bonus issue of ordinary shares. What will be the effect of this issue on the business's:

　i financial gearing,
　ii earnings per share,
　iii liquidity, and finally on
　iv shareholder wealth?

6.4 Rashford plc intends to raise £45 million to launch an advertising campaign for a new product. To raise this amount, its senior management team has decided that a loan for a one-year period should be agreed. This loan will become part of an extensive debt portfolio held by the business. What factors should the senior management team have taken into account in arriving at this loan decision?

Exercises 6.2 to 6.7 are more advanced than 6.1. Those with **coloured numbers** have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

6.1 H. Brown (Portsmouth) Ltd produces a range of central heating systems for sale to build-ers' merchants. As a result of increasing demand for the business's products, the directors have decided to expand production. The cost of acquiring new plant and machinery and the increase in working capital requirements are planned to be financed by a mixture of long-term and short-term borrowing.

Required:

(a) Discuss the major factors that should be taken into account when deciding on the appropriate mix of long-term and short-term borrowing necessary to finance the expan-sion programme.
(b) Discuss the major factors that a lender should take into account when deciding whether to grant a long-term loan to the business.
(c) Identify three conditions that might be included in a long-term loan agreement and state the purpose of each.

6.2 Balliol Ltd produces a tracking device that can be attached to bicycles. The device is designed to help locate the whereabouts of stolen bicycles and is sold to wholesalers and retailers throughout the UK. The following sales and cost data relating to the tracking device has been produced by the business:

	Per device	
	£	£
Selling price		50.00
Less		
Materials	10.00	
Labour (See Note 1)	12.00	
Overheads (See Note 2)	15.00	37.00
Profit		**13.00**

Notes:
1 Labour is a fixed cost.
2 Two-thirds of overhead costs incurred are fixed.

In recent years, sales of the device have been stable at £20 million per year. However, a new chief executive has been appointed who is determined to increase sales. He com-missioned a market research report, which indicates that sales could be increased by 20 per cent if a marketing campaign costing £1.5m per year is undertaken. The business has unused capacity within its factory and could easily cope with such an increase in sales.

All sales are on credit and the business divides its customers into three separate categories according to their payment characteristics. The three categories are as follows:

Category	Average collection period (Number of days)	Bad debts (%)
A	30	1.0
B	40	3.0
C	50	5.0

If the marketing campaign is launched and the increase in sales achieved, 20 per cent of additional sales would be from Category A customers, 30 per cent Category B and 50 per cent from Category C customers. The business would finance any expansion in its trade receivables by a bank overdraft, on which it would expect to pay interest at 10 per cent per year.

All workings should be in £000s and should be made to one decimal place.

Required:

(a) What would be the effect of undertaking the marketing campaign on the annual profits before tax of the company, assuming the increase in sales is achieved?

(b) Briefly comment on the results of your finding in (a) above.

6.3 Bellona Ltd is a small business that produces a single product – a thermostat that is used in a range of kitchen appliances. Information relating to the thermostat is as follows:

Per thermostat

	£
Selling price	10·00
Material costs	(4·50)
Variable labour costs	(2·50)
Fixed costs apportionment	(2·00)
Profit	1·00

All sales are made to kitchen goods manufacturers on credit. Bellona Ltd divides its customers into three separate categories with each having the following characteristics:

Customer category	Bad debts (%)	Average settlement period (No. of days)
A	1·00	20
B	2·50	30
C	5·00	60

A new chief executive is concerned that sales have shown no significant growth for several years and is considering launching a marketing campaign to address the problem. A firm of marketing consultants has suggested that a focused campaign costing £0·80 million would increase sales revenue by £4·00 million. The business has sufficient spare capacity to accommodate this increase in sales.

It is predicted that the increased sales would be distributed among the different categories of customers as follows:

Customer category	Predicted share of increase in sales %
A	5
B	20
C	75

Bellona Ltd has an overdraft on which it pays 10% interest per year.

Required:

(a) Calculate the effect on the profit of Bellona Ltd of launching the marketing campaign and briefly comment on the results. (Workings to nearest £000)

(b) Explain why the management of trade credit can be a particular problem for small businesses such as Bellona Ltd.

6.4 Raphael Ltd is a small engineering business that has annual credit sales revenue of £2.4 million. In recent years, the business has experienced credit control problems. The average settlement period for sales has risen to 50 days even though the stated policy of the business is for payment to be made within 30 days. In addition, 1.5 per cent of sales are written off as bad debts each year.

The business has recently been in talks with a factor that is prepared to make an advance to the business equivalent to 80 per cent of trade receivables, based on the assumption that customers will, in future, adhere to a 30-day payment period. The interest rate for the advance will be 11 per cent a year. The trade receivables are currently financed through a bank overdraft, which has an interest rate of 12 per cent a year. The factor will take over the credit control procedures of the business and this will result in a saving to the business of £18,000 a year; however, the factor will make a charge of 2 per cent of sales revenue for this service. The use of the factoring service is expected to eliminate the bad debts incurred by the business.

Required:

Calculate the net cost of the factor agreement to the business and state whether or not the business should take advantage of the opportunity to factor its trade receivables.

6.5 Cybele Technology Ltd is a software business that is owned and managed by two computer software specialists. Although sales have remained stable at £4 million per year in recent years, the level of trade receivables has increased significantly. A recent financial report submitted to the owners indicates an average settlement period for trade receivables of 60 days compared with an industry average of 40 days. The level of bad debts has also increased in recent years and the business now writes off approximately £20,000 of bad debts each year.

The recent problems experienced in controlling credit have led to a liquidity crisis for the business. At present, the business finances its trade receivables by a bank overdraft bearing an interest rate of 14 per cent a year. However, the overdraft limit has been exceeded on several occasions in recent months and the bank is now demanding a significant decrease in the size of the overdraft. To comply with this demand, the owners of the business have approached a factor who has offered to make an advance equivalent to 85 per cent of trade receivables, based on the assumption that the level of receivables will be in line with the industry average. The factor will charge a rate of interest of 12 per cent a year for this advance. The factor will take over the sales records of the business and, for this service, will charge a fee based on 2 per cent of sales revenue. The business believes that the services offered by the factor should eliminate bad debts and should lead to administrative cost savings of £26,000 per year.

Required:

(a) Calculate the effect on the profit of Cybele Technology Ltd of employing a debt factor. Discuss your findings.

(b) Discuss the potential advantages and disadvantages for a business that employs the services of a debt factor.

6.6 Telford Engineers plc, a medium-sized manufacturer of automobile components, has decided to modernise its factory by introducing a number of robots. These will cost £20 million and will reduce operating costs by £6 million a year for their estimated useful life of 10 years starting next year (Year 10). To finance this scheme, the business can raise £20 million either by issuing:

(i) 20 million ordinary shares at 100p, or
(ii) loan notes at 7 per cent interest a year with capital repayments of £3 million a year commencing at the end of Year 11.

Telford Engineers' summarised financial statements appear below.

Summary of statements of financial position at 31 December

	Year 6 £m	Year 7 £m	Year 8 £m	Year 9 £m
ASSETS				
Non-current assets	48	51	65	64
Current assets	55	67	57	55
Total assets	103	118	122	119
EQUITY AND LIABILITIES				
Equity	48	61	61	63
Non-current liabilities	30	30	30	30
Current liabilities				
Trade payables	20	27	25	18
Short-term borrowings	5	–	6	8
	25	27	31	26
Total equity and liabilities	103	118	122	119
Number of issued 25p shares	80m	80m	80m	80m
Share price	150p	200p	100p	145p

Note that the short-term borrowings consisted entirely of bank overdrafts.

Summary of income statements for years ended 31 December

	Year 6 £m	Year 7 £m	Year 8 £m	Year 9 £m
Sales revenue	152	170	110	145
Operating profit	28	40	7	15
Interest payable	(4)	(3)	(4)	(5)
Profit before taxation	24	37	3	10
Tax	(12)	(16)	(0)	(4)
Profit for the year	12	21	3	6
Dividends paid during each year	6	8	3	4

You should assume that the tax rate for Year 10 is 30 per cent, that sales revenue and operating profit will be unchanged except for the £6 million cost saving arising from the introduction of the robots, and that Telford Engineers will pay the same dividend per share in Year 10 as in Year 9.

Required:

(a) Prepare, for each financing arrangement, Telford Engineers' projected income statement for the year ending 31 December Year 10 and a statement of its share capital, reserves and loans on that date.

(b) Calculate Telford's projected earnings per share for Year 10 for both schemes.

(c) Which scheme would you advise the business to adopt? You should give your reasons and state what additional information you would require.

6.7 Gainsborough Fashions Ltd operates a chain of fashion shops. In recent months the business has been under pressure from its suppliers to reduce the average credit period taken from three months to one month. As a result, the directors have approached the bank to ask for an increase in the existing overdraft for one year to be able to comply with the suppliers' demands. The most recent financial statements of the business are as follows:

Statement of financial position as at 31 May

	£m
ASSETS	
Non-current assets	
Property, plant and equipment at cost less depreciation	
Fixtures and fittings	67.0
Motor vehicles	7.0
	74.0
Current assets	
Inventories	198.0
Trade receivables	3.0
	201.0
Total assets	275.0
EQUITY AND LIABILITIES	
Equity	
£1 ordinary shares	20.0
General reserve	4.0
Retained earnings	17.0
	41.0
Non-current liabilities	
Borrowings – loan notes repayable in just over one year's time	40.0
Current liabilities	
Trade payables	162.0
Accrued expenses	10.0
Borrowings – bank overdraft	17.0
Tax due	5.0
	194.0
Total equity and liabilities	275.0

Abbreviated income statement for the year ended 31 May

	£m
Sales revenue	740.0
Operating profit	38.0
Interest charges	(5.0)
Profit before taxation	33.0
Tax	(10.0)
Profit for the year	23.0

A dividend of £23 million for the year was made.

Notes:
1   The loan notes are secured by personal guarantees from the directors.
2   The current overdraft bears an interest rate of 12 per cent a year.

Required:

(a) Identify and discuss the major factors that a bank would take into account before deciding whether or not to grant an increase in the overdraft of a business.

(b) State whether, in your opinion, the bank should grant the required increase in the overdraft for Gainsborough Fashions Ltd. You should provide reasoned arguments and supporting calculations where necessary.

FINANCING A BUSINESS 2: RAISING LONG-TERM FINANCE

INTRODUCTION

We begin this chapter by looking at the role of the London Stock Exchange (which we shall refer to as simply the Stock Exchange) in raising finance for large businesses. We then go on to consider whether shares listed on the Stock Exchange are efficiently priced. If so, there are far reaching implications for both managers and investors. We shall see that share price efficiency has been the subject of much research and debate.

Share capital may be issued in various ways and the most important of these will be explored in the chapter. Some involve direct appeals to investors, whereas others involve the use of financial intermediaries. Smaller businesses do not have access to the Stock Exchange and so must look elsewhere to raise long-term finance. We conclude this chapter by considering some of the main providers of long-term finance for these businesses.

Learning outcomes

When you have completed this chapter, you should be able to:

- Discuss the role and nature of the Stock Exchange.
- Discuss the nature and implications of stock market efficiency.
- Outline the main methods by which share capital may be issued.
- Identify the problems that smaller businesses experience in raising finance and describe the ways in which they may gain access to long-term finance.

THE STOCK EXCHANGE

The **Stock Exchange** acts as a *primary* and *secondary* capital market for large businesses. As a primary market, its main function is to enable these businesses to raise new capital. Thus, businesses may use the Stock Exchange to raise capital by issuing shares or loan notes. To issue either through the Stock Exchange, however, a business must be 'listed'. This means that it must meet fairly stringent Stock Exchange requirements concerning size, profit history, information disclosure and so on.

Share issues arising from the initial listing of the business on the Stock Exchange are known as initial public offerings (IPOs). In preparing for an IPO, managers must review all major aspects of the business's operations as they will come under close scrutiny from analysts and investors. In particular, this review should cover:

- business operations and strategy.
- the composition and balance of the senior management team and board of directors.
- internal controls and corporate governance procedures.
- growth prospects and associated risks.
- the purpose to which the funds raised by the IPO will be applied.
- any problems that may adversely affect the IPO.

There is convincing evidence, from both the USA and the UK, to suggest that investing in IPOs is usually a bad idea. One comprehensive study of 2,499 IPOs floated on the Stock Exchange between 1975 and 2004 found that they underperformed the market by 12.6 per cent after three years and 31.6 per cent after five years (see reference 1 at the end of the chapter). This suggests that shares were overpriced when issued, which may reflect opportunistic timing by the issuing businesses.

Real World 7.1 provides some interesting comments on the wisdom of investing in IPOs from two leading figures in the investment world.

Real World 7.1

Issues can be problems

Benjamin Graham, an economist and successful investor, warned against investing in IPOs. He also expressed despair at the failure of investors to learn from their mistakes. In his famous book, *The Intelligent Investor*, he wrote:

> In every case, investors have burned themselves on IPOs, have stayed away for at least two years, but have always returned for another scalding. For as long as stock markets have existed, investors have gone through this manic-depressive cycle.
>
> In America's first great IPO boom back in 1825, a man was said to have been squeezed to death in the stampede of speculators trying to buy shares in the new Bank of Southwark. The wealthiest buyers hired thugs to punch their way to the front of the line. Sure enough, by 1829, stocks had lost roughly 25% of their value.

Warren Buffett, a disciple of Graham, has speculated on why IPOs are often overpriced (and so underperform the market). He points out:

> It's almost a mathematical impossibility to imagine that, out of the thousands of things for sale on a given day, the most attractively priced is the one being sold by a knowledgeable seller (company insiders) to a less-knowledgeable buyer (investors).

Sources: Graham, B. (2003) *The Intelligent Investor*, Harper Business, p. 141; Warren Buffett quoted in www. investorwords.com, accessed 15 February 2019.

Share issues undertaken by businesses that are already listed and seeking additional finance are known as *seasoned equity offerings* (SEOs). IPOs and SEOs no longer represent an important source of finance for many businesses. We shall see a little later that other forms of share issue have become more popular.

The function of the Stock Exchange as a secondary market is to help investors transfer their securities (that is, shares and loan notes) with ease. It provides a 'second-hand' market where shares and loan notes already in issue may be bought and sold.

Activity 7.1

Could listed businesses also benefit by the Stock Exchange making it easier for investors to sell their securities? If so, how?

Investors are more likely to invest if they know their investment can be turned into cash whenever required. Listed businesses are, therefore, likely to find it easier to raise long-term finance and to do so at lower cost.

Although investors are not obliged to use the Stock Exchange as the means of transferring shares in a listed business, it is usually the most convenient way of buying or selling shares.

Listed businesses

Businesses listed on the Stock Exchange vary considerably in size. **Real World 7.2** provides some impression of the distribution of businesses based on the total market value of their equity shares.

Real World 7.2

UK listed businesses by equity market value

The distribution of UK listed businesses by equity market value at the end of December 2018 is shown in Figure 7.1.
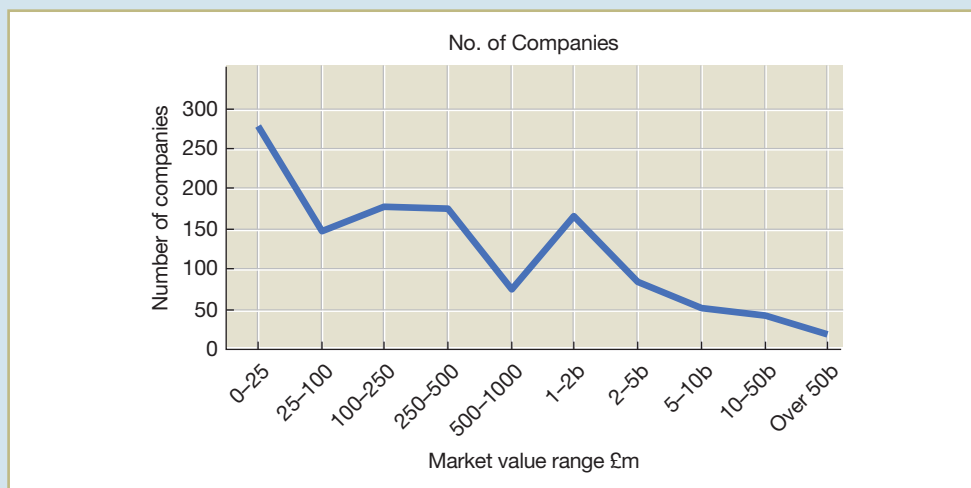
Figure 7.1 Distribution of UK listed businesses by equity market value

Share price indices

There are various indices available to help monitor trends in overall share price movements of Stock Exchange listed businesses. **FTSE (Footsie) indices**, as they are called, derive their name from the organisations behind them: the Financial Times (FT) and the Stock Exchange (SE). The most common indices are:

- *FTSE 100.* This is probably the best-known share price index. It is based on the share price movements of the 100 largest businesses, by **market capitalisation**, listed on the Stock Exchange. (Market capitalisation is the total market value of the shares issued by a business.) Businesses within this index are often referred to as 'large cap' businesses.
- *FTSE Mid 250.* An index based on the share price movements of the next 250 largest businesses, by market capitalisation, listed on the Stock Exchange.
- *FTSE A 350.* This index combines businesses in the FTSE 100 and FTSE Mid 250 indices.
- *FTSE Actuaries All Share Index.* An index based on the share price movements of more than 800 shares, which account for more than 90 per cent of the market capitalisation of all listed businesses.

Each index is constructed using a base date and a base value (the FTSE 100 index, for example, was constructed in 1984 with a base of 1,000). Each index is updated throughout each trading day and reviewed on a quarterly basis. Changes in the relative size of businesses during a particular quarter will usually lead to some businesses within an index being replaced by others.

Raising finance

The amount of finance raised by Stock Exchange businesses each year varies according to economic conditions. **Real World 7.3** gives an indication of the amounts raised in recent years from equity issues by listed businesses (including those that are newly listed).

Real World 7.3

Equity issues

The following amounts were raised from new equity issues by listed businesses through the main market of the London Stock Exchange over the ten-year period 2009–2018.

	Number of businesses	Total amount raised (£m)
2018	844	17,676
2017	519	20,757
2016	446	15,962
2015	566	28,260
2014	579	26,217
2013	477	23,788
2012	532	11,449
2011	688	17,790

	Number of businesses	Total amount raised (£m)
2010	510	23,915
2009	454	77,047

We can see that the amounts raised vary significantly over the period.

Source: Compiled from 'Main Market Fact Sheets', December 2009 to December 2018, London Stock Exchange, www.londonstockexchange.com.

The Stock Exchange can be a useful vehicle for entrepreneurs to realise value from their business.

Activity 7.2

How can the Stock Exchange help entrepreneurs to do this?

By listing their businesses on the Stock Exchange, the shares become more easily available to other investors. Entrepreneurs can then convert the value of their stake in the business into cash by selling all, or some, of their shares.

Real World 7.4 describes how one group of entrepreneurs did exactly this.

Real World 7.4

Self-funding

In September 2018, three 35-year-old entrepreneurs were able to cash in on their success when Funding Circle Holdings plc, the business they created, was floated on the London Stock Exchange. The floatation raised £300m and involved just under 30 per cent of the shares of the business. Funding Circle was created in 2010 to link small businesses needing finance with individual investors on a 'peer-to-peer' basis.

The three entrepreneurs used the IPO to turn part of their fortune into cash. Samir Desai, the chief executive, sold some of his shares for £21 million, James Meeking realised £16.2 million and Andrew Mullinger, £13.6 million.

Source: Based on information in: *Founders of online lender Funding Circle's make £200m on London Stock market float* Thisismoney.co.uk, 28 September 2018, I. Lunden P2P lender Funding Circle closes flat after closing IPO at the lower end of range and raining £300 m, 5 September 2018.

Advantages and disadvantages of a listing

In addition to the advantages already mentioned, a Stock Exchange listing may help a business by:

- raising its profile, which may be useful in dealings with customers and suppliers
- ensuring that its shares are valued in an efficient manner (a point to which we return later)
- broadening its investor base
- acquiring other businesses by using its own shares as payment rather than cash
- attracting and retaining employees by offering incentives based on share ownership schemes.

Before a decision is made to float (that is, to list), however, the advantages must be weighed against the possible disadvantages of a listing.

Raising finance through the Stock Exchange can be a costly process. For smaller businesses, the costs will absorb between 7 per cent and 10 per cent of the total proceeds from

a sale (see reference 2 at the end of the chapter). When making an initial public offering, a business must pay an admission fee to the London Stock Exchange and employ the services of lawyers, accountants and bankers, who do not come cheap. In addition to these out-of-pocket expenses, a huge amount of management time is usually required, which can lead to missed business opportunities.

Another important disadvantage is the regulatory burden placed on listed businesses. Once a business is listed, there are continuing requirements to be met, covering issues such as:

- disclosure of financial information
- informing shareholders of significant developments
- the rights of shareholders and lenders
- the obligations of directors.

These requirements can be onerous and can also involve substantial costs for the business.

Stock Exchange investors are often accused of taking a short-term view, thereby putting pressure on managers to produce quick results. If managers believe that shareholders focus on the forthcoming quarterly, or half-yearly, profit announcements, they may respond accordingly. Thus, they may decide against projects that yield benefits only over the longer term. Instead, they may opt for investments with good short-term prospects, even though the long-term prospects may be poor. The accusation that the Stock Exchange promotes short-termism is a serious one, which we shall explore a little later in the chapter.

The activities of listed businesses are closely monitored by financial analysts, financial journalists and other businesses. Such scrutiny can be unwelcome, particularly if the business is dealing with sensitive issues or is experiencing operational problems. Furthermore, if investors become disenchanted with the business and the price of its shares falls, this may make it vulnerable to a takeover bid from another business.

Such are the burdens of a Stock Exchange listing that some businesses decide to delist. **Real World 7.5** describes how one listed business, faced with operational problems, was heading towards a delisting and private company status.

Real World 7.5

It's a private matter

Shares in Intu Properties rose as much as 37 per cent on Friday following news that its largest shareholder, British billionaire John Whittaker, is considering taking the retail property landlord private.

The news came months after a failed £3.4m takeover attempt of the indebted group by larger rival Hammerson, following which Intu's long-time chief executive said he would leave the company. Both companies are having to contend with a downturn in bricks-and-mortar retailing as store chains struggle with a shift to online shopping, faltering consumer confidence and higher business rates.

A string of failures in the sector, including House of Fraser and Maplin, have led to expectations that rents and capital values for retail properties will fall. John Cahill, analyst at Stifel, said: 'Intu is fast running out of road with its business model, faced with declining retail rents, tenant insolvencies, CVAs [company voluntary arrangements], a large capex programme, and a [loan to value ratio of] over 50 per cent, all framed by the search for a new CEO willing to take on the most difficult job in property'.

FT *Source*: Extracts from Hodgson, C. and Evans, J. (2018) Intu share price soars on report of being taken private, ft.com, 5 October.
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STOCK MARKET EFFICIENCY

We mentioned above that the Stock Exchange helps share prices to be efficiently priced. The term 'efficiency' in this context does not relate to the way in which the Stock Exchange is administered but rather to the way in which information is processed. An **efficient stock market** is one in which information is processed quickly and accurately and so share prices faithfully reflect all relevant information available. In other words, prices are determined in a rational manner and represent the best estimate of the 'true worth' of the shares.

Activity 7.3

How would you define the 'true worth' of a share? (*Hint*: Think back to Chapter 4.)

The value of an economic asset can be defined in terms of its future benefits. In the case of a share, it is the discounted cash inflows from future dividends.

The term 'efficiency' does not imply that investors have perfect knowledge concerning a business and its future prospects and that this knowledge is reflected in the share price. Information may come to light concerning the business that investors did not previously know about and which may indicate that the current share price is higher or lower than its 'true worth'. However, in an efficient market, new information will be quickly absorbed by investors and this will lead to an appropriate share price adjustment.

We can see that the term 'efficiency' in relation to the Stock Exchange is not the same as the economists' concept of perfect markets, which you may have come across in your previous studies. The definition of an efficient capital market does not rest on a set of restrictive assumptions regarding the operation of the market (for example, no taxes, no transaction costs, no entry or exit barriers and so on). In reality, such assumptions will not hold. The term 'efficient market' is a narrower concept that has been developed by studying how stock markets behave in the real world. It simply describes the situation where relevant information is *quickly* and *accurately* reflected in share prices. The speed at which new information is absorbed in share prices will mean that not even nimble-footed investors will have time to make superior gains by buying or selling shares when new information becomes available.

To understand why the Stock Exchange may be efficient, it is important to bear in mind that shares listed on the Stock Exchange are scrutinised by many individuals, including skilled analysts, who are constantly seeking to make gains from identifying shares that are inefficiently priced. They are alert to new information and will react quickly when new opportunities arise. If, for example, shares can be identified as being below their 'true worth', investors would immediately exploit this information by buying those shares. When this is done on a large scale, the effect will be to drive up the price of the shares, thereby eliminating any inefficiency within the market. Thus, as a result of the efforts to make gains from inefficiently priced shares, investors will, paradoxically, promote the efficiency of the market.

Three levels of efficiency have been identified concerning the operation of stock markets. These are as follows.

Weak form of efficiency

The weak form reflects the situation where past market information, such as the sequence of share prices, rates of return and trading volumes and so on, is fully reflected in current share prices and so should have no bearing on future share prices. In other words, future share price

movements are independent of past share price movements. Movements in share prices will follow a random path and, as a result, any attempt to study past prices in order to detect a pattern of price movements will fail. It is not possible, therefore, to make gains from simply studying past price movements. Investors and analysts who draw up charts of share price changes (known as technical analysis) in order to predict future price movements will thus be wasting their time.
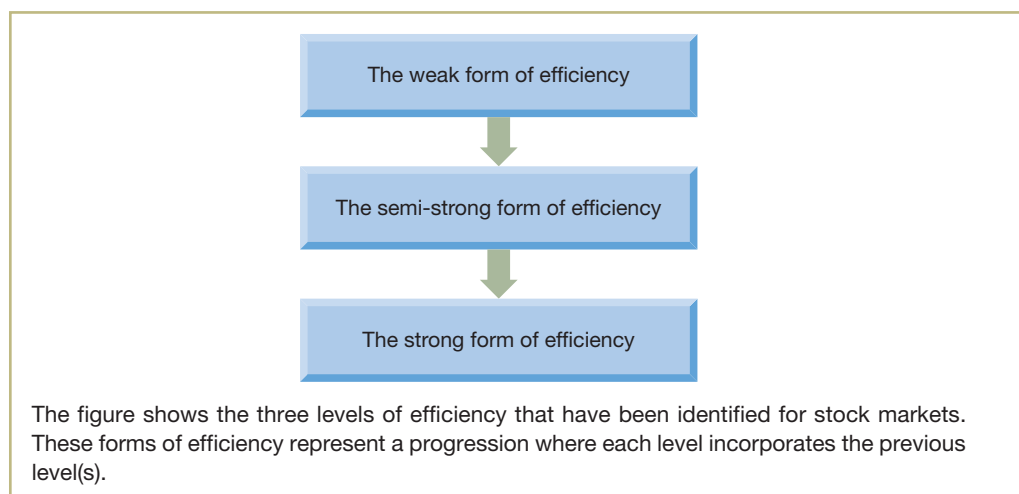
Semi-strong form of efficiency

The semi-strong form takes the notion of efficiency a little further and describes the situation where all publicly available information, including past share prices, is fully reflected in the current share price. Other publicly available forms of information will include published financial statements, business announcements, newspaper reports, economic forecasts and so on. These forms of information, which become available at random intervals, are quickly absorbed by the market and so investors who study relevant reports and announcements (this is known as fundamental analysis), in an attempt to make above-average returns on a consistent basis, will be disappointed. The information will already be incorporated into share prices.

Strong form of efficiency

The strong form is the ultimate form of efficiency and describes the situation where share prices fully reflect all available information, whether public or private. This means that the share price will be a good approximation to the 'true' value of the share. As all relevant information is absorbed in share prices, even those who have 'inside' information concerning a business, such as unpublished reports or confidential management decisions, will not be able to make superior returns, on a consistent basis, from using this information.

   The various forms of efficiency described above can be viewed as a progression where each higher form of efficiency incorporates the previous form(s). Thus, if a stock market is efficient in the semi-strong form it will also be efficient in the weak form. Similarly, if a stock market is efficient in the strong form, it will also be efficient in the semi-strong and weak forms (see Figure 7.2).

The figure shows the three levels of efficiency that have been identified for stock markets. These forms of efficiency represent a progression where each level incorporates the previous level(s).

Figure 7.2 Three levels of market efficiency

Can you explain why the relationship between the various forms of market efficiency described above should be the case?

If a stock market is efficient in the semi-strong form it will reflect all publicly available information. This will include past share prices. Thus, the semi-strong form will incorporate the weak form. If the stock market is efficient in the strong form, it will reflect all available information; this includes publicly available information. It will, therefore, incorporate the semi-strong and weak forms.

Activity 7.5 tests your understanding of how share prices might react to a public announcement under two different levels of market efficiency.

Activity 7.5

Dornier plc is a large civil engineering business that is listed on the Stock Exchange. On *1 May* it received a confidential letter stating that it had won a large building contract from an overseas government. The new contract is expected to increase the profits of the business by a substantial amount over the next five years. The news of the contract was announced publicly on *4 May*.

How would the shares of the business react to the formal announcement on 4 May assuming (a) a semi-strong, and (b) a strong form of market efficiency?

Under the semi-strong form, the formal announcement is new information to the market and should lead to an increase in share price. Under the strong form of efficiency, however, there should be no market reaction as the information would have already been incorporated into the share price.

Evidence on stock market efficiency

You may wonder what evidence exists to support each of the above forms of efficiency. For the weak form there is now a large body of evidence that spans many countries and many time periods. Much of this evidence has involved checking to see whether share price movements follow a random pattern: that is, finding out whether successive price changes were independent of each other. The research evidence generally confirms the existence of a random pattern of share prices.

Research has also been carried out to assess the value of trading rules used by some investors. These rules seek to achieve superior returns by identifying trend-like patterns to determine the point at which to buy or sell shares. The research has produced mixed results but tends to demonstrate that trading rules are not worthwhile. However, the value of these rules is difficult to assess, partly because of their sheer number and partly because of the subjective judgement involved in interpreting trends.

Activity 7.6

If share prices follow a random pattern, does this not mean that the market is acting in an irrational (and inefficient) manner?

No. New information concerning a business is likely to arise at random intervals and so share price adjustments to the new information will arise at those random intervals. The randomness of share price movements is therefore to be expected if markets are efficient.

Although the weight of research evidence offers little support for the belief that share prices exhibit repetitive patterns of behaviour, some analysts (known as technical analysts) continue to search for such patterns. **Real World 7.6** illustrates one of the techniques used to help predict future price movements.

Real World 7.6

Reading the signs

According to technical analysts, charts can identify the direction of share price movements. They believe that share prices exhibit trends and so past price movements offer a clue to future price movements. Detecting a trend and its future direction can therefore provide the key to profitable share trading.

Among the various share price patterns identified by technical analysts, the head and shoulders pattern is, perhaps, the most well known. As the name suggests, this pattern resembles a human head with shoulders on each side. It has three distinct peaks: the first and third are broadly equal in height and the middle peak is higher than the other two. An example of a head and shoulders pattern is shown in Figure 7.3 below.
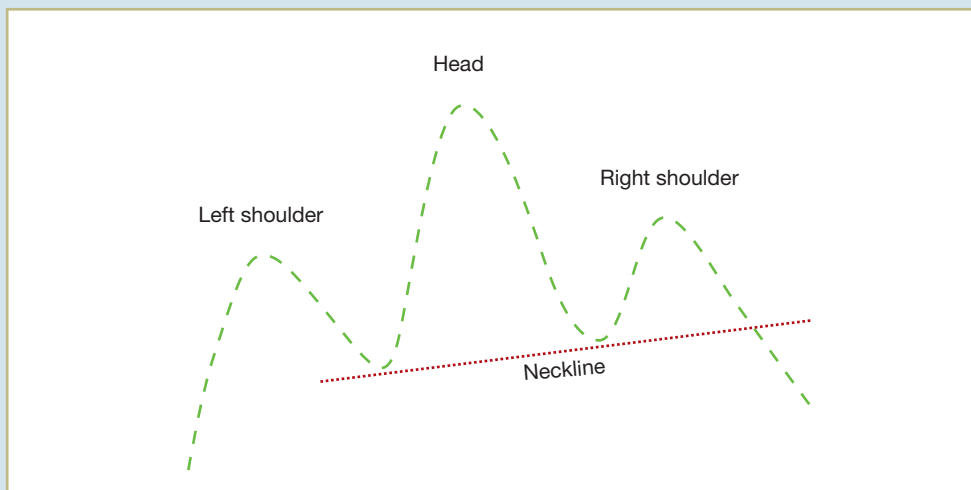
Figure 7.3 Head and shoulders pattern

This pattern is created by share price rises and falls. The left peak, or shoulder, is created by a share price rally resulting in a new high. This rally, however, is short lived. It is followed by a decline in investor interest and so the share price falls. The second peak, the head, is created by a further share price rally, which takes the share price to an even higher level. Again, however, it is followed by a fall in share prices. The final peak, the right shoulder, is created when there is a third, and final share price rise. This is, again, followed by a share price fall.

By taking two low points in a head and shoulders pattern, a 'neckline' can be drawn. The first low point will arise at the end of the left shoulder, just before the upturn towards the head. The second low point will arise at the end of the head, just before the upturn to the right shoulder. The neckline, which is a support level, may have a slope that is slightly tilted up or down. When share price movements, occurring at the end of the right shoulder, break below the neckline, the head and shoulders pattern is said to be complete.

Research to test the semi-strong form of efficiency has usually involved monitoring the reaction of the share price to new information, such as profit announcements. This is done to see whether the market reacts to new information in an appropriate manner. The results usually show that share prices readjust quickly and accurately to any new information that affects the value of the business. This implies that investors cannot make superior returns by reacting quickly to new information. The results also show that investors are able to distinguish between new information that affects the value of the underlying business and new information that does not.

Other semi-strong tests have assessed whether it is possible to predict future returns by using available public information. These tests have produced more mixed results. One test involves the use of P/E ratios. We saw in Chapter 3 that the P/E ratio reflects the market's view of the growth prospects of a particular share: the higher the P/E ratio, the greater the growth prospects. Tests have shown, however, that shares with low P/E ratios outperform those with high P/E ratios. The market overestimates the growth prospects of businesses with high P/E ratios and underestimates the growth prospects of those with low P/E ratios. In other words, the market gets it wrong. We shall return to this point a little later.

Research to test the strong form of efficiency has often involved an examination of the performance of investment fund managers. These managers are highly skilled and have access to a wide range of information, not all of which may be in the public domain. If, despite their advantage over private investors, fund managers were unable to generate consistently superior performance over time compared to the market, it would provide some support for the view that markets are strong-form efficient. The results, alas, are mixed. Although earlier studies often supported the view that fund managers cannot outperform the market, more recent studies have suggested that some can.

Implications for managers

If stock markets are efficient, what should managers do? It seems that they must learn six important lessons.

Lesson 1: Timing doesn't matter

Managers considering a new share issue may feel that timing is important. In an inefficient stock market, the share price may fall below its 'true worth' and making a new issue at this point could be costly. In an efficient stock market, however, the share price will faithfully reflect the available information. This implies that the timing of issues will not be critical as there is

Activity 7.7

Why might managers who accept that the market is efficient, at least in the semi-strong form, be justified in delaying the issue of new shares until what they believe will be a more appropriate time?

They may believe the market has underpriced the shares because it does not have access to all relevant information. They may have access to inside information which, when made available to the market, will lead to an upwards adjustment in share prices.

no optimal point for making a new issue. Even if the market is depressed and share prices are low, it cannot be assumed that things will improve. The prevailing share price still reflects the market's estimate of future returns from the share.

Lesson 2: Don't search for undervalued businesses

If the stock market accurately absorbs publicly available information, share prices will represent the best estimates available of their 'true worth'. This means that investors should not spend time trying to find undervalued shares in order to make gains. Unless they have access to information which the market does not have, they will not be able to 'beat the market' on a consistent basis. To look for undervalued shares will only result in time being spent and transaction costs being incurred to no avail. Similarly, managers should not try to identify undervalued shares in other businesses with the intention of identifying possible takeover targets. While there may be a number of valid and compelling reasons for taking over another business, the argument that shares of the target business are undervalued by the stock market is not one of them.

Lesson 3: Take note of market reaction

The investment plans and decisions of managers will be quickly and accurately reflected in the share price. Where these plans and decisions result in a fall in share price, managers may find it useful to review them. In effect, the market provides managers with a 'second opinion', which is both objective and informed. This opinion should not go unheeded.

Lesson 4: You can't fool the market

Managers may believe that form is as important as substance when communicating information to investors. This may induce them to 'window dress' the financial statements to provide a better picture of financial health than is warranted by the facts. The evidence suggests, however, that the market will see through any cosmetic attempts to improve the financial picture. It quickly and accurately assesses the economic substance of a business and prices the shares accordingly. Thus, accounting policy changes (such as switching depreciation methods, or switching inventories valuation methods, to boost profits in the current year) will be a waste of time.

Lesson 5: The market, not the business, decides the level of risk

Investors will correctly assess the level of risk associated with an investment and will impose an appropriate rate of return. Moreover, this rate of return will apply to whichever business undertakes that investment. Managers will not be able to influence this rate of return by adopting particular financing strategies. This means, for example, that the issue of certain types of security, or combinations of securities, will not reduce investors' required rate of return.

Lesson 6: Champion the interests of shareholders

The primary objective of a business is the maximisation of shareholder wealth. If managers take decisions and actions that are consistent with this objective, it will be reflected in the share price. This is likely to benefit the managers of the business as well as the shareholders.

ARE THE STOCK MARKETS REALLY EFFICIENT?

The idea that stock markets are efficient, at least in major industrialised countries, reached its high water mark during the 1970s. In 1978, Professor Michael Jensen, a leading proponent of market efficiency, confidently claimed '*there is no other proposition in economics which has*

more solid empirical evidence supporting it than the efficient market hypothesis.' Since then, however, a growing body of evidence has risen to challenge the hypothesis and its far-reaching conclusions. Although the notion of efficient markets is still held in respect, many now believe that it does not provide a complete explanation of how markets behave. This revised position should not, perhaps, come as a great surprise. The world is usually much richer and more complex than the theories and models we employ to explain it.

Below we consider some stock market 'anomalies' that challenge the efficient market hypothesis. We shall begin with one that we touched upon a little earlier in the chapter.

The problem of short termism

Stock market investors are often accused of adopting a short-term focus. If this is the case, it is difficult to square with the efficient market hypothesis. The value of a share is represented by the future discounted cash flows that it generates. In a stock market where shares are efficiently priced, investors should therefore be concerned with the ability of a business to generate long-term cash flows rather than its ability to meet short-term profit targets. In other words, if a stock market is efficient, a critical mass of investors will not adopt a short-term view when making share investment decisions.

The behaviour of investors does appear to have changed over time. In the UK, shares of listed businesses are held by investors for much shorter periods. It seems that investors are acting increasingly like share traders and less like owners. There is a risk, therefore, they become less concerned with the future stream of dividends and more concerned with short-term share price movements (which, in turn, may be influenced by short-term profit performance). Why such a change in behaviour may have occurred among investors is not clear. One suggestion is that it can be traced back to the short-term focus of institutional investors. Fund managers often have their performance subjected to quarterly review, thereby increasing pressure to produce short-term returns.

Although there is support for the existence of short-termism in the research literature, recent research casts doubt on these findings. **Real World 7.7** is an extract from an article citing the recent research that challenges the conventional wisdom.

Not going short

In recent years, a welter of academic research has alleged that leaders of publicly listed companies find it hard to implement a long-term vision, say by developing investment plans, because of the pressures of quarterly earnings reports. So, staying private – or delisting – is seen as a way to combat the disease of short-termism. It sounds like a persuasive argument. But there is a catch: the data on company activity may not support it.

Take a look, for example, at some fascinating research that has just been published by a group of economists linked to the US Federal Reserve. Over the past year, these researchers have been crunching statistics from the Internal Revenue Service on corporate tax returns filed by public and private companies between 2004 and 2015. Their aim was to see what the data reveal about corporate investment. These statistics have never been used to study investment flows before. However, the Fed economists believe the data offer powerful insights since they not only capture research-and-development spending, which has hitherto been hard to track, but also present information for public and private companies in a consistent manner.

The results of the exercise are startling. Most academic studies previously asserted that publicly listed companies were less willing to invest long term than their private counterparts.

→

However, the IRS data, which covered 2.7m 'firm-years', suggest that listed groups actually invested 48.1 percentage points more – not less – than private ones, after adjusting for sector and size. More remarkable still, when the Fed team analysed what happened when privately held companies went public, their R&D-to-physical-asset ratios increased by 34.5 percentage points, and their 'R&D-to-total investment shares by 17.1 percentage points'. When publicly listed companies went private, however, there was 'a reduction in R&D investments'.

This does not mean the problem of short-termism has disappeared: the research notes that listed companies from 'industries that are more sensitive to earnings announcements pull back their investments in long-term physical assets and innovation' when share prices swing too wildly, investing in short-term projects instead. But this did not change the overall statistics. The researchers found 'robust evidence that public firms invest more overall, particularly in R&D' than private companies.

What should investors make of this? A cynic might point out that the problem of short-termism cannot be measured by capital expenditure alone. Stock market pressures can prompt chief executives to take other destructive steps, such as chasing foolish acquisitions, creating crazy compensation schemes or ignoring 'externalities', such as environmental costs. The Fed report does not attempt to measure those aspects, nor does it measure whether publicly listed companies invest as productively as private ones. Moreover, the capex data would look less impressive if set in a wider international setting. On a gross basis, corporate R&D in America has risen in recent years. But on a per capita basis, it ranks below countries such as South Korea, Japan, Germany and Switzerland – and Chinese R&D is rapidly catching up.

But even with those caveats, the Fed research is unusually good news for anyone wanting to defend the principle of shareholder capitalism. Yes, public listings are beset with dangers. But being private does not guarantee an explosion of long-term investment or R&D.

While the above findings are interesting, we should await further research before making a final judgement on whether short-termism exists.

Other stock market anomalies

Apart from short termism, researchers have unearthed other 'anomalies' in major stock markets. Once again, these may be exploited by investors to achieve superior returns. Some of the more important are:

- *Business size.* A substantial body of evidence suggests that, other things being equal, small businesses yield higher returns than large businesses. It is not clear why this should be the case and various explanations exist. Some argue that it is because institutional investors tend to shun small businesses even though they may offer high returns. For such large investors, the size of the investment would be fairly modest and any benefits would be outweighed by the costs of evaluation and monitoring.
- *Price/earnings (P/E) ratio.* We mentioned earlier that research has shown that a portfolio of shares held in businesses with a low P/E ratio will outperform a portfolio of shares held in businesses with a high P/E ratio. This suggests that investors can make superior returns from investing in businesses with low P/E ratios.
- *Market overreaction.* Studies have shown that stock markets often overreact to new information. Where, for example, a business announces bad news, the fall in share price can be excessive and some time can elapse before the share price adjusts correctly to the news. In other words, the market does not react both quickly and accurately to new information.

Activity 7.8

How might an investor exploit this anomaly?

An investor could make an abnormal gain by buying shares immediately after the announcement and then selling them when their price has correctly adjusted.

- *Investment timing.* Various studies indicate that superior returns may be gained by timing investment decisions appropriately. There is evidence, for example, that higher returns can be achieved by buying shares at the beginning of April, in the UK, and then selling them later in the month, than similar trading in other months. There is also evidence that on Mondays there is an above-average fall in share prices. This may be because investors review their share portfolio at the weekend and sell unwanted shares when the market opens on Monday, thereby depressing prices. This means it is better to buy rather than sell shares on a Monday. There is also evidence that the particular time of the day in which shares are traded can lead to superior returns.

Activity 7.9

Can you suggest why, in the UK, April may provide better returns than other months of the year?

A new tax year begins in April. Investors may sell loss-making shares in March to offset any capital gains tax on shares sold at a profit during the tax year. As a result, share prices will become depressed. At the start of the new tax year, however, investors will start to buy shares again and so share prices will rise.

A fervent disciple of efficient markets may argue that market anomalies are of only minor importance and that, on the whole, the markets are efficient for most of the time. In the real world, there may well be inefficiencies but these are short-term, chance events. Where investors discover share price anomalies, they will exploit them in order to make gains. By doing so, they will eliminate the anomalies and thereby make the markets more efficient.

This sort of reasoning, however, cannot explain why some 'super investors', such as Warren Buffett, have managed to outperform the stock market over many years. Their success suggests that there may be 'pockets of inefficiency' within the market. Thus, while the market may display some features of efficiency, it should not be viewed simply through the lens of efficient markets.

Behavioural finance

In recent years, a new discipline called **behavioural finance** has emerged, which tries to provide a more complete understanding of the way in which stock markets behave. In particular, it seeks to explain why and how markets may be inefficient. This new discipline takes account of the psychological traits of individuals when seeking to explain market behaviour. It does not accept that individuals always behave in a rational manner, and there is a plethora of research evidence in psychology to support this view.

Many studies have shown that individuals are not always rational in their decision making. Emotional and mental biases can influence the way in which information is processed.

What consequences may arise from investors displaying irrational behaviour when buying and selling shares?

It may lead to the mispricing of shares. This, in turn, can create the opportunity to gain from the mispricing.

There is now convincing research evidence that investors:

- place emphasis on information and ideas that confirm their existing beliefs and discount those that do not. This means that when new information comes to light concerning the price of a share, they may not respond in a rational manner.
- have a strong aversion to making losses. This may lead them to hold, rather than sell, loss-making shares. Selling the shares would mean having to recognise the loss and so confront an earlier poor decision. Instead, they would prefer to hold on to the shares in the hope that prices rise sufficiently to eliminate the loss.
- display a preference for investing in what is familiar to them. This may result in holding a poorly diversified share portfolio.
- place excessive emphasis on recent events at the expense of those occurring at a more distant date. This may lead them to extrapolate expected future returns from a share based simply on recent performance.
- rely on a single reference point, or piece of information, even though it may not be relevant to the investment decision. An investor may, for example, invest in a share that has fallen from a previously high price to a low price in the belief that it offers an opportunity to exploit a temporary price weakness.

Activity 7.11

Why might this be a risky thing to do?

An examination of the share fundamentals is required before deciding whether the lower price means that the share is now undervalued. The previous higher share price should not be used as the single reference point when forming this judgement.

- demonstrate overconfidence in their own skills, judgement and ability to control events. This can lead to excessive optimism, which in turn leads to an overestimation of the potential rewards and an underestimation of the risks involved. (Researchers have found that men are more likely to suffer from overconfidence than women – but no prizes for guessing that!) Overconfidence can lead to a variety of errors when making investment decisions, including a tendency to buy and sell shares frequently. There is research evidence, however, to show that higher levels of trading are associated with poorer investment returns.

It seems that overconfidence is the most widespread, persistent and powerful of the behavioural biases. In the finance area, it has been linked to share price 'bubbles' and overextended 'bull runs' where investor demand keeps share prices buoyant despite evidence suggesting that share prices are too high. (The phenomenon of share price bubbles will be discussed in the following section.)

Supporters of efficient markets offer two main arguments to counter the growing evidence concerning irrational investor behaviour. The first is that investors generally behave in a rational

manner. Even, if this were not the case, the particular form of irrational behaviour adopted will vary between investors and so each form will be diversified away. The second argument is that, even if the form of irrational behaviour did not vary between investors, there would still be clear-sighted investors in the market who could identify any mispricing that occurs. They could then exploit this by, for example, buying shares that are undervalued. It would then simply be a matter of waiting for less clear-sighted investors to recognise the mispricing. When this finally happens, share prices will rise and the clear-sighted investors will make a gain. The problem with this line of argument, however, is that buying mispriced shares exposes clear-sighted investors to a high degree of risk.

To conclude, we can say that the evidence indicates that investors do not always behave in a rational manner. The evidence also indicates that stock markets are not always efficient. What is still not clear, however, are the precise links between the two. Hopefully, future research will shed more light on this issue.

Share price bubbles

Share price bubbles, which inflate and then burst, appear in stock markets from time to time. When they inflate there is a period of high prices and high trading volumes, which is sustained by the enthusiasm of investors rather than by the fundamentals affecting the shares. During a bubble, investors appear to place too much faith in their optimistic views of future share price movements and, for a while at least, ignore warning signals concerning future growth prospects. However, as the warning signals become stronger, the disparity between investors' views and reality eventually becomes too great and a correction occurs, bringing investors' views more into line with fundamental values. This realignment of investors' views, leading to a sharp correction in share prices, means that the bubble has burst.

Share price bubbles are unusual and may be limited to particular industries or even particular businesses. **Real World 7.8** below reveals a prediction for the bursting of a stock market bubble by a leading investment fund manager.

Bubble trouble

Neil Woodford said he expects the stock market bubble that has hampered the performance of his flagship £8.2bn Woodford Equity Income fund will burst this year.

Mr Woodford's view that this year the stock market bubble will burst would mean the market is too optimistic about the outlook for the Chinese economy, and the global economy, while being too pessimistic about the prospects for the UK economy. He said the performance of the Chinese economy is driven by unsustainable credit growth, and the global economy by low US interest rates.

Mr Woodford said he thinks those trends will diminish, and his fund will perform better.

The fund manager said: 'This is a consistent feature of bubbles – there is always a subset of the market which falls out of favour as investors increasingly pursue the excitement that exists elsewhere.'

FT

Source: Extracts from Thorpe, D. (2018) 'Woodford predicts stock market bubble will burst this year', FT Advisor, 2 January.
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How should managers act?

The debate over the efficiency of stock markets has yet to run its course and further research is needed before a clear picture emerges. Although this situation may suit researchers, it is unlikely to suit managers confronted with an increasingly mixed set of messages concerning stock market behaviour. Probably the best thing for managers to do is to assume that well-developed markets, such as those in the UK and the USA, are efficient for much of the time, at least in the semi-strong form. The weight of evidence still supports this view. Although it may be possible to 'beat the market', it is not easy to do so and failure to recognise this may prove costly. Where it is clear, however, that market inefficiency exists, managers should exploit this.

SHARE ISSUES

A business may issue shares in a number of ways. These may involve direct appeals to investors or may involve financial intermediaries. The most common methods of share issue are set out in Figure 7.4.

The figure sets out five methods of issuing shares. As explained in the chapter, bonus issues differ from the other methods in that they do not lead to an injection of cash for the business.
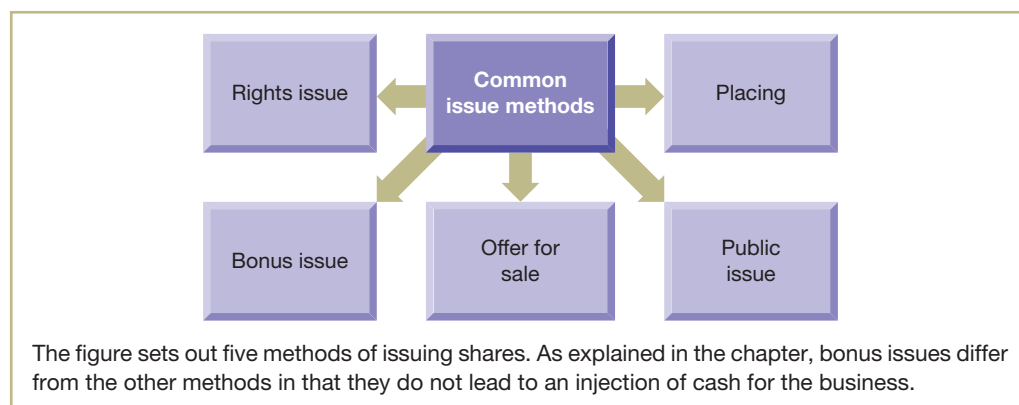
Figure 7.4 Common methods of share issue

Each of the methods identified above will now be examined in turn.

Rights issues

Rights issues can be made by established businesses seeking to raise finance by issuing additional shares for cash. UK company law gives existing shareholders the right of first refusal on these new shares, which are offered to them in proportion to their existing shareholding. Only where they waive their right would the shares then be offered to the investing public.

The business (in effect, the existing shareholders) would typically prefer that existing shareholders buy the shares through a rights issue, irrespective of the legal position. This is for two reasons:

■ Ownership (and, therefore, control) of the business remains in the same hands; there is no 'dilution' of control.
■ The costs of making the issue (advertising; complying with various company law requirements) tend to be less if the shares are to be offered to existing shareholders.

To encourage existing shareholders to take up their 'rights' to buy new shares, they are offered at a price discounted to below the current market price of the existing ones. The size of discounts offered appears to have increased in recent years. It is now common for discounts to be 30 per cent or more.

As shareholders can acquire shares at a price below the current market price, the entitlement to participate in a rights offer has a cash value. Those shareholders not wishing to take up the rights offer can sell their rights to others. Calculating the cash value of the rights entitlement is quite straightforward. Example 7.1 can be used to illustrate how this is done.

Example 7.1

Shaw Holdings plc has 20 million ordinary shares of 50p in issue. These shares are currently valued on the Stock Exchange at £1.60 per share. The directors of Shaw Holdings plc believe the business requires additional long-term capital and have decided to make a one-for-four issue (that is, one new share for every four shares held) at £1.30 per share. What is the value of the rights per new share?

Solution

The first step in the valuation process is to calculate the price of a share following the rights issue. This is known as the *ex-rights price* and is simply a weighted average of the price of shares before the issue of rights and the price of the rights shares. In the above example we have a one-for-four rights issue. The theoretical ex-rights price is therefore calculated as follows:

		£
Price of four shares before the rights issue (4 × £1.60)		6.40
Price of taking up one rights share		1.30
		7.70
Theoretical ex-rights price	(£7.70/5)	£1.54

As the price of each share, in theory, should be £1.54 following the rights issue and the price of a rights share is £1.30, the value of the rights offer will be the difference between the two:

$$£1.54 - £1.30 = £0.24 \text{ per new share}$$

Market forces will usually ensure that the actual price of rights and the theoretical price will be fairly close.

Activity 7.12

An investor with 2,000 shares in Shaw Holdings plc (see Example 7.1) has contacted you for investment advice. She is undecided whether to take up the rights issue, sell the rights or allow the rights offer to lapse.

Calculate the effect on the net wealth of the investor of each of the options being considered.

Before the rights issue, the position of the investor was:

	£
Value of shares (2,000 × £1.60)	3,200

→

If she takes up the rights issue, she will be in the following position:

	£
Value of holding after rights issue ((2,000 + 500) × £1.54)	3,850
Less Cost of buying the rights shares (500 × £1.30)	(650)
	3,200

If she sells the rights, she will be in the following position:

	£
Value of holding after rights issue (2,000 × £1.54)	3,080
Sale of rights (500 × £0.24)	120
	3,200

If she lets the rights offer lapse, she will be in the following position:

	£
Value of holding after rights issue (2,000 × £1.54)	3,080

As we can see, the first two options should leave her in the same position concerning net wealth as she was in before the rights issue. Before the rights issue she had 2,000 shares worth £1.60 each, or £3,200. However, she will be worse off if she allows the rights offer to lapse than under the other two options. In practice, the business may sell the rights offer on behalf of the investor and pass on the proceeds in order to ensure that she is not worse off as a result of the issue.

When making a rights issue, the total funds needed must first be determined. This will depend on the future plans of the business. A decision on the issue price of the rights shares must then be made. Generally speaking, this decision is not critical. In the example above, the business made a one-for-four issue with the price of the rights shares set at £1.30. However, it could have raised the same amount by making a one-for-two issue and setting the rights price at £0.65, or a one-for-one issue and setting the price at £0.325, and so on. The issue price that is finally decided upon will not affect the value of the underlying assets of the business or the proportion of the underlying assets and earnings of the business to which the shareholder is entitled. Nevertheless, it is important to ensure that the issue price is not *above* the current market price of the shares.

Activity 7.13

Why is this important?

If the issue price is above the current market price, it would be cheaper for the investor to buy shares in the open market (assuming transaction costs are not significant) than to take up the rights offer. This would mean that the share issue would fail.

It was mentioned earlier that rights shares will usually be priced at a discount to the market price of shares at the date of the rights announcement. By the date that the rights shares have to be taken up, there is a risk that the market price will have fallen below the rights price. If this occurs, the rights issue will fail for the same reasons as mentioned in Activity 7.13. The higher the discount offered, the lower the risk of such failure. Not surprisingly, discounts tend to be higher when markets are either volatile or falling. There is a danger, however, that offering a

very high discount will convey an impression that there is little enthusiasm for the issue among shareholders.

Despite the benefits of giving pre-emptive rights to shareholders, it does result in less competition for the new shares issued. This may increase the costs of raising finance as other forms of share issue may be able to raise the amount more cheaply.

Real World 7.9 describes how one large construction business made a rights issue to strengthen its financial position. However, it experienced a very poor take up from its shareholders.

Real World 7.9

When rights go wrong

Five British banks and brokers lost millions of pounds after they were saddled with Kier shares following a failed emergency fundraising for the construction and support services group. Kier said on Thursday that only 38 per cent of investors had taken up the call to bolster the business through a rights issue, though it emphasised it had secured the £250m it needed as the 64.5m new shares had been fully underwritten. Banks Citigroup, HSBC and Santander, along with stockbrokers Numis and Peel Hunt, underwrote the issue and had been left collectively holding about £100m of the new shares, according to two people familiar with the deal. They later sold the shares.

Kier declined to comment on the banks' handling of the rights issue. The new shares were priced at 409p when the rights issue was announced at the end of November, a discount of almost 50 per cent compared with the prior day's closing price. But the stock quickly fell below that price as concern deepened about the company's health and the state of the broader sector.

Kier's chief executive, said in a statement: 'Following the completion of the £250m rights issue, Kier enters 2019 with a strong balance sheet which puts us in an excellent competitive position.' However, the low take-up of the issue is a further sign of wavering confidence in a sector under strain.

Kier announced on November 30 that it was seeking to bolster its finances in the face of a challenging environment. Lenders were cutting their exposure to the UK building sector, the company said, while broader concerns about the viability of outsourcing businesses such as Interserve have dented investor confidence.

Bonus issues

A **bonus issue** should not be confused with a rights issue of shares. A bonus, or scrip, issue also involves the issue of new shares to existing shareholders in proportion to their existing shareholdings. However, shareholders do not have to pay for the new shares issued. The bonus issue is achieved by transferring a sum from the reserves to the paid-up share capital of the business and then issuing shares, equivalent in value to the sum transferred, to existing shareholders. As the reserves are already owned by the shareholders, they do not have to pay for the shares issued. In effect, a bonus issue will simply convert reserves into paid-up capital. To understand this conversion process, and its effect on the financial position of the business, let us consider Example 7.2.

Example 7.2

Wickham plc has the following abbreviated statement of financial position as at 31 March:

	£m
Net assets	<u>20</u>
Financed by	
Share capital (£1 ordinary shares)	10
Reserves	<u>10</u>
	<u>20</u>

The directors decide to convert £5 million of the reserves to paid-up capital. As a result, it was decided that a one-for-two bonus issue should be made. Following the bonus issue, the statement of financial position of Wickham plc will be as follows:

	£m
Net assets	<u>20</u>
Financed by	
Share capital (£1 ordinary shares)	15
Reserves	<u>5</u>
	<u>20</u>

We can see in Example 7.2 that, following the bonus issue, share capital has increased but there has also been a corresponding decrease in reserves. Net assets of the business remain unchanged. More shares are now in issue but the proportion of the total number of shares held by each shareholder will remain unchanged. Thus, bonus issues do not, of themselves, result in an increase in shareholder wealth. They will simply switch part of the owners' claim from reserves to share capital.

Activity 7.14

Assume that the market price per share in Wickham plc (see Example 7.2) before the bonus issue was £2.10. What will be the market price per share following the share issue?

The business has made a one-for-two issue. A holder of two shares would therefore be in the following position before the bonus issue:

2 shares held at £2.10 market price = £4.20

As the wealth of the shareholder has not increased as a result of the issue, the total value of the shareholding will remain the same. This means that, as the shareholder holds one more share following the issue, the market value per share will now be:

$$\frac{£4.20}{3} = £1.40$$

You may wonder from the calculations above why bonus issues are made. Various reasons have been put forward to explain this type of share issue, which include:

■ *Share price.* The share price may be very high and, as a result, shares of a business may become difficult to trade on the Stock Exchange. It seems that shares trading within a certain price range generate more investor interest. If the number of shares in issue is increased, the market price of each share will be reduced, which may make the shares more marketable.

- *Lender confidence.* Making a transfer from distributable reserves to paid-up share capital will increase the permanent capital base of the business. This may increase confidence among lenders. In effect, it will lower the risk of ordinary shareholders withdrawing their investment through dividend distributions, thereby leaving lenders in an exposed position.
- *Market signals.* A bonus issue offers managers an opportunity to signal to shareholders their confidence in the future. The issue may be accompanied by the announcement of good news concerning the business (for example, securing a large contract or achieving an increase in profits). Under these circumstances, the share price may rise in the expectation that earnings/dividends per share will be maintained. Shareholders would, therefore, be better off following the issue. However, it is the *information content* of the bonus issue, rather than the issue itself, that will create this increase in wealth.

Offer for sale

An **offer for sale** may involve a publicly-listed business selling a new issue of shares to a financial institution known as an issuing house. It may also involve shares already held by existing shareholders being sold to an issuing house. The issuing house will, in turn, sell the shares purchased from the business, or its shareholders, to the public. To do this, it will publish a prospectus setting out details of the business and the type of shares to be sold, and investors will be invited to apply for shares.

The advantage of this type of issue, from the business's viewpoint, is that the sale proceeds of the shares are certain. It is the issuing house that will take on the risk of selling the shares to investors. Any unsold shares will remain with the issuing house. An offer for sale is most often used when a business seeks a listing on the Stock Exchange and wishes to raise a large amount of funds.

Public issue

A **public issue** involves a public limited company making a direct invitation to the public to buy its shares. Typically, this is done through a newspaper advertisement, and the invitation will be accompanied by the publication of a prospectus. The shares may, once again, be a new issue or shares already in issue. An issuing house may be asked by the business to help administer the issue of the shares to the public and to offer advice concerning an appropriate selling price. However, the business rather than the issuing house will take on the risk of selling the shares. Both an offer for sale and a public issue result in a widening of share ownership in the business.

Setting a share price

When making an issue, the business, or issuing house, will usually set a fixed price for the shares. However, establishing a price may not be an easy task, particularly where the market is volatile or where the business has unique characteristics.

Activity 7.15

What are the risks involved for the business of selling shares at a fixed price?

If the share price is set too high, the issue will be undersubscribed and the anticipated amount will not be received. If the share price is set too low, the issue will be oversubscribed and the amount received will be less than could have been achieved.

One way of dealing with the pricing problem is to make a **tender issue** of shares. This involves the investors determining the price at which the shares are issued. Although a reserve

price may be set to help guide investors, it is up to each individual investor to decide on the number of shares to be purchased and the price to be paid. Once the offers from investors have been received, a price at which all the shares can be sold will be established (known as the *striking price*). Investors who have made offers at, or above, the striking price will be issued shares at the striking price and offers received below the striking price will be rejected. Note that all of the shares will be issued at the same price, irrespective of the prices actually offered by individual investors.

Example 7.3 illustrates the way in which a striking price is achieved.

Example 7.3

Celibes plc made a tender offer of shares and the following offers were received by investors:

Share price	Number of shares tendered at this particular price 000s	Cumulative number of shares tendered 000s
£2.80	300	300
£2.40	590	890
£1.90	780	1,670
£1.20	830	2,500

The directors of Celibes plc wish to issue 2,000,000 shares, at a minimum price of £1.20.

The striking price would have to be £1.20 as, above this price, there would be insufficient interest to issue 2,000,000 shares. At the price of £1.20, the total number of shares tendered exceeds the number of shares available and so a partial allotment would be made. Normally, each investor would receive 4 shares for every 5 shares tendered (that is 2,000/2,500).

Activity 7.16

Assume that, instead of issuing a fixed number of shares, the directors of Celibes plc (see Example 7.3) wish to maximise the amount raised from the share issue. What would be the appropriate striking price?

The price at which the amount raised from the issue can be maximised is calculated as follows:

Share price	Cumulative number of shares 000s	Share sale proceeds £000
£2.80	300	840
£2.40	890	2,136
£1.90	**1,670**	**3,173**
£1.20	2,500	3,000

The table shows that the striking price should be £1.90 to maximise the share sale proceeds.

Tender issues are not popular with investors and therefore are not in widespread use.

Placing

A **placing** does not involve an invitation to the public to subscribe to shares. Instead, the shares are 'placed' with selected investors, such as large financial institutions. These shares are normally offered at a small discount to the current market price. The maximum discount that can be offered under listing rules for the main market is 10 per cent.

A placing can be a quick and relatively cheap method of raising funds because savings can be made in advertising and legal costs. It can, however, result in the ownership of the business being concentrated in a few hands and may prevent small investors from participating in the new issue of shares. Businesses seeking relatively small amounts of cash will often employ this form of issue.

Real World 7.10 describes how a placing was used by one business to strengthen its financial position and to provide investment funds for the future.

Real World 7.10

Well placed

Metro Bank was forced to complete a long-awaited share placement at a discount on Thursday evening but raised more money that it had planned after a positive reaction from investors. The under-fire lender initially said it would raise about £350m after London markets closed to prop up its capital levels and allow it to return to lending growth after the discovery of a reporting error earlier this year. However, Metro later increased the total sum raised to £375m because of high demand.

People briefed on discussions said a large portion of the cash would be provided by existing investors, though Fidelity, which was until recently Metro's second-largest shareholder, was not expected to take part. Craig Donaldson, chief executive of Metro, has been discussing the deal with investors in New York this week, although some new Europe-based investors will also buy shares.

The new stock was priced at 500p a share. The price was around 6 per cent lower than Metro's volume-weighted average share price over the past week, and 13 per cent lower than the price when the Financial Times first reported the placing would be completed at a discount on Thursday afternoon. The discount contrasts with the bank's previous capital raises, which it was able to complete at market prices with the promise of rapid future growth. However, Metro's plans have been severely disrupted by the revelation that it had been miscategorising the riskiness of certain loans and as a result had less capital than it should have had

FT *Source*: Extracts from N.Megaw and P. Jenkins (2019) *Metro Bank raises more than expected in discounted share placement* ft.com 16 May.
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A placing is sometimes used in conjunction with a rights issue. Where a planned rights issue is unlikely to raise all the funds needed, a placing may also be made to fill the funding gap.

Placings have become an extremely popular way of issuing shares among listed businesses. During 2017, they accounted for approximately 80 per cent of the funds raised for newly listed businesses (see reference 3 at the end of the chapter). **Real World 7.11** reveals that they also account for a significant proportion of the total amount raised from shares issued by already-listed businesses.

Raising the issue

The table below reveals the percentage of the total amount raised from issuing shares, according to issuing method, by businesses already listed on the Stock Exchange.

Percentage of total funds raised through different issuing methods by already-listed businesses 2012–17

	2017	2016	2015	2014	2013	2012
	%	%	%	%	%	%
Public offer	6.7	3.3	3.7	2.1	1.0	8.2
Placing	51.1	39.9	46.5	46.7	31.5	45.2
Public offer and placing	22.1	20.2	9.5	13.6	10.3	18.3
Rights issue	20.1	36.6	40.3	37.6	57.2	28.3
	100.0	100.0	100.0	100.0	100.0	100.0

We can see that, together, placings and rights issues account for a vast proportion of the total amount raised each year.

Source: Based on figures in Table 3 of Main Market Statistics covering the six-year period ending 31 December 2017, London Stock Exchange, www.londonstockexchange.com.

LONG-TERM FINANCE FOR THE SMALLER BUSINESS

Although the Stock Exchange provides an important source of long-term finance for large businesses, it is not suitable for smaller businesses. The total market value of shares to be listed on the Stock Exchange must be at least £700,000 and in practice the amounts are much higher because of the listing costs identified earlier. Thus, smaller businesses must look elsewhere for help in raising long-term finance. Reports and studies over several decades, however, have highlighted the problems that they encounter in doing so. These problems can be an obstacle to growth and include:

- a lack of financial management skills (leading to difficulties in developing credible business plans that will satisfy lenders)
- a lack of knowledge concerning the availability of sources of long-term finance
- insufficient security for loan capital
- failure to meet rigorous assessment criteria (for example, a good financial track record over five years)
- an excessively bureaucratic screening process for loan applications (see reference 4 at the end of the chapter).

In addition, the cost of finance is often higher for smaller businesses than for larger businesses because of the higher risks involved.

Not all financing constraints are externally imposed. Small business owners often refuse to raise new finance through ordinary share issues.

Can you think why?

It is often because they do not wish to dilute their control of the business. There is also a risk that other equity owners will not share the same vision for the business, which could lead to conflict.

Some small business owners also refuse to consider loan finance as they do not believe in borrowing. There is evidence that around half are 'permanent non-borrowers' (see reference 5 at the end of the chapter).

How acute are financing problems for small businesses?

Raising finance has traditionally been seen as a major concern for smaller businesses. However, the owners of small businesses do not seem to share this view. One recent survey, for example, found that only 18 per cent of respondents regarded it as a major problem. Overall, it was ranked as the tenth most important problem confronting owners. This placed it well behind those of 'competition in the market' (51 per cent of respondents) 'regulation/red tape' (46 per cent) and 'taxation' (36 per cent) which were viewed as greater barriers to success (see reference 6 at the end of the chapter). The low ranking attributed to financing problems is echoed in similar surveys relating to small businesses. Nevertheless, gaining access to external finance can create obstacles for small businesses, particularly those at an early stage in their life.

Sources of finance

Some important ways in which small businesses can gain access to long-term finance are set out in Figure 7.5 and considered below.

Each of the methods of obtaining long-term finance for smaller businesses is described below.
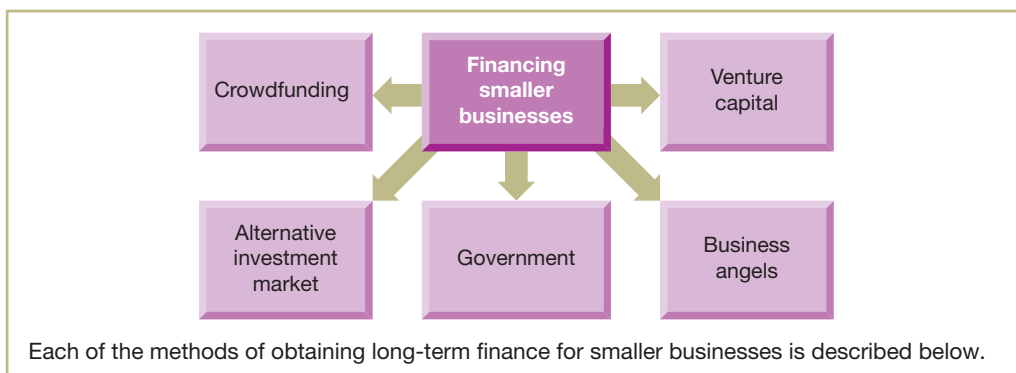
Figure 7.5 Long-term finance for smaller businesses

Private-equity firms

Private-equity firms provide long-term capital to small and medium-sized businesses wishing to grow but that do not have ready access to stock markets. The supply of **private equity** has increased rapidly in the UK over recent years since both government and corporate financiers have shown greater commitment to entrepreneurial activity.

It is possible to distinguish between private equity and **venture capital** based on the investment focus. In broad terms, private equity focuses on investments in established businesses whereas venture capital focuses on investments in start-up, or early-stage, businesses. In the sections that follow, however, we shall treat private equity as encompassing investments that are sometimes described as being financed by venture capital.

Types of investment

Private-equity firms seek to invest in small and medium-sized businesses with high growth potential. These businesses must also have owners, however, with the ambition and determination to fulfil this potential. Although private-equity-backed businesses have higher levels of risk than other finance providers will normally accept, they also have the potential for higher returns. The investment period for private equity is often between five and seven years. During this period, the private equity firm will expect the value of the business to increase so that it can profit from the sale of its investment.

Private equity is used to fund a range of business needs and provides the following:

■ *Venture capital.* For businesses at an early stage of development. Those that have yet to commence production may look for *seed capital*. This may be used to help design, develop and test new products and services. Businesses that have completed their development work may look for *start-up capital* in order to commence production. This is often used to buy equipment and to invest in working capital.

■ *Growth (development) capital.* For established business wishing to expand their operations, or wishing to enter new markets.

■ *Replacement capital.* To fund the buyout of part-ownership of a business, or the buyout of another private-equity firm.

■ *Re-financing bank loans.* To help businesses repay, or restructure, their bank borrowings

■ *Buyout and buyin capital.* To finance the acquisition of an existing business. A *management buyout* (MBO) is where an existing management team acquires the business, and an *institutional buyout* (IBO) is where the private-equity firm acquires the business and installs a management team of its choice. A *management buyin* (MBI) is where an outside management team acquires an existing business. Buyouts and buyins often occur where a large business wishes to divest itself of one of its operating units or where the owners of a family business wish to sell because of succession problems.

■ *Rescue capital.* To turn around a business's fortunes after a period of financial difficulties.

Venture capital investments, which were mentioned above, can be particularly challenging for private-equity firms. To begin with they are very high risk. Investing in existing businesses with a good track record is a much safer bet. They may also require fairly small amounts of finance. This makes it difficult to justify the high cost of investigating and monitoring the investment.

Real World 7.12 provides an impression of private-equity investment in UK businesses.

Nothing ventured, nothing gained

Figure 7.6 shows the main private-equity investments made in UK businesses during 2017 according to the type of financing.
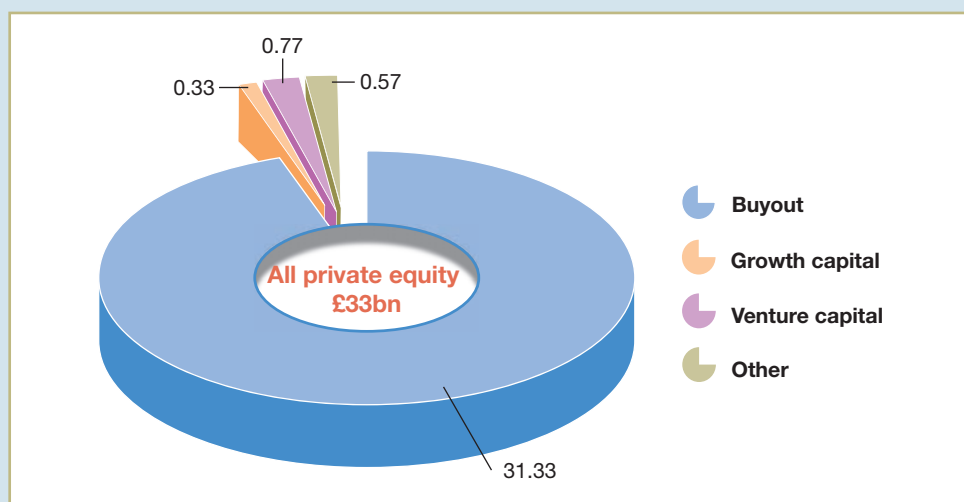
Figure 7.6 Funds raised during 2017 by private-equity firms according to financing type

We can see that buyouts were, by far, the most popular form of investment.

Source: British Private Equity and Venture Capital Association (2018) 'Report on investment activity 2017', www.bvca.co.uk, p. 8.

The private-equity investment process

Private-equity investment involves a five-step process that is similar to the investment process undertaken within a business. The five steps are set out in Figure 7.7 and below we consider each in turn.

Step 1: Obtaining the funds

Private-equity firms obtain their funds from various sources, including large financial institutions, such as pension funds, sovereign wealth funds and private investors. Once obtained, there can be a two- or three-year time lag before the funds are invested in suitable businesses.

Activity 7.18

Can you think of reasons why there may be such a delay?

Suitable businesses take time to identify and, once found, they require careful investigation. There may also be lengthy negotiations with owners over the terms of the investment.

Step 1	Obtain funds
Step 2	Evaluate available investment opportunities and make a selection
Step 3	Structure the terms of the investment
Step 4	Implement the deal and monitor progress
Step 5	Achieve returns and exit from the investment

The figure shows the five steps that a private-equity firm will go through when making an investment in a business.
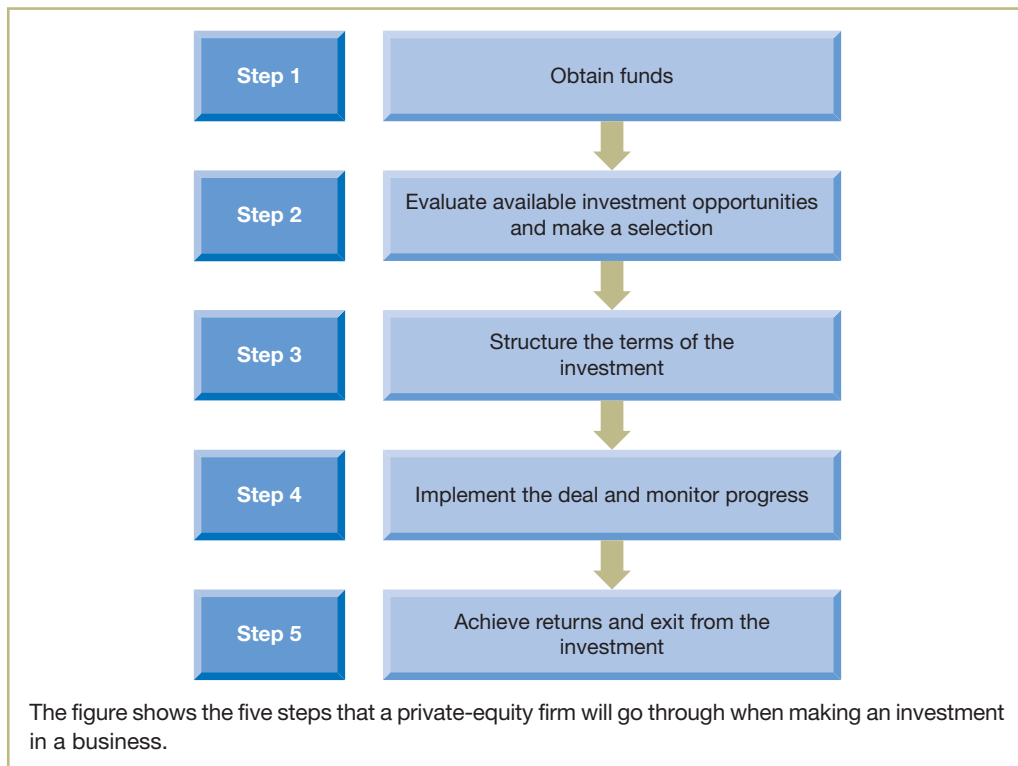
Figure 7.7 The investment process

Source: Van der Wayer, M. (1995) 'The venture capital vacuum', *Management Today*, July, pp. 60–4, Figure 7.9.

Step 2: Evaluating investment opportunities and making a selection

When a suitable business is identified, the management plans will be reviewed and an assessment made of the investment potential, including the potential for growth. This will involve an examination of:

- the market for the products
- the business processes and the ways in which they can be managed
- the ambition and quality of the management team
- the opportunities for improving performance
- the types of risks involved and the ways in which they can be managed
- the track record and future prospects of the business.

Private-equity firms will also be interested to see whether the likely financial returns are commensurate with the risks that have to be taken. The internal rate of return (IRR) method is often used in helping to make this assessment and an IRR in excess of 20 per cent is often required.

Step 3: Structuring the terms of the investment

When structuring the financing agreement, private-equity firms try to ensure that their own exposure to risk is properly managed. This will involve establishing control mechanisms within the financing agreements to protect their investment. One important control mechanism is the requirement to receive information on the progress of the business at regular intervals.

The information provided, as well as information collected from other sources, will then be used as a basis for providing a staged injection of funds. In this way, progress is regularly reviewed and where serious problems arise, the option of abandoning further investments in order to contain any losses is retained.

In some cases, the private-equity firm may reduce the amount of finance at risk by establishing a financing syndicate with other private-equity firms. However, this will reduce the potential returns. It will also increase the possibility of disputes between syndicate members, particularly when things do not go according to plan.

Private-equity firms usually expect the owner/managers to demonstrate their commitment by investing in the business. Although the amounts they invest may be small in relation to the total investment, they should be large in relation to their personal wealth.

Step 4: Implementing the deal and monitoring progress

Private-equity firms usually work closely with client businesses throughout the investment period. It is quite common for them to have a representative on the board of directors to keep an eye on things. They may also provide a form of consultancy service by offering advice on technical and marketing matters.

Business plans that were prepared at the time of the initial investment will be monitored to see whether they are achieved. Those businesses that meet their key targets are likely to find the presence of the private-equity firms less intrusive than those that do not. Monitoring is likely to be much closer at the early stages of the investment until certain problems, such as the quality of management and cost overruns, become less of a risk (see reference 7 at the end of the chapter).

Step 5: Achieving returns and exiting from the investment

A major part of the total returns from the investment is usually achieved through the final sale of the investment. The particular method of divestment is therefore of great concern to the private-equity firm. The most common forms of divestment are through:

- a trade sale (that is, where the investment is sold to another business)
- flotation of the business on the Stock Exchange, or sale of the quoted equity
- sale of the investment to the management team (buyback)
- sale of the investment to another private-equity firm or financial institution.

In some cases, there will be an 'involuntary exit' when the business fails, in which case the investment must be written off.

Private equity and borrowing

A private-equity firm will often require a business to borrow a significant proportion of its needs from a bank or other financial institution. In this way, the business reaps the benefit of financial gearing. It also reduces the amount of equity that the private-equity firm needs to invest. Cash flows generated by the business during the investment period are used to reduce or eliminate the outstanding loans.

Example 7.4 provides a simple illustration of how a private-equity firm may structure and then evaluate its investment in a business.

Example 7.4

Ippo Ltd is a private-equity firm that has recently purchased Andante Ltd for £80 million. The business requires an immediate injection of £60 million to meet its needs and Ippo Ltd has insisted that this be raised by a 10 per cent bank loan. Ippo Ltd intends to float Andante Ltd in four years' time to exit from the investment and then expects to receive £160 million on the sale of its shares. During the next four years, the cash flows generated by Andante Ltd (after interest has been paid) will be used to eliminate the outstanding loan.

The net cash flows (before interest) of the business, over the four years leading up to the flotation, are predicted to be as follows:

Year 1	Year 2	Year 3	Year 4
£m	£m	£m	£m
20.0	20.0	20.1	15.0

Ippo Ltd has a cost of capital of 18 per cent and uses the IRR method to evaluate investment projects.

The following calculations reveal that the loan can be entirely repaid over the next four years:

	Year 1	Year 2	Year 3	Year 4
	£m	£m	£m	£m
Net cash flows	20.0	20.0	20.1	15.0
Loan interest (10%)	(6.0)	(4.6)	(3.1)	(1.4)
Cash available to repay loan	14.0	15.4	17.0	13.6
Loan at start of year	60.0	46.0	30.6	13.6
Cash available to repay loan	14.0	15.4	17.0	13.6
Loan at end of year	46.0	30.6	13.6	–

There are no cash flows remaining after the loan is repaid and so Ippo Ltd will receive nothing until the end of the fourth year, when the shares are sold.

The IRR of the investment will be the discount rate which, when applied to the net cash inflows, will provide an NPV of zero. Thus,

$$(\text{£160m} \times \text{discount factor}) - \text{£80m} = 0$$

$$\text{Discount factor} = 0.50$$

A discount rate of approximately 19 per cent will give a discount factor of 0.5 in four years' time.

Thus, the IRR of the investment is approximately 19 per cent. This is higher than the cost of capital of Ippo Ltd and so the investment will increase the wealth of its shareholders.

To illustrate the benefits for the private-equity firm of financial gearing, Activity 7.19 requires you to rework the above example. This time, on the assumption that the investee business relies on equity finance rather than borrowing.

A further advantage of requiring a business to take on large borrowing is that it imposes a tight financial discipline on managers. There must always be enough cash available to make interest payments and capital repayments. This should encourage managers to be aggressive in chasing sales and bearing down on costs.

Assume that:

(a) Ippo Ltd (see Example 7.4) provides additional ordinary share capital at the beginning of the investment period of £60 million, thereby eliminating the need for Andante Ltd to take on a bank loan
(b) any cash flows generated by Andante Ltd would be received by Ippo Ltd in the form of annual dividends.

What would be the IRR of the total investment in Andante Ltd for Ippo Ltd? (*Hint*: Start with a discount rate of 10 per cent.)

The IRR can be calculated using the trial and error method as follows. At discount rates of 10 per cent and 16 per cent, the NPV of the investment proposal is:

		Trial 1		Trial 2	
Year	Cash flows	Discount rate	Present value	Discount rate	Present value
	£m	10%	£m	16%	£m
0	(140.0)	1.00	(140.0)	1.00	(140.0)
1	20.0	0.91	18.2	0.86	17.2
2	20.0	0.83	16.6	0.74	14.8
3	20.1	0.75	15.1	0.64	12.9
4	175.0	0.68	119.0	0.55	96.3
		NPV	28.9	NPV	1.2

The calculations reveal that, at a discount rate of 16 per cent, the NPV is close to zero. Thus, the IRR of the investment is approximately 16 per cent, which is lower than the cost of capital. In other words, the investment would reduce the wealth of shareholders in Ippo Ltd, when financial gearing is not employed.

BUSINESS ANGELS

Business angels are often wealthy individuals who have been successful in business. Most are entrepreneurs who have sold their businesses while others may be former senior executives of a large business, or business professionals, such as accountants, lawyers and management consultants. Business angels are generally willing to invest between £5,000 and £150,000, depending on the particular needs of the business. In return, they will normally acquire a minority equity stake representing up to 25 per cent of the total equity of the business. The investment period may be 8–10 years, which is longer than for private equity investments.

Business angels invest with the primary motive of making a financial return, but non-financial motives also play an important part, such as being involved in growing a business and helping budding entrepreneurs. They fill an important financing gap because the size and/or nature of their investments rarely appeal to private-equity firms. Their main focus is normally start-ups and early-stage businesses, although they may also invest in more mature businesses. It has been estimated that business angels invest around £1.5 billion per year in UK businesses and represent the largest source of finance for start-ups and early-stage businesses. However, being an angel is a risky business. More than half of investments made may not return the original capital invested. (See reference 8 at the end of the chapter.)

Business angels have the ability to make investment decisions quickly, particularly if they are familiar with the industry in which the business operates. They may also require lower financial returns than that demanded by private-equity firms in order to become involved in an interesting project.

Business angels often seek an active role and their skills, knowledge and experience can frequently be put to good use by business owners. Their contribution may take the form of providing advice and moral support, providing business contacts and helping to make strategic decisions. This contribution, however, may not simply be for the satisfaction gained from helping a business to grow.

Activity 7.20

What other motive may a business angel have for contributing to the business?

By having a greater understanding of what is going on, and by exerting some influence over decision making, business angels are better placed to increase their financial rewards and/ or reduce their level of investment risk.

Angel syndicates

Where a large investment is required, a syndicate of business angels may be formed to raise the money. The syndicate may then take a majority equity stake in the business. Several advantages may spring from syndication.

Activity 7.21

Can you think of at least two advantages of syndication for a business angel?

The advantages include:

- sharing of risk
- pooling of expertise leading to better evaluation of investment opportunities
- access to larger-scale investment opportunities
- an increased capacity to provide follow-up funding
- sharing of transaction and monitoring costs
- increased opportunity to hold a diversified portfolio of investments.

You may have thought of others.

Business angels are often enthusiastic about syndication and there is a growing trend towards this form of financing. There are, however, potential disadvantages, such as the greater complexity of deal structures, the need to comply with group decisions and disputes within the syndicate. From the perspective of an investee business, an angel syndicate can unlock access to a deeper pool of finance. However, dealing with a syndicate, rather than an individual, can lead to more drawn out and complex negotiations. It also means that more individuals have to be persuaded by the attractiveness of the deal.

The investment process

Although business angels can make decisions quickly, this does not mean finance is made available overnight. A period of 4–6 months may be needed between the initial introduction

and the provision of the finance. There is usually a thorough review of the business plan and financial forecasts. This may be followed by a series of meetings to help the business angel gain a deeper insight into the business and to deal with any concerns and issues that may arise.

Assuming these meetings go well and the business angel wishes to proceed, negotiations over the terms of the investment will then be undertaken. This can be the trickiest part of the process as agreement has to be reached over key issues such as the value of the business, the equity stake to be offered to the business angel and the price to be paid. Failure to reach agreement with the owners over a suitable price, and the post-investment role to be played by a business angel, are the two most common 'deal killers'.

If agreement can be reached between the parties, **due diligence** can then be carried out. This will involve an investigation of all material information relating to the financial, technical and legal aspects of the business. Even at this early stage, the business angel should be considering the likely exit route from the investment. The available routes are broadly the same as those identified earlier for private-equity firms.

Angel networks

Business angels offer an informal source of share finance and it is not always easy for owners of small businesses to identify a suitable angel. However, business angel networks have developed to help owners of small businesses find their 'perfect partner'. These networks will offer various services, including:

- publishing investor bulletins and organising meetings to promote the investment opportunities available
- registering the investment interests of business angels and matching them with emerging opportunities
- screening investment proposals and advising owners of small businesses on how to present their proposal to interested angels.

The UK Business Angels Association (UKBAA) is the trade association for the business angel networks. In addition to being a major source of information about the business angel industry, it seeks to promote good practice and provides access to investment opportunities through its online market place.

GOVERNMENT ASSISTANCE

The UK government offers a range of tax incentives for investment in small businesses, such as the *Seed Enterprise Investment Scheme* and the *Enterprise Investment Scheme*. Grants may also be awarded through regional and central government. These include *Smart Grants* to help fund scientific or technological breakthroughs and *Launchpads* to help convert innovative ideas into viable commercial ventures.

One of the most effective ways in which the UK government assists small businesses is through the *Enterprise Finance Guarantee Scheme*. This helps small businesses that have viable business plans but lack the security, or suitable track record, to borrow. The scheme guarantees:

- 75 per cent of the amount borrowed, for which the borrower pays a premium of 2 per cent per year on the outstanding borrowing
- loans ranging from £1,000 to £1.2 million for a maximum period of 10 years.

The scheme is available for businesses that have annual sales revenue of up to £41 million.

The government-owned British Business Bank aims to support economic growth by increasing access to finance and markets for smaller businesses. As well as developing new initiatives, the bank has taken over existing government commitments, such as the Enterprise Finance Guarantee Scheme. The bank does not lend or invest directly. Instead, it works through various financial institutions such as banks, leasing businesses and venture capital funds. To support smaller businesses, the bank also produces a guide which explains the various types and sources of finance available.

THE ALTERNATIVE INVESTMENT MARKET (AIM)

There are now a number of stock markets throughout the world that specialise in the shares of smaller businesses. These include the **Alternative Investment Market (AIM)**, which is the largest and most successful. AIM is a second-tier market of the London Stock Exchange. It was created in 1995 and grew rapidly for many years. It now includes a significant proportion of non-UK businesses, reflecting the international ambitions of the market. AIM offers smaller businesses a stepping stone to the main market – though not all AIM-listed businesses wish to make this step – and offers private-equity firms a useful exit route from their investments.

The regulatory framework

AIM provides businesses with many of the benefits of a listing on the main market without the cost or burdensome regulatory environment. Obtaining an AIM listing and raising funds costs the typical business about £500,000. Differences in the regulatory environment between the main market and AIM can be summarised as follows:

Main market	AIM
Minimum 25 per cent of shares in public hands	No minimum of shares to be in public hands
Normally, 3-year trading record required	No trading record requirement
Prior shareholder approval required for substantial acquisitions and disposals	No prior shareholder approval required for such transactions
Pre-vetting of admission documents by the UK Listing Authority	Admission documents not pre-vetted by the Stock Exchange or the UK Listing Authority
Minimum market capitalisation	No minimum market capitalisation

Source: Adapted from information on London Stock Exchange website, www.londonstockexchange.com.

A key element of the regulatory regime is that each business must appoint a Nominated Adviser (NOMAD) before joining AIM and then retain its services throughout the period of a listing. The NOMAD's role, which is undertaken by corporate financiers and investment bankers, involves the dual responsibilities of corporate adviser and regulator. It includes assessing the suitability of a business for joining AIM, bringing a business to market and monitoring its share trading. A NOMAD must also help AIM-listed businesses to strike the right balance between fostering an entrepreneurial culture and public accountability. It will therefore advise on matters such as corporate governance structures and the timing of public announcements.

To retain its role and status in the market, a NOMAD must jealously guard its reputation. It will, therefore, not act for businesses that it considers unsuitable for any reason. If a NOMAD ceases to act for a business, its shares are suspended until a new NOMAD is appointed. The continuing support of a NOMAD is therefore important, which helps it to wield influence over the business. This should help create a smooth functioning market and pre-empt the need for a large number of prescriptive rules.

AIM-listed businesses

AIM-listed businesses vary considerably in size, with equity market values ranging from less than £25 million to more than £1 billion. **Real World 7.13** below provides an insight to the size distribution of AIM-listed businesses.

Real World 7.13

Distribution of AIM-listed businesses by equity market value

The distribution of businesses by equity market value at the end of December 2018 is shown in Figure 7.8.
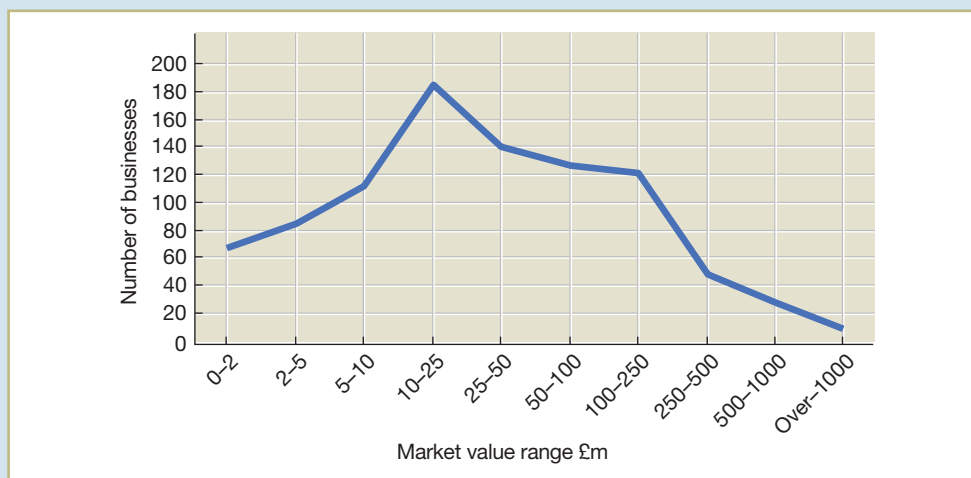
Figure 7.8 Distribution of AIM-listed businesses by equity market value

The chart shows that 67 businesses have a market capitalisation of less than £2 million. However, nine businesses have a market capitalisation of more than £1,000 million. We can see that the median range is between £10 million and £25 million.

There is a significant overlap between the size distribution of businesses listed on the main market (see Figure 7.1) and those listed on AIM. It is clear that not only smaller businesses use this second-tier market.

Source: London Stock Exchange, 'AIM market statistics', www.londonstockexchange.com, December 2018.

Investing in AIM-listed businesses

AIM has proved to be successful in attracting both private and institutional investors. However, businesses listed on AIM tend to be immature, fairly small and not-well diversified. This makes them vulnerable to economic shocks. There is a risk that, during difficult times, share prices

may fall sharply as investors make a 'flight to quality'. Share price weakness during periods of uncertainty may be increased by a lack of media coverage, or analysts' reports, to help investors understand what is going on.

A broad range of industry sectors are represented in the market. However, financial businesses and resource-based businesses, such as mining, oil and gas businesses, are easily the most important. AIM listed businesses include Fevertree Drinks plc, the soft drinks provider; Majestic Wine plc, the wine retailer, Asos plc and Boohoo.com plc, the online fashion retailers.

Although market liquidity has improved in recent years, it can still be a problem. This is particularly true for businesses that are too small to attract institutional investors, or where the shares are tightly held by directors, or where investors lack confidence in the business. If, for whatever reason, shares are infrequently traded, market makers may significantly adjust buying and selling prices, leading to sharp price changes. This can also mean that relatively small share trades will lead to a dramatic change in share price.

Real World 7.14 reveals that, since its inception, returns to investors from AIM-listed businesses have been disappointing.

Real World 7.14

Aiming to lose money

. . . Aim provides a lower-cost alternative for growth companies seeking investment. Yet it has been dogged by poor returns and a host of corporate failures – including some high-profile fraud cases. Investing in small, unproven companies is inherently riskier than backing larger, more predictable ones, and Aim's annualised total return of –1.6 per cent a year when measured over the past two decades is hardly cause for celebration. The fact that average returns from small-cap UK companies outside Aim have been much stronger, by comparison, is a further worry.

Over the past 20 years, investors would have lost money in 72 per cent of all the companies ever to have listed on Aim, according to Professors Dimson and Marsh of London Business School. Analysing data on the 2,877 companies which have listed on Aim, they calculate that in more than 30 per cent of cases, shareholders lost at least 95 per cent of their investment. By contrast, there are 39 companies – just 1.4 per cent of the historic total – that have given investors multi-year returns in excess of 1,000 per cent. 'While these have been superb performers, there have simply not been enough of them for Aim as a whole to generate a decent return for investors,' says Prof Dimson.

Five of the top ten best-performing Aim shares of all time have since moved to a main market listing – a hoped-for rite of passage since the junior market was created – and the professors argue that to exclude them from any 'best of' index would skew the overall picture. However, their subsequent level of success has been mixed – separate research by Numis Securities shows that the 100 or so Aim alumni have generally performed poorly since transferring.

Aim's two decades of underperformance are variously blamed on its high weighting of resources stocks (currently around one-third of companies listed), a high level of IPOs from 'unseasoned' companies, and a tendency towards fads. Aim's lower cost of listing often results in several small opportunist companies chasing the same market trend – and not all of them will survive. Investors bold enough to buy shares in oil explorers, biotech or tech companies will often pick a 'basket' of stocks, but this is clearly a high-risk investment strategy.

Crowdfunding

Crowdfunding is an increasingly popular method of raising finance for small businesses. It involves connecting a business directly to a large pool of potential investors (the crowd) through an internet-based platform. Crowdfunding can be used to raise both equity and debt. In the latter case, it is provided through various methods such as peer-to-peer lending, mini-bonds and invoice financing.

Businesses wishing to raise equity finance by crowdfunding will make a pitch through an internet platform. Before doing so, however, they must demonstrate that they represent a viable investment. The platform provider will, therefore, carry out due diligence on each applicant, which normally leads to a high rejection rate. Businesses that are admitted to the platform will receive the funds raised from investors when the target amount is reached. If the target is not reached, the money is returned to investors.

In most cases, the money required by businesses is for seed capital and so this form of financing offers an alternative to business angels. Individual investors can usually invest small amounts (from as little as £10) and are charged a success fee based on profits arising from their equity investment. One drawback for investors is that they hold an illiquid investment as there is no secondary market for the shares acquired.

Activity 7.22

Can you think how the equity investment of investors may eventually be liquidated?

The most likely opportunities are where a business is eventually floated on the stock exchange, or where it is acquired by another business.

Crowdfunding is an innovative and rapidly evolving form of alternative finance. It is also a disruptive force as it bypasses traditional financial institutions. However, financial institutions are adapting to this new world by investing through crowdfunding platforms, particularly with respect to debt financing. The UK is at the forefront of the crowdfunding market in Europe. It boasts sophisticated trading platforms as well as a regulatory framework. This latter feature, however, poses problems for regulators. They must somehow strike the right balance between investor protection and allowing this new form of financing to develop.

Crowdfunding offers the prospect of high rewards for equity investors but investing seed capital is always risky. High failure rates among fledgling businesses are the norm. Unfortunately, crowdfunding attracts many unsophisticated investors who may not fully appreciate the risks involved. Furthermore, the opportunities on offer do not always provide

sufficient transparency or high-quality information. This increases the difficulties of making informed judgements.

Evidence on small business financing

The original owners of smaller businesses provide the vast majority of equity finance. External providers tend to provide finance through borrowing. There is a dearth of published information, however, on the extent to which external providers finance small businesses. Instead, most survey information focuses on the types of external finance used by owners of small businesses. **Real World 7.15** below reveals the main sources of non-equity finance that are being employed.

Small business funding

A recent survey found that around 37 per cent of small UK businesses were currently using an external source of finance. (As mentioned earlier, around half of small business owners are permanent not-borrowers.) The various types of finance being used are set out in Figure 7.9.
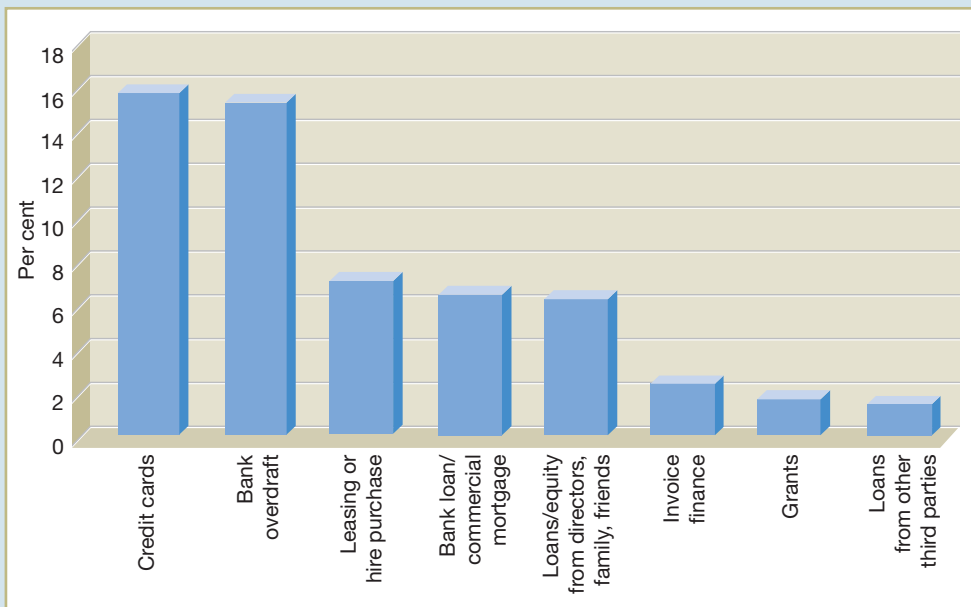
Figure 7.9 External financing of small businesses (2017/18)

Source: British Business Bank (2018) 'Small business finance markets (February)', Figure B.16, p. 25.

We can see that the bulk of finance is provided by financing institutions (banks and credit card businesses). However, loans from family and friends also play a significant role along with leasing and HP finance. It is striking that a fairly large proportion of the funding came from the use of credit cards (17 per cent). This type of finance might be used for working capital purposes, with the outstanding balance being cleared before interest becomes payable.

Self-assessment question 7.1

Ceres plc is a large conglomerate which, following a recent strategic review, has decided to sell its agricultural foodstuffs division. The managers of this operating division believe that it could be run as a separate business and are considering a management buyout. The division has made an operating profit of £10 million for the year to 31 May Year 6 and the board of Ceres plc has indicated that it would be prepared to sell the division to the managers for a price based on a multiple of 12 times the operating profit for the most recent year.

The managers of the operating division have £5 million of the finance necessary to acquire the division and have approached Vesta Ltd, a private-equity firm, to see whether it would be prepared to assist in financing the proposed management buyout. The divisional managers have produced the following forecast of operating profits for the next four years:

Year to 31 May	Year 7	Year 8	Year 9	Year 10
	£m	£m	£m	£m
Operating profit	10.0	11.0	10.5	13.5

To achieve the profit forecasts shown above, the division will have to invest a further £1 million in working capital during the year to 31 May Year 8. The division has premises costing £40 million and plant and machinery costing £20 million. In calculating operating profit for the division, these assets are depreciated, using the straight-line method, at the rate of 2.5 per cent on cost and 15 per cent on cost, respectively.

Vesta Ltd has been asked to invest £45 million in return for 90 per cent of the ordinary shares in a new business specifically created to run the operating division. The divisional managers would receive the remaining 10 per cent of the ordinary shares in return for their £5 million investment. The managers believe that a bank would be prepared to provide a 10 per cent loan for any additional finance necessary to acquire the division. (The properties of the division are currently valued at £80 million and so there would be adequate security for a loan up to this amount.) All net cash flows generated by the new business during each financial year will be applied to reducing the balance of the loan and no dividends will be paid to shareholders until the loan is repaid. (There are no other cash flows apart from those mentioned above.) The loan agreement will be for a period of eight years. However, if the business is sold during this period, the loan must be repaid in full by the shareholders.

Vesta Ltd intends to realise its investment after four years when the non-current assets and working capital (excluding the bank loan) of the business are expected to be sold to a rival at a price based on a multiple of 12 times the most recent annual operating profit. Out of these proceeds, the bank loan will have to be repaid by existing shareholders before they receive their returns. Vesta Ltd has a cost of capital of 25 per cent and employs the internal rate of return method to evaluate investment proposals.

Ignore taxation. Workings should be in £ millions and should be made to one decimal place.

Required:

(a) Calculate:
  (i)   the amount of the loan outstanding at 31 May Year 10 immediately prior to the sale of the business
  (ii) the approximate internal rate of return for Vesta Ltd of the investment proposal described above.

(b) State, with reasons, whether or not Vesta Ltd should invest in this proposal.

The solution to this question can be found at the back of the book on p. 642.

SUMMARY

The main points of this chapter may be summarised as follows:

The stock exchange

- It provides a primary and secondary market in capital for large businesses.
- Obtaining a Stock Exchange listing can help a business to raise finance and help to raise its profile, but obtaining a listing can be costly and the regulatory burden can be onerous.

Capital market efficiency

- A stock market is efficient if information is processed by investors quickly and accurately so that prices faithfully reflect all relevant information.
- Three forms of efficiency have been suggested: the weak form, the semi-strong form and the strong form.
- If a stock market is efficient, managers of a listed business should learn six important lessons:
    - Timing doesn't matter.
    - Don't search for undervalued businesses.
    - Take note of market reaction.
    - You can't fool the market.
    - The market decides the level of risk.
    - Champion the interests of shareholders.
- Stock market anomalies and behavioural research provide a challenge to the notion of market efficiency.

Share issues

- Share issues that involve the payment of cash by investors include rights issues, public issues, offers for sale and placings.
- A rights issue is made to existing shareholders. The law requires that shares to be issued for cash must first be offered to existing shareholders.
- A public issue involves a direct issue to the public and an offer for sale involves an indirect issue to the public.
- A placing is an issue of shares to selected investors.
- A bonus (scrip) issue involves issuing shares to existing shareholders. No payment is required as the issue is achieved by transferring a sum from reserves to the share capital.
- A tender issue allows investors to determine the price at which the shares are issued.

Smaller businesses

- Do not have access to the Stock Exchange main market and so must look elsewhere for funds.
- Private equity (venture capital) is long-term capital for small or medium-sized businesses not listed on the Stock Exchange. These businesses often have high levels of risk but provide the private-equity firm with the prospect of high levels of return.
- Private-equity firms are interested in businesses with good growth prospects and offer finance for start-ups, business expansions and buyouts.

- The investment period is usually five years or more and the private-equity firms may exit by a trade sale, flotation, buyback or sale to another financial institution.

- Business angels are often wealthy individuals who are willing to invest in businesses at an early stage of development.

- They can usually make quick decisions and will often become actively involved in the business.

- Various business angel networks exist to help small business owners find an angel.

- The UK government assists small businesses through a variety of measures such as guaranteeing or providing loans, providing grants and tax incentives.

- The Alternative Investment Market (AIM) specialises in the shares of smaller businesses.

- AIM is a second-tier market of the Stock Exchange, which offers many of the benefits of a main market listing without the same cost or regulatory burden.

- AIM has proved popular with investors but could benefit from greater market liquidity and a more balanced portfolio of listed businesses.

- Crowdfunding involves connecting a business directly to a large pool of potential investors. Businesses wishing to raise equity or debt in this way use an internet platform to make their pitch.

KEY TERMS

Stock Exchange p. 306
FTSE (Footsie) indices p. 308
Market capitalisation p. 308
Efficient stock market p. 311
Behavioural finance p. 319
Rights issue p. 322
Bonus issue (scrip issue) p. 325
Offer for sale p. 327
Public issue p. 327

Tender issue p. 327
Placing p. 329
Private equity p. 332
Venture capital p. 332
Business angels p. 337
Due diligence p. 339
Alternative Investment Market (AIM) p. 340
Crowdfunding p. 343

For definitions of these terms, see the Glossary, pp. 685–94.

REFERENCES

1 Gregory, A., Guermat, C. and Al-Shawawreh, F. (2009) *UK IPOs: Long Run Returns, Behavioural Timing and Pseudo Timing*. Discussion paper No 08/06, Xfi – Centre for Finance and Investment, University of Exeter, September.

2 Mondaq (2015) 'UK: Obtaining a premium or standard listing of the London Stock Exchange', www.mondaq.com/uk, 15 April.

3 London Stock Exchange, Main Market Statistics, December 2017, Table 3.

4 Institute of Chartered Accountants in England and Wales (2000) *SME Finance and Regulation*, ICA.

5 British Business Bank (2018) *Small Business Finance Markets Report 2017/18*, British Business Bank, p. 25.

6 Department for Business, Energy and Industrial Strategy (2018) *Small Business Survey* (May).

7 Norton, E. (1995) 'Venture capital as an alternative means to allocate capital: an agency-theoretic view', *Entrepreneurship*, Winter, pp. 19–30.

8 UK Business Angels Association (2019) 'About UKBAA', www.ukbaa.org.uk/about/ (accessed 1 February 2019).

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 9, 10 and 13.

Madura, J. (2017) *Financial Markets and Institutions*, 12th edn, South-Western College Publishers, Chapters 10 and 11.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 2 and 16.

Shefrin, H. (2017) *Behavioral Corporate Finance*, McGraw-Hill Education, Chapters 2, 3 and 5.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 653–54.

7.1 UK private-equity firms have been criticised for the low level of funding invested in business start-ups by comparison with the levels invested by their US counterparts. Can you think of possible reasons why such a difference may exist?

7.2 Explain the role that investment analysts and investors play in creating an efficient stock market. Can you see a paradox in their behaviour?

7.3 The board of directors of Beton Ltd are considering the use of private equity finance to help fund the next stage of development. What should the board take into consideration before going down this route?

7.4 What kind of attributes should the owners and managers of a business possess to attract private equity finance?

EXERCISES

Exercises 7.5 to 7.7 are more advanced than 7.1 to 7.4. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

7.1 Comment on each of the following statements.

(a) A stock market that is efficient in the strong form is one in which investors cannot make any gains from their investment.

(b) Private-equity firms are not interested in investing in business start-ups.

(c) Short-term behaviour by investors is difficult to reconcile with the notion of stock market efficiency.

7.2 Consider each of the following.

1 An investor expects to make abnormal gains on her stock market investments by analysing published annual reports, relevant newspaper articles, industry reports and published share prices.

2 Dorsal plc, a business listed on the London Stock Exchange, received a confidential letter from a rival business on 30 July 2019 offering to buy all its shares at a premium of

20 per cent on their current market value. At a private meeting, convened on the same day, the directors of Dorsal plc agreed to accept the offer and made a public announcement of this decision on 3 August 2019.

3 Juniper plc is an airport operator that is listed on the London Stock Exchange. Recently, the board of directors agreed to change the business's depreciation policy concerning airport runways. In future, these assets will be written off over 100 years rather than 50 years. This change, which will reduce the annual depreciation charge over the next 50 years, is solely designed to increase reported profits over that period and thereby create a better impression to investors of business performance.

Required:

(a) What is the maximum level of market efficiency that the investor is assuming in (1) above? Briefly explain your answer.

(b) What would be the share price reaction to the announcement in (2) above under the strong form of market efficiency and why?

(c) What is the maximum level of market efficiency that the board of directors is assuming in (3) above that is consistent with such behaviour? Briefly explain your answer.

7.3 Provide *two* reasons why:

(a) Tax incentives may have only limited value in stimulating greater investment by business angels.

(b) Business angels can be an attractive source of finance to entrepreneurs.

(c) Business angels may find it difficult being part of an angel syndicate in order to finance a business.

7.4 Pizza Shack plc operates a chain of pizza restaurants. The business started operations five years ago and has enjoyed uninterrupted and rapid growth. The directors, however, believe that future growth can be achieved only if the business seeks a listing on the London Stock Exchange. If the directors go ahead with a listing, the financial advisers to the business have suggested that an issue of ordinary shares by tender at a minimum price of £2.20 would be an appropriate method of floating the business. The advisers have suggested that 3 million ordinary shares should be issued in the first instance, although the directors of the business are keen to raise the maximum amount of funds possible.

Initial research carried out by the financial advisers suggests that the following demand for shares at different market prices is likely:

Share price	Number of shares tendered at each share price
£	000s
3.60	850
3.20	1,190
2.80	1,380
2.40	1,490
2.00	1,540
1.60	1,560
	8,010

Required:

(a) Discuss the advantages and disadvantages of making a tender issue of shares.

(b) Calculate the expected proceeds from the tender issue, assuming the business:
  (i)   issues 3 million shares
  (ii) wishes to raise the maximum amount of funds possible.

7.5 Thermia Ltd is a family-owned business that produces packaged foods for supermarkets. The family has recently lost interest in the business and has indicated a willingness to sell. The senior managers of the business have decided to make an offer to the family to buy the business and have approached a private equity firm to help raise the finance required. If the purchase offer is accepted, the purchase will take place on 1 December Year 12.

Operating profits for the year to 30 November Year 12 were £15.0m and these are expected to grow steadily over the next four years. The strategic plan for the business shows forecast future profits as follows:

Year to 30 November	Year 13	Year 14	Year 15	Year 16
	£m	£m	£m	£m
Forecast operating profit	16.0	17.4	18.5	19.0

The strategic plan also shows that, to achieve the forecast profits, additional investment in plant and equipment of £8.0m will be required during the year to 30 November Year 15. Depreciation is charged on plant and equipment at the rate of 20 per cent per year on cost for all items held at the year end. Total depreciation charges for non-current assets are currently £4.0m per year. These are included before arriving at the forecast operating profits above. No disposal of non-current assets is planned over the next four years.

The family is prepared to sell all the shares in the business for a multiple of 11 times the current operating profit. To finance the purchase of the shares, the senior managers will provide £10.0m from their own resources and will expect the private equity firm to provide a further £40.0m. A bank will be approached to provide a loan to make up the balance of funds required and this is expected to attract a rate of interest of 8 per cent per year.

All the net cash flows generated by the business will be applied each year to paying off the loan and no dividends or other cash payments to investors will be made until the loan is fully repaid.

The private equity firm will acquire 80 per cent of the shares of the business in exchange for the investment made, which will be realised at the end of four years. At that point, the net assets (excluding the loan) are expected to be sold for 10 times the most recent operating profit. The proceeds from the sale will be used to pay off any remaining loan and the balance will then be distributed to the senior managers and the private equity firm.

The private equity firm has a cost of capital of 25 per cent for this type of investment and uses the internal rate of return to evaluate possible investment opportunities.

Ignore taxation. Workings should be in £ millions and made to one decimal point.

Required:
(a) Calculate:
  (i)   the loan outstanding as at 30 November Year 16, immediately before the sale of the business
  (ii) the approximate internal rate of return that the private equity firm is expected to receive from the investment made.
(b) State, with reasons, whether the private equity firm should undertake the investment.

7.6 Devonian plc has the following long-term capital structure as at 30 November Year 4:

	£m
Ordinary shares 25p fully paid	50.0
General reserve	22.5
Retained earnings	25.5
	98.0

The business has no long-term loans.

In the year to 30 November Year 4, the operating profit (profit before interest and taxation) was £40 million and it is expected that this will increase by 25 per cent during the forthcoming year. The business is listed on the London Stock Exchange and the share price as at 30 November Year 4 was £2.10.

The business wishes to raise £72 million in order to re-equip one of its factories and is considering two possible financing options. The first option is to make a one-for-five rights issue at a discount price of £1.80 per share. The second option is to take out a long-term loan at an interest rate of 10 per cent a year. If the first option is taken, it is expected that the price/earnings (P/E) ratio will remain the same for the forthcoming year. If the second option is taken, it is estimated that the P/E ratio will fall by 10 per cent by the end of the forthcoming year.

Assume a tax rate of 30 per cent.

Required:
(a) Assuming a rights issue of shares is made, calculate:
    (i)   the theoretical ex-rights price of an ordinary share in Devonian plc
    (ii) the value of the rights for each original ordinary share.
(b) Calculate the price of an ordinary share in Devonian plc in one year's time assuming:
    (i)   a rights issue is made
    (ii) a loan issue is made.
    Comment on your findings.
(c) Explain why rights issues are usually made at a discount.
(d) From the business's viewpoint, how critical is the pricing of a rights issue likely to be?

7.7 Carpets Direct plc wishes to increase the number of its retail outlets. The board of directors has decided to finance this expansion programme by raising the funds from existing shareholders through a one-for-four rights issue. The most recent income statement of the business is as follows:

Income statement for the year ended 30 April

	£m
Sales revenue	164.5
Operating profit	12.6
Interest	(6.2)
Profit before taxation	6.4
Tax	(1.9)
Profit for the year	4.5

An ordinary dividend of £2.0 million was proposed and paid during the year.

The share capital of the business consists of 120 million ordinary shares with a nominal value of £0.50 per share. The shares of the business are currently being traded on the Stock Exchange at a price/earnings ratio of 22 times and the board of directors has decided to issue the new shares at a discount of 20 per cent on the current market value.

Required:
(a) Calculate the theoretical ex-rights price of an ordinary share in Carpets Direct plc.
(b) Calculate the price at which the rights in Carpets Direct plc are likely to be traded.
(c) Identify and evaluate, at the time of the rights issue, each of the options arising from the rights issue to an investor who holds 4,000 ordinary shares before the rights announcement.

Chapter 8

THE COST OF CAPITAL AND THE CAPITAL STRUCTURE DECISION

INTRODUCTION

We saw in Chapter 4 that the cost of capital has a vital role to play when using the NPV and IRR methods of investment appraisal. In this chapter, we examine how the cost of capital may be calculated. We first consider how the cost of each element of long-term capital is calculated and then how these costs can be combined so as to derive an overall cost of capital.

We continue the chapter by considering whether there is an optimal capital structure for a business. This is an important topic, which has generated much debate. We shall discuss the two main schools of thought concerning this topic and explore the limitations of each.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Calculate the cost of each element of long-term capital employed by a business.

■ Calculate the weighted average cost of capital for a business and assess its usefulness when making investment decisions.

■ Discuss the key points in the debate as to whether a business has an optimal capital structure.

■ Explain the trade-off theory of capital structure and discuss its limitations.

COST OF CAPITAL

We saw in Chapter 4 that the *cost of capital* is used as the discount rate in NPV calculations and as the 'hurdle rate' when assessing IRR calculations. As investment projects are usually financed from long-term capital, the discount rate (or hurdle rate) applied to new projects should reflect the required returns from investors in long-term capital. From the business's viewpoint, these returns represent its cost of capital. It represents an *opportunity* cost as it will reflect the returns that investors require from investments of similar risk.

The cost of capital must be calculated with care as failure to do so could be damaging.

Activity 8.1

What adverse consequences might result from incorrectly calculating the cost of capital?

Where the NPV approach is used, an incorrect discount rate will be applied to the net cash flows of investment projects. If the cost of capital is understated, there is a risk that projects that reduce shareholder wealth will be accepted. This can occur when applying the understated cost of capital produces a positive NPV, whereas applying the correct cost of capital produces a negative NPV. If the cost of capital figure is overstated, projects that increase shareholder wealth may be rejected. This can occur when applying the overstated cost of capital produces a negative NPV, whereas applying the correct cost of capital produces a positive NPV.

Similar problems can occur with the IRR method where the cost of capital is used as the hurdle rate.

In Chapter 6, we saw that the main forms of *external* long-term capital for businesses include:

- ordinary shares
- preference shares
- loan capital.

In addition, an important form of *internal* long-term capital is:

- retained earnings.

In the sections that follow, we shall see how the cost of each element of long-term capital may be deduced. We shall also see that there is a strong link between the cost of each element and its value: both are determined by the level of return. As a result, our discussions concerning the cost of capital will also embrace the issue of value. For reasons that should soon become clear, we first consider how each element of capital is valued and then go on to deduce its cost to the business.

Ordinary (equity) shares

There are two major approaches to determining the cost of ordinary shares to a business: the dividend-based approach and the risk/return-based approach. Each approach is examined below.

Dividend-based approach

Investors hold assets (including ordinary shares) in the expectation of receiving future benefits. Broadly speaking, the value of an asset can be defined in terms of the stream of future benefits that arises from holding the asset. When considering ordinary shares, the value of an ordinary

share will be the future dividends that the investor expects to receive. To be more precise, the value of an ordinary share will be the present value of the expected future dividends that it generates.

In mathematical terms, the value of an ordinary share (P_0) can be expressed as follows:

$$P_0 = \frac{D_1}{(1 + K_0)} + \frac{D_2}{(1 + K_0)^2} + \frac{D_3}{(1 + K_0)^3} + \cdots + \frac{D_n}{(1 + K_0)^n}$$

where P_0 = the current market value of the share

D = the expected future dividend in years 1 to n

n = the number of years over which the business expects to issue dividends

K_0 = the cost of ordinary shares to the business (that is, the required return for investors).

Activity 8.2

The valuation approach above takes into account the expected dividend stream over the whole life of the business. Is this relevant for an investor who holds a share for a particular period of time (say five years) and then sells the share?

The valuation approach described is still relevant. The market value of the share at the time of sale should reflect the present value of the (remaining) future dividends. Thus, when determining an appropriate selling price, the expected dividend stream beyond the point at which the share is held should be highly relevant to the investor.

The valuation model above can be used to determine the *cost* of ordinary shares to the business (K_0). Assuming the value of an ordinary share and the expected future dividends are known, the cost of an ordinary share will be the discount rate that, when applied to the stream of expected future dividends, will produce a present value that is equal to the current market value of the share. Thus, the required rate of return for ordinary share investors (that is, the cost of ordinary shares to the business) is similar to the internal rate of return (IRR) used to evaluate investment projects.

To deduce the required rate of return for investors, we can use the same trial and error approach as that used to deduce the internal rate of return for investment projects. In practice, however, this trial and error approach is rarely used. Instead, as simplifying assumptions are normally employed concerning the pattern of dividends, which make the calculations easier. These simplifying assumptions help us avoid some of the problems associated with predicting the future dividend stream from an ordinary share.

One of two simplifying assumptions concerning the pattern of future dividends will often be employed. The first assumption is that dividends will remain constant over time. Where dividends are expected to remain constant for an infinite period, the fairly complicated equation to deduce the current market value of a share stated above can be reduced to:

$$P_0 = \frac{D_1}{K_0}$$

where D_1 = the annual dividend per share in year 1 (which, assuming a constant dividend, will also be the annual dividend in perpetuity).

This equation (which is the equation for capitalising a perpetual annuity) can be re-arranged to provide an equation for deducing the *cost* of ordinary shares to the business. Hence:

$$K_0 = \frac{D_1}{P_0}$$

Activity 8.3

Kowloon Investments plc has ordinary shares in issue with a current market value of £2.20. The annual dividend per share in future years is expected to be 40p. What is the cost of the ordinary shares to the business?

The cost will be:

$$K_0 = \frac{D_1}{P_0} = \frac{£0.40}{£2.20}$$

$$= 0.182 \text{ or } 18.2\%$$

The second simplifying assumption that may be employed is that dividends will grow at a constant rate over time. Where dividends are expected to have a constant growth rate, the equation to deduce the current market value of a share can be reduced to:

$$P_0 = \frac{D_1}{K_0 - g}$$

where g is the expected annual growth rate. (The model assumes K_0 is greater than g. If it is the other way around, the model can produce negative values.)

This equation can also be rearranged to provide an equation for calculating the *cost* of ordinary share capital. Hence:

$$K_0 = \frac{D_1}{P_0} + g$$

This is sometimes referred to as *Gordon's growth model* after the person credited with developing it.

Activity 8.4

Avalon plc has ordinary shares in issue that have a current market price of £1.50. The dividend expected for next year is 20p per share and future dividends are expected to grow at a constant rate of 3 per cent a year.
   What is the cost of the ordinary shares to the business?

The cost is:

$$K_0 = \frac{D_1}{P_0} + g$$

$$= \frac{0.20}{1.50} + 0.03$$

$$= 0.163 \text{ or } 16.3\%$$

Determining the future growth rate in dividends (g) can pose difficulties. It is important, nevertheless, to establish an appropriate growth rate as the cost of equity calculated will be sensitive to the rate chosen. Future growth rates are often based on average historical rates of growth in dividends. It may be unsafe, however, to assume that future dividend payouts will follow historical trends. Dividends can change significantly over time.

Where an average historical growth rate is to be used, it can be derived through a few simple calculations. Example 8.1 illustrates the steps in the process.

Example 8.1

Portby Potassium plc began issuing a dividend at the end of the first year of trading. The first dividend paid was 10 pence per share. Dividends grew steadily each year and, by the end of the fifth year of trading, the dividend per share had risen to 16 pence.

Calculate the average annual dividend growth rate for the period.

Solution

The starting point is to divide the dividend per share at the end of the period by the dividend per share at the beginning of the period (that is, the dividend for Year 5 and the dividend for Year 1). Thus,

$$16p/10p = 1.6$$

The next step is to take the Nth root of this figure (where N = number of years of the dividend period). In this case, $N = 5$. Thus:

$$\sqrt[5]{1.6} = 1.1 \text{ (approx.)}$$

The final step is to subtract 1 from the figure derived and to multiply the answer by 100 per cent. This will give us the average annual dividend growth rate in percentage terms. Thus:

$$(1.1 - 1) \times 100\% = 10\%$$

Share value and the cost of equity

Having read this section, it should now be clear why we began by looking at how a share is valued before going on to deduce its cost. We have seen how the value of an ordinary share to an investor and the cost of capital for the business are linked and how valuation models can help in deriving the required returns from investors. This relationship between value and the cost of capital also applies to preference shares and to loan capital, as we shall see in later sections.

Limitations of the dividend growth model

While the dividend growth model is easy to understand, it suffers from a number of weaknesses. Firstly, it assumes a constant growth rate in dividends. This is an unrealistic assumption that limits its real world application. No dividend policy will conform precisely to this assumption. Nevertheless, the model may still be usefully applied to 'steady state' businesses, such as mature businesses with well-established dividend policies.

Second, the dividend growth model cannot be used where a business does not make dividend payments. Thus it cannot be applied, for example, to growth-oriented businesses that retain their earnings.

Finally, there is no explicit consideration of risk of the underlying investment. The higher the risk associated with the investment, the higher should be the cost of equity. We should, therefore, expect a high risk investment to attract a high growth rate in dividends. This failure to take account of risk undermines comparisons between estimated returns from the investment and the cost of equity.

Risk/return-based approach

An alternative approach to deducing the returns required by ordinary shareholders is to use the **capital asset pricing model (CAPM)**. This approach builds on the ideas that we discussed in Chapter 5.

We may recall that, when discussing the attitude of investors towards risk and the risk-adjusted discount rate, the following points were made:

- Investors who are risk-averse will seek additional returns to compensate for the risks associated with a particular investment. These additional returns are referred to as the risk premium.
- The higher the level of risk, the higher the risk premium that will be demanded.
- The risk premium is an amount required by investors that is over and above the returns from investing in risk-free investments.
- The total returns required from a particular investment will therefore be made up of a risk-free rate plus any risk premium.

Figure 8.1 illustrates the relationship between risk and return.

The figure shows how the risk premium rises with the level of risk and so the total required returns will rise as the level of risk increases.
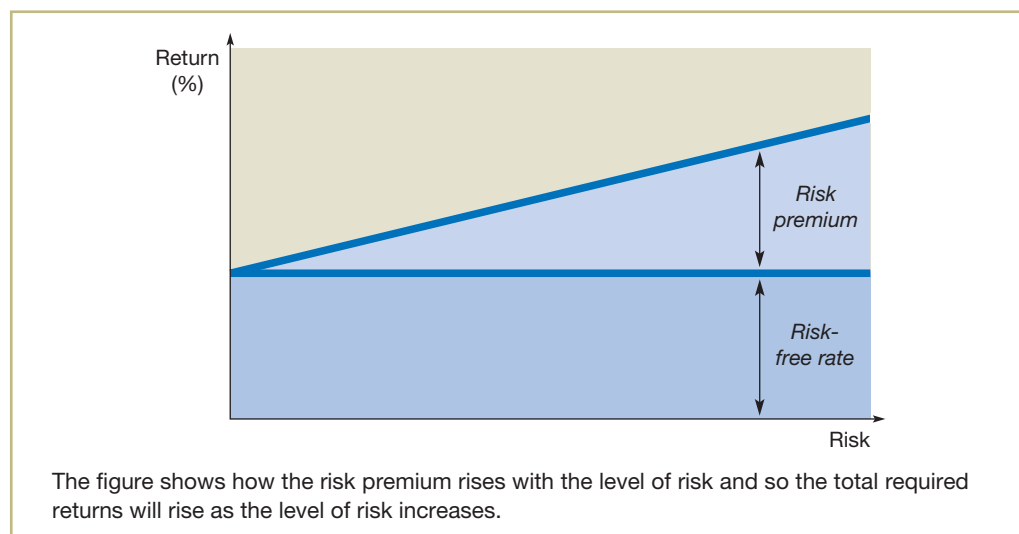
Figure 8.1 The relationship between risk and return

Although the above ideas were discussed in respect of investment projects undertaken by a business, they are equally valid when considering investments in ordinary shares. CAPM (pronounced 'cap-M') is based on the above ideas. The required rate of return to ordinary share investors (and, therefore, the cost of ordinary shares to the business) is viewed as being:

Required return = Risk−free rate + Risk Premium

This means that to calculate the required return, we have to derive the risk-free rate of return and the risk premium associated with a particular share.

The risk-free rate is a purely theoretical construct as all investments involve some element of risk. Some approximation must therefore be used, which normally takes the form of government bonds.

Activity 8.5

Can you think why returns from government bonds can be used as an approximation for the risk-free rate?

Although not totally risk free, they offer the most secure return available. The probability of a government defaulting on its obligations is usually very low. The UK government, for example, has never defaulted on its debt obligations even during periods of great economic stress.

There is some debate as to whether short-term or long-term bonds should be used as the risk-free rate. The advantages of short-term bonds are that there is less risk of default and they are less likely to be affected by inflation and interest rate changes. Nevertheless, a survey of 272 finance professionals, predominantly based in Western Europe, revealed that, typically, rates for longer-term government bonds are used (see reference 1 at the end of the chapter).

To derive the risk premium for a particular share, CAPM adopts the following three-stage process:

1 Measure the risk premium for the stock market as a whole. This figure will be the difference between the returns from the stock market and the returns from risk-free investments.
2 Measure the returns from a particular share relative to the returns from the stock market as a whole.
3 Apply this relative measure of returns to the stock market risk premium (calculated in stage 1) to derive the risk premium for the particular share.

The second and third stages of the process require further explanation.

We saw in Chapter 5 that total risk is made up of two elements: *diversifiable* and *non-diversifiable* risk.

Activity 8.6

Can you recall the difference between the two types of risk?

Diversifiable risk is that part of the risk that is specific to the investment project and which can be eliminated by spreading available funds among investment projects. Non-diversifiable risk is that part of total risk that is common to all projects and which therefore cannot be diversified away. It arises from general market conditions and can be avoided only by making risk-free investments.

This distinction between diversifiable and non-diversifiable risk is also relevant to investors. By holding a well-balanced portfolio of shares, an investor can eliminate diversifiable risk relating to a particular share, but not necessarily common to other shares, leaving only non-diversifiable risk, which is common to all shares. This is because, with a well-balanced portfolio, gains and losses arising from the diversifiable risk of different shares will tend to cancel each other out.

We know that risk-averse investors will be prepared to take on increased risk only if there is the expectation of increased returns. However, as diversifiable risk can be eliminated through holding a well-balanced portfolio, there is no reason why investors should receive additional returns for taking on this form of risk. It is, therefore, only the non-diversifiable risk element of total risk for which investors should expect additional returns.

The non-diversifiable risk element can be measured using **beta**. This measures the non-diversifiable risk of a particular share to the market as a whole. The higher the share's non-diversifiable risk relative to the market, the higher will be its beta value. A key feature of CAPM is that there is a linear relationship between risk and return. Thus, beta can also be seen as a measure of the responsiveness of returns from an individual share relative to the market as a whole. The higher the share's return relative to the market, the higher will be its beta value. Hence, a share that produces increased returns of 12 per cent when the market increases by 6 per cent will have a higher beta value than a share that produces increased returns of only 4 per cent in response to a 6 per cent market increase.

The CAPM equation

Using the above ideas, the required rate of return for investors for a particular share can be calculated as follows:

$$K_0 = K_{RF} + b(K_m - K_{RF})$$

where K_0 = the required return for investors for a particular share
     K_{RF} = the risk-free rate
     b = beta of the particular share
     K_m = the expected returns to the market for the next period
     $K_m - K_{RF}$ = the expected market average risk premium for the next period.

This equation reflects the idea that the required return for a particular share is made up of two elements: the risk-free return plus a risk premium. We can see that the risk premium is equal to the expected risk premium for the market as a whole multiplied by the beta of the particular share. As explained earlier, beta measures are, in essence, a measure of responsiveness of changes in a particular share to changes in the market as a whole.

CAPM is a forward-looking model; however, information concerning the future is not available. This means that the expected risk premium for the market is derived by reference to past periods, on the assumption that they provide a good predictor of future periods. The CAPM equation shows that the expected risk premium can be deduced by subtracting the risk-free rate from the average returns to the market. Historical average market returns are usually calculated for a relatively long period, as returns can fluctuate wildly over the short term. (Note that the returns to a share are made up of dividends plus any increase, or less any decrease, in the share price during a period.)

Real World 8.1 sets out the equity market risk premium for UK businesses over different time periods.

Putting a premium on equities

Figure 8.2 is based on a figure from *Credit Suisse Global Investment Returns Yearbook 2019.* It shows the equity risk premium for UK listed businesses calculated by using returns from very short-term government securities (bills) as well as returns from long-term government securities (bonds). Both forms of government security may be used as a proxy for the risk-free rate of return. Annualised equity premia based on both are calculated for the periods 1969–2018 and 1900–2018. We can see that since 1969 the annualised equity risk premium (EP) relative to bills has been 3.8 per cent and since 1900 it has been 4.3 per cent.

Note: EP bonds = Equity premium relative to bonds; EP bills = Equity premium relative to bills; Mat Prem = Maturity premium of bond returns relative to bill returns; RealXRate = Inflation-adjusted change in the exchange rate against the US dollar.
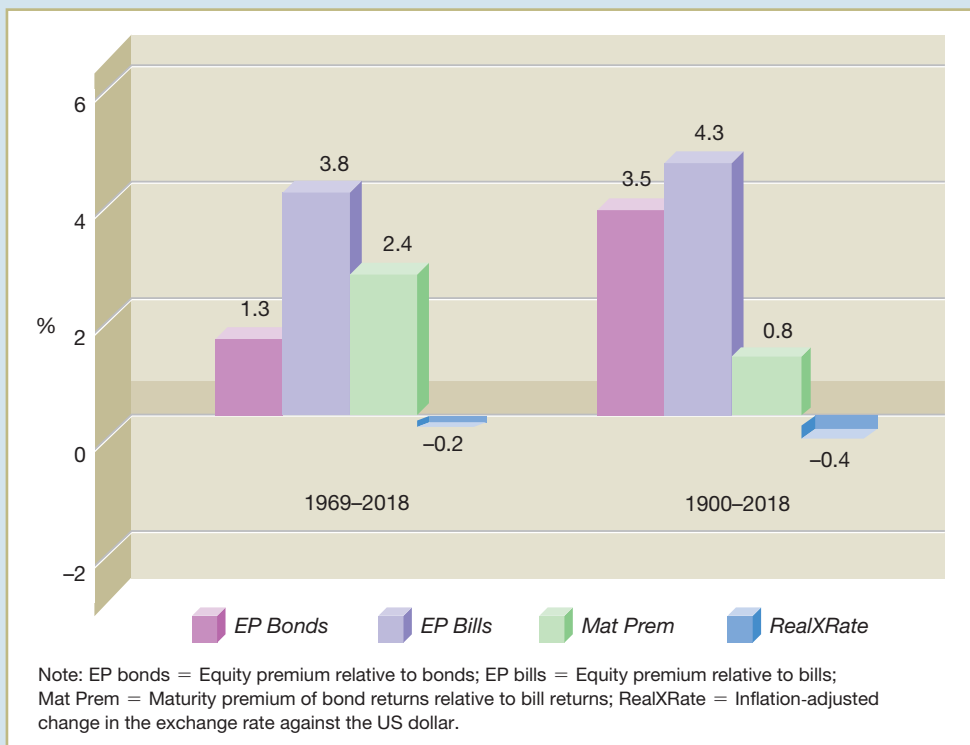
Figure 8.2 Annualised equity, bond, and currency premia (%)

Source: Elroy Dimson, Paul Marsh, Mike Staunton, Credit Suisse Global Investment Returns Year book 2019: Summary Edition, Credit Suisse Research Institute, Figure 23, p. 35.

The beta value for the market as a whole is set at 1.0. This provides a yardstick against which the risk premium of individual shares can be compared. Thus, where a share has the same expected risk premium as the market as a whole, it will have a beta value of 1.0. Where

a share has an expected risk premium of half the expected market risk premium, it will have a beta of 0.5, and where a share has an expected risk premium that is twice the expected market risk premium, it will have a beta of 2.0. (Given a linear relationship between risk and return, it also means that a share with a beta of 2.0 has twice the expected return than the market as a whole.)

Activity 8.7

Would it be better to hold shares with a beta value of more than 1.0 or less than 1.0 when stock market prices are generally:

(a) rising
(b) falling?

When stock market prices are rising, it is better to hold shares with a beta value of more than 1.0. Their returns are more responsive to market price changes and so when stock market prices are rising, their returns will be greater than for the market as a whole. As shares with a beta value of less than 1.0 are less responsive to market price changes, they will not benefit so much from a rise in market prices. When stock market prices are falling, however, the position is reversed. It is better to hold shares with a beta value of less than 1.0 as their returns are less responsive to falls in market prices.

Shares with a beta value of more than 1.0 are often referred to as *aggressive shares,* whereas shares with a beta value of less than 1.0 are referred to as *defensive shares.* Shares with a beta of 1.0 are referred to as *neutral shares.* Bear in mind that while the points made in the solution to Activity 8.7 are generally true, factors specific to a particular business may cause its shares to move in a different manner.

Many shares have a beta that is fairly close to the market beta of 1.0, with most falling within the range 0.5 to 2.0. The beta value for a share is largely determined by the nature of the industry in which the particular business operates. Beta values can change over time, particularly where the business changes the nature of its operating activities.

Measuring betas

Betas can be measured using regression analysis on past data, on the assumption that past periods provide a good predictor of future periods. The monthly returns from a particular share (that is, dividends plus any increase, or less any decrease, in share price) for a period are regressed against the returns from the market as a whole. A Stock Exchange index, such as the FTSE 100 or FTSE Actuaries All Share Index, is normally used as a proxy measure for returns from the market over time.

To illustrate this approach, let us assume that the monthly returns from a particular share and the returns to the market are plotted on a graph, as shown in Figure 8.3. A line of best fit can then be drawn, using regression analysis. Note the slope of this line (and the blue dotted lines to illustrate that slope). We can see that, for this particular share, the returns do not change as much as the returns for the market as a whole. In other words, the beta is less than 1.

The figure shows the relationship between the returns from an individual share and the movements for the market. A linear relationship is assumed and linear regression analysis is used to establish a line of best fit.
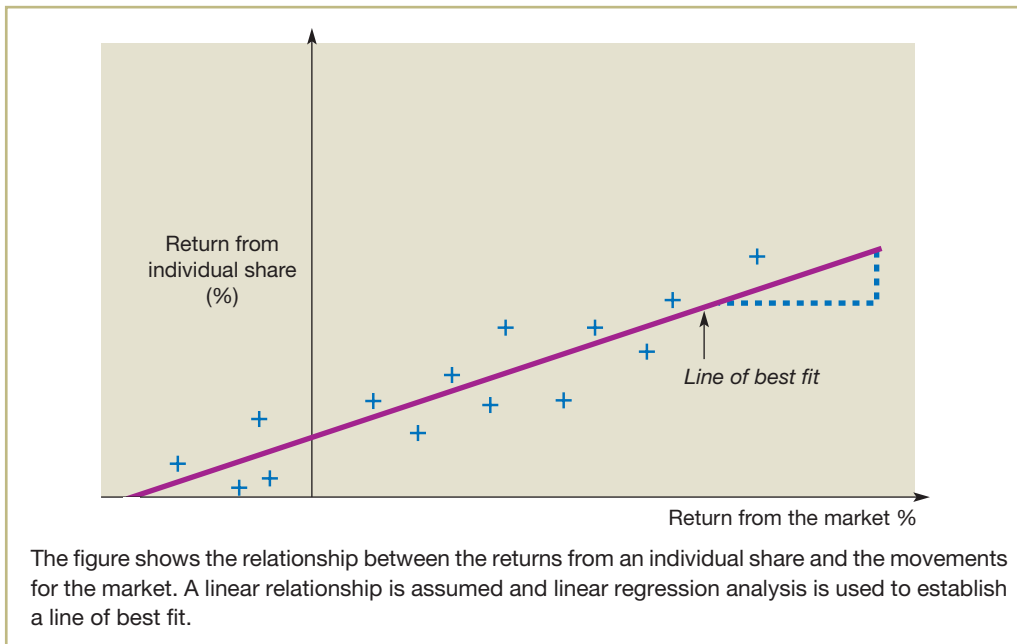
Figure 8.3 The relationship between the returns from an individual share and returns from the market

Real World 8.2 provides some examples of betas of large UK listed businesses operating in different industries.

Real World 8.2

Betas in practice

Betas for some well-known UK listed businesses are set out below.

Name	Industry	Beta
Royal Bank of Scotland	Banking	0.90
United Utilities	Utilities	0.71
Marks and Spencer	Retailer	0.81
easyJet	Airline	0.59
AstraZeneca	Pharmaceuticals	1.01
Premier Foods	Food producer	1.74
BP	Energy	1.43
Stagecoach	Passenger transport	0.62
BT	Communications	0.78
Tesco	Supermarket	1.03
Glencore	Mining	1.86

Source: Compiled from information taken from www.reuters.com, accessed 13 January 2019.

Measures of beta for the shares of UK listed businesses are available from various information agencies. Thus, calculating beta is not usually necessary. **Real World 8.3** overleaf provides an insight to how betas are established in practice by finance professionals, such as investment bankers, assets managers and consultants.

A beta way to do it

A study of 272 finance professionals, based predominantly in Western Europe, found that 50 per cent of respondents relied on information agencies when seeking beta values while the remaining 50 per cent calculated betas in-house. 56 per cent of those that relied on information agencies used Bloomberg with Thomson Reuters and Damodaran both coming a poor second at 9 per cent each.

Source: Mukhlynina, L. and Nyborg, K. (2016) *The Choice of Valuation Techniques in Practice: Education Versus Profession*, Swiss Finance Institute Research Paper Series, no. 16-36, p. 18.

Activity 8.8

Lansbury plc has recently obtained a measure of its beta from a business information agency. The beta value obtained is 1.2. The expected returns to the market for the next period is 10 per cent and the risk-free rate on government securities is 3 per cent. What is the cost of ordinary shares to the business?

Using the CAPM formula we have:

$$K_0 = K_{RF} + b(K_m - K_{RF})$$
$$= 3\% + 1.2\,(10\% - 3\%)$$
$$= 11.4\%$$

Figure 8.4 illustrates the main elements in calculating the cost of ordinary shares using CAPM.

The figure shows that the risk-free rate plus the risk premium for the shares will equal the cost of ordinary shares. The risk premium is derived by multiplying the equity (ordinary share) market risk premium by the beta for the share.
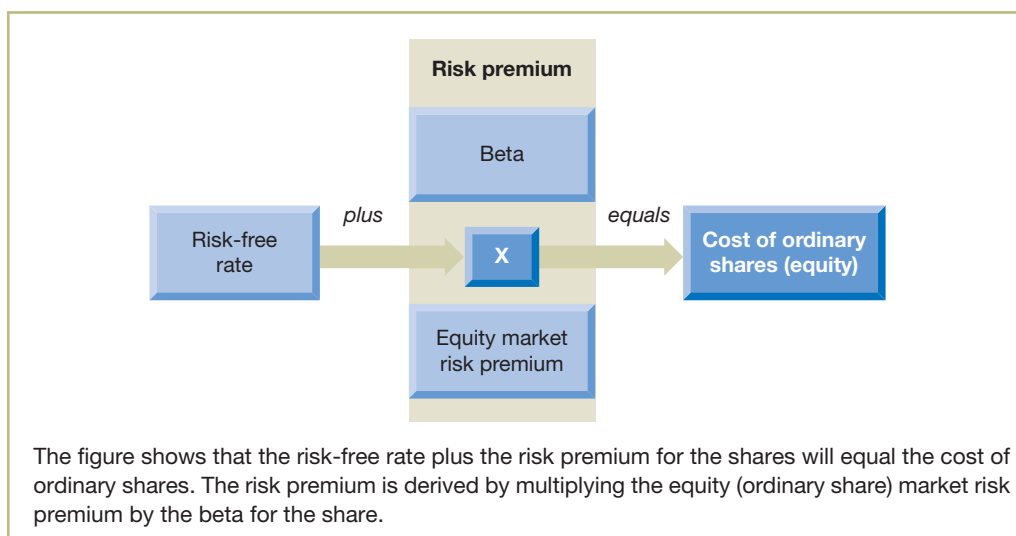
Figure 8.4 Calculating the cost of ordinary shares using CAPM

Limitations of CAPM

CAPM has been subject to some criticism, which will not be considered in detail as it is beyond the scope of this book. If you are interested in pursuing this issue, take a look at the further reading section at the end of this chapter. It is enough to point out that various unrealistic assumptions underpin the model. These include a perfect capital market where there are:

■ no taxes and no transaction costs
■ a large number of buyers and sellers, all of whom have access to the same information.

The CAPM model further assumes that all investors:

■ are interested only in a share's expected returns and standard deviation
■ can borrow and lend at a risk-free interest rate
■ hold a diversified portfolio of shares (so that unsystematic risk can be ignored).

There are also practical problems concerning measurement of the main inputs to the model: beta values, the risk-free rate of return and returns to the market. These problems vary in magnitude. We saw earlier. that beta values are based on past performance, which may not provide a good guide to the future. Nevertheless, for businesses in certain industries, beta values tend to be fairly stable over time. We also saw earlier that, to estimate the future risk-free rate of return, we must first identify a surrogate for a risk-free asset. Where UK short-term government bills are used, estimating future rates is not a huge problem. This is because rates for these bills are fairly stable over time. Returns to the market tends to be the biggest problem area. These returns can be volatile over time and, therefore, difficult to forecast accurately. While average returns for past periods can be used as a proxy, dramatically different results can arise according to the particular period chosen.

The key issue, however, is whether these unrealistic assumptions and measurement problems undermine CAPM's ability to explain share behaviour. While early studies were broadly supportive, more recent studies have cast doubts over its reliability. CAPM is a single factor model that predicts a linear relationship between beta values and share returns. Research has shown, however, that beta values are not the only factor influencing average share returns. There is, for example, a 'size effect' leading to larger businesses generating lower returns than smaller businesses.

Like the dividend growth model, CAPM has a restricted application. It can only normally be used for businesses listed on the Stock Exchange.

Activity 8.9

Why is this the case?

In the absence of information concerning returns to the market as a whole, beta values, which measure the responsiveness of changes in particular shares to changes in the market as a whole, cannot be derived.

Sometimes, however, the share beta value of a similar listed business may be used by an unlisted business as a proxy measure.

Despite the problems and limitations mentioned, a more complete model for estimating the cost of ordinary share capital has yet to be developed. We should not, therefore, be too eager

to abandon CAPM (even though it may make life easier for students!). It still contains useful ideas concerning the nature of risk and the link between risk, as measured by beta, and return.

Having ploughed through the above discussion of CAPM, you may be relieved to know that it is actually used in practice. We shall return to this point a little later in the chapter.

CAPM v dividend growth model

In a world of certainty and perfect capital markets, CAPM and the dividend growth model will arrive at the same cost of equity. In the real world, however, where these conditions do not apply, we should expect outputs from the two models to diverge. This raises the question as to which one is superior.

The CAPM model is theoretically superior to the dividend growth model insofar that it takes risk into account. According to CAPM, the required return from ordinary shares is directly related to the systematic risk associated with holding those shares. The dividend growth model, on the other hand, does not explicitly consider risk. It offers no explanation as to why shares in different businesses have different required returns.

From a practical standpoint, the CAPM model also tends to be the better bet. We saw earlier that the application of the dividend growth model is really restricted to businesses that have a stable growth in dividends. CAPM, on the other hand, can be applied to most listed businesses. Moreover, inputs to CAPM (beta, the market premium and risk-free rate) tend to be easier to calculate than future dividend growth. It is not, surprising, therefore, that finance professionals show a marked preference for CAPM. (See Real World 8.6.)

Retained earnings

Retained earnings are an important source of finance from ordinary shareholders and, as we saw in Chapter 6, cannot be regarded as 'cost free'.

Activity 8.10

Can you recall why this is the case?

If earnings are reinvested by the business, the shareholders will expect to receive returns on these funds that are equivalent to the returns expected from investments in opportunities with similar levels of risk.

The ordinary shareholders' stake in the business is made up of ordinary share capital plus any retained earnings, and the expected returns from each will, in theory, be the same. Hence, when we calculate the cost of ordinary share capital, we are also calculating the cost of any retained earnings.

Loan capital

We begin this section in the same way as we began the section relating to ordinary shares. We shall first consider the value of loan capital and then go on to consider its cost. It cannot be emphasised enough that these two aspects are really two sides of the same coin.

Loan capital may be irredeemable (that is, the principal sum is not expected to be repaid and so interest will be paid indefinitely). Where the rate of interest on the loan is fixed, the equation

used to derive the value of irredeemable loan capital is similar to that used to derive the value of ordinary shares, where dividends remain constant over time. The value of irredeemable loan capital is:

$$P_d = \frac{I}{K_d}$$

where P_d = the current market value of the loan capital
K_d = the cost of loan capital to the business
I = the annual rate of interest on the loan capital.

This equation can be rearranged to provide an equation for calculating the *cost* of loan capital. Hence:

$$K_d = \frac{I}{P_d}$$

Interest on loan capital is a tax-deductible expense and so the net cost is the interest charge *after* tax. For investment appraisal purposes, we take the after-tax net cash flows resulting from a project. Thus, when calculating the appropriate discount rate, we should be consistent and use the after-tax rates for the cost of capital. The after-tax cost will be:

$$K_d = \frac{I(1 - t)}{P_d}$$

where t is the rate of tax payable.

Activity 8.11

Tan and Co plc has irredeemable loan capital outstanding on which it pays an annual rate of interest of 10 per cent. The current market value of the loan capital is £88 per £100 nominal value and the tax rate is 20 per cent. What is the cost of the loan capital to the business?

Using the above formula, the cost is:

$$K_d = \frac{I(1 - t)}{P_d}$$
$$= \frac{10(1 - 0.20)}{88}$$
$$= 9.1\%$$

Note that the rate of interest on the nominal value of the loan capital is not the relevant cost. Rather, we are concerned with the *opportunity* cost of the loan capital. This represents the return that can be earned by investing in an opportunity with the same level of risk. The *current market rate of interest* of the loan capital, as calculated above, provides us with a measure of opportunity cost.

Where the loan capital is redeemable, deriving the cost of capital figure is a little more complicated. However, the principles and calculations required to derive the relevant figure

have already been covered in Chapter 4. An investor who purchases redeemable loan capital will pay an initial outlay and then expect to receive annual interest plus a repayment of capital at the end of the loan period. The required rate of return for the investor will be the discount rate which, when applied to the future cash flows, will produce a present value that is equal to the current market value of the investment. Thus, the rate of return can be computed in the same way as the IRR is computed for other forms of investment opportunity. Let us consider Example 8.2.

Example 8.2

Lim Associates plc issues £20 million loan capital on which it pays an annual rate of interest of 10 per cent on the nominal value. The issue price of the loan capital is £88 per £100 nominal value and the tax rate is 20 per cent. The loan capital is due to be redeemed in four years' time at its nominal value.

What are the annual cash flows for this issue?

Solution

The cash flows for this issue of loan capital will be as follows:

		Cash flows £m
Year 0	Current market value (£20m × (88/100))	17.6
Years 1–3	Interest payable (£20m × 10%)	(2.0)
Year 4	Redemption value (£20m + Interest (£2m))	(22.0)

To derive the cost of loan capital to the business, the trial and error approach that is used in calculating the IRR can be used.

Activity 8.12

Calculate the pre-tax cost of loan capital for Lim Associates plc. (*Hint*: Start with a discount rate of 10 per cent.)

Using a discount rate of 10 per cent, the NPV is calculated as follows:

	Cash flows £m	Discount rate 10%	PV of cash flows £m
Year 0	17.6	1.00	17.6
Year 1	(2.0)	0.91	(1.8)
Year 2	(2.0)	0.83	(1.7)
Year 3	(2.0)	0.75	(1.5)
Year 4	(22.0)	0.68	(15.0)
		NPV	(2.4)

The discounted future cash outflows exceed the issue price of the loan capital and so the NPV is negative. This means that the discount rate is too low. Let us try 15 per cent.

	Cash flows	Discount rate	PV of cash flows
	£m	15%	£m
Year 0	17.6	1.00	17.6
Year 1	(2.0)	0.87	(1.7)
Year 2	(2.0)	0.76	(1.5)
Year 3	(2.0)	0.66	(1.3)
Year 4	(22.0)	0.57	(12.5)
		NPV	0.6

This discount rate is a little too high as the discounted cash outflows are less than the issue price of the loan capital. Thus, the appropriate rate lies somewhere between 10 per cent and 15 per cent.

Trial	Discount factor	Net present value
		£m
1	10%	(2.4)
2	15%	0.6
Difference	5%	3.0

The change in NPV for every 1 per cent change in the discount rate will be:

$$£3.0m/5 = £0.6m$$

Thus, the reduction in the 15 per cent discount rate required to achieve a zero NPV will be 1 per cent as a 15 per cent discount rate produced an NPV of £0.6 million. In other words, the discount rate is 14 per cent.

The above figure of 14 per cent represents the *pre-tax* cost of loan capital. The tax rate is 20 per cent and so the after-tax cost of loan capital is 14 per cent $\times$ (1 − 0.2) = 11.2 per cent.

Some final points

Calculating the cost of loan capital is much easier where a credit rating agency, such as Standard and Poor, provides a rating for the loan. Assume, for example that a loan has been awarded a rating of BB and, for this rating, the required yield for lenders is 5 per cent above the risk-free rate. Further assume that the risk-free rate is 2 per cent. The pre-tax cost of loan capital will be the sum of these two rates, that is 7 per cent. If the relevant tax rate for the business is 20 per cent, the after-tax cost of loan capital is 7 $\times$ (1 − 0.2) = 5.6 per cent.

Where the rate of interest is floating rather than fixed, calculating the cost of loan capital becomes more difficult. This is because it is dependent on movements in interest rates over time. To deal with this problem, it is often assumed that current interest rates also reflect future rates.

Preference shares

Let us again begin by considering the value of this type of capital before moving on to calculate its cost. Preference shares may be redeemable or irredeemable. They are similar to loan capital in so far that the holders normally receive an agreed rate of return each year (which is expressed in terms of the nominal value of the shares). They differ, however, in that the annual dividend paid to preference shareholders is not a tax-deductible expense. Thus, the full cost

of the dividend payments must be borne by the business (that is, the ordinary shareholders). As the rate of dividend on the preference shares is normally fixed, the equation used to derive the value of irredeemable preference shares is again similar to the equation used to derive the value of ordinary shares, where the dividends remain constant over time. The equation for irredeemable preference shares is:

$$P_p = \frac{D_p}{K_p}$$

where P_p = the current market price of the preference shares
K_p = the cost of preference shares to the business
D_p = the annual dividend payments.

This equation can be rearranged to provide an equation for deriving the cost of irredeemable preference shares. Hence:

$$K_p = \frac{D_p}{P_p}$$

Activity 8.13

Iordanova plc has 12 per cent irredeemable preference shares in issue with a nominal (par) value of £1. The shares have a current market price of £0.90 (excluding dividends). What is the cost of these shares?

The cost is:

$$K_p = \frac{D_p}{P_p}$$
$$= \frac{12}{90}$$
$$= 13.3\%$$

The cost of redeemable preference shares can be deduced using the IRR approach, which was used earlier to determine the cost of redeemable loan capital.

Activity 8.14

L.C. Conday plc has £50 million 10 per cent £1 preference shares in issue. The current market price is £0.92 and the shares are due to be redeemed in three years' time at their nominal value.
What is the cost of these shares? (*Hint*: Start with a discount rate of 11 per cent.)

The annual cash flows are as follows:

		Cash flows £m
Year 0	Current market value (£50m × 0.92)	46.0
Years 1–2	Dividends (£50m × 10%)	(5.0)
Year 3	Redemption value (£50m) + Dividend (£5m)	(55.0)

Using a discount rate of 11 per cent, the NPV is as follows:

	Cash flows £m	Discount rate 11%	PV of cash flows £m
Year 0	46.0	1.00	46.0
Year 1	(5.0)	0.90	(4.5)
Year 2	(5.0)	0.81	(4.1)
Year 3	(55.0)	0.73	(40.2)
		NPV	(2.8)

This discount rate is too low as the discounted future cash outflows exceed the issue price of the preference share capital. Let us try 13 per cent:

	Cash flows £m	Discount rate 13%	PV of cash flows £m
Year 0	46.0	1.00	46.0
Year 1	(5.0)	0.89	(4.5)
Year 2	(5.0)	0.78	(3.9)
Year 3	(55.0)	0.69	(38.0)
		NPV	(0.4)

The discounted cash outflows are almost equal to the issue price of the preference share capital. Thus, the cost of preference shares is approximately 13 per cent.

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

When making financing decisions, the managers of a business are assumed to have a target capital structure in mind. Although the relative proportions of equity, preference shares and loans may vary over the short term, these proportions are assumed to remain fairly stable when viewed over the medium to longer term.

The assumption of a fairly stable capital structure is consistent with the view that managers believe that a particular financing mix will minimise the cost of capital. In other words, it will provide an **optimal capital structure** for the business. (Whether or not there is such a thing as an optimal capital structure is discussed later in the chapter.) However, a target capital structure is unlikely to be set in stone. It may change from time to time in response to changes in the tax rates, interest rates and so on, which change the cost of particular elements of the capital structure.

The existence of a stable capital structure (presumably reflecting the target capital structure) has important implications for the evaluation of investment projects. It has already been argued that the required rates of return from investors (that is, the costs of capital to the business) should provide the basis for determining an appropriate discount rate for investment projects. If we accept that a business will maintain a fairly stable capital structure over the period of the project, then the average cost of capital can provide an appropriate discount rate. By accepting investment projects that yield more than this average cost, shareholder wealth will be enhanced.

The average cost of capital can be calculated by taking the cost of the individual elements and then weighting each element in proportion to the target capital structure (by market value)

of the business. Example 8.3 illustrates how the **weighted average cost of capital (WACC)** is calculated.

Example 8.3

Danton plc has 10 million ordinary shares in issue with a current market value of £2.00 per share. The expected dividend for next year is 16p per share and this is expected to grow each year at a constant rate of 4 per cent. The business also has:

- 10.0 million 9 per cent £1 irredeemable preference shares in issue with a market price of £0.90 per share
- £20 million of irredeemable loan capital in issue with a nominal rate of interest of 6 per cent and which is quoted at £80 per £100 nominal value.

Assume a tax rate of 20 per cent and that the current capital structure reflects the target capital structure of the business.

What is the weighted average cost of capital of the business?

Solution

The first step is to calculate the cost of the individual elements of capital. The cost of ordinary shares in Danton plc is calculated as follows:

$$K_0 = \frac{D_1}{P_0} + g \text{ (see note)}$$

$$= \frac{16}{200} + 0.04$$

$$= 12\%$$

Note: The dividend valuation model has been used to calculate the cost of ordinary shares; however, the CAPM model could have been used instead if the relevant information had been available.

The cost of the preference share capital is as follows:

$$K_p = \frac{D_p}{P_p}$$

$$= \frac{9}{90}$$

$$= 10\%$$

The cost of loan capital is:

$$K_d = \frac{I(1 - t)}{P_d}$$

$$= \frac{6(1 - 0.2)}{80}$$

$$= 6.0\%$$

Having derived the cost of the individual elements, we can now calculate the weighted average cost of these elements. The WACC will be:

	(a) Market value £m	(b) Proportion of total market value	(c) Cost %	(d) = (b × c) Contribution to WACC
Ordinary shares (10m × £2) (see note)	20	0.44	12	5.3
Preference shares (10m × £0.90)	9	0.20	10	2.0
Loan capital (£20m × 0.8)	16	0.36	6	2.2
	45	1.00		
WACC				9.5%

Note: The market value of the capital rather than the nominal value has been used in the calculations. This is because we are concerned with the opportunity cost of capital invested, as explained earlier.

Figure 8.5 sets out the approach used to calculate the WACC of a business.

The figure shows that, for a business financed by a mixture of ordinary shares, loan capital and preference shares, the weighted average cost of capital (WACC) is calculated by first multiplying the proportion of each element by its cost. The WACC is the sum of the figures derived for each element.
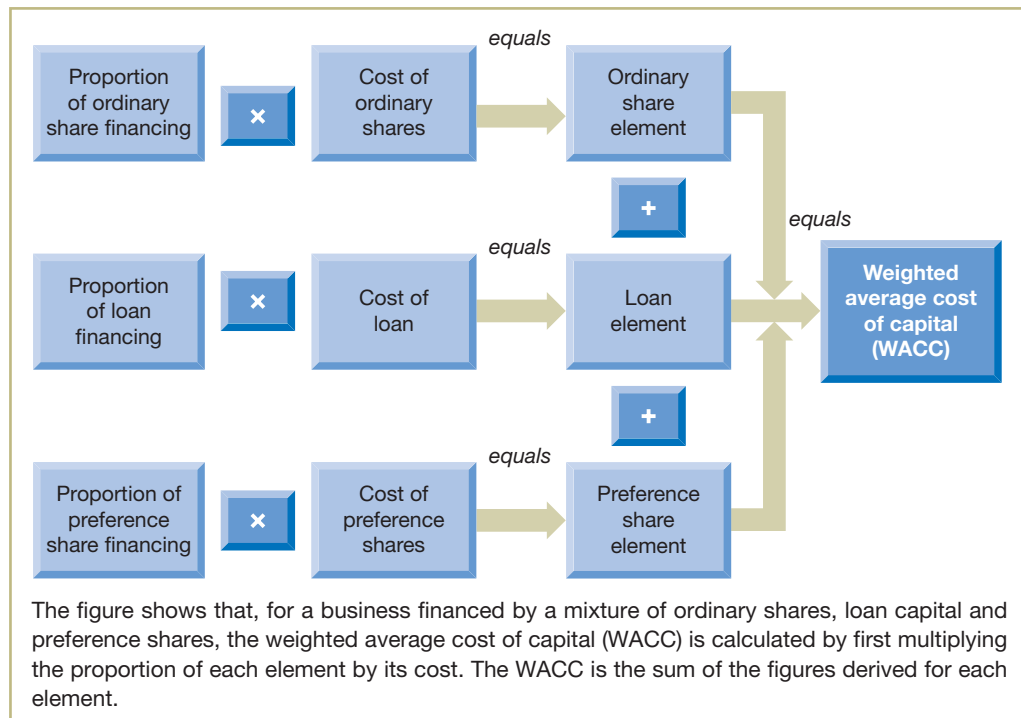
Figure 8.5 Calculating WACC

Whether businesses maintain a target capital structure in practice has been the subject of some debate. **Real World 8.4** provides some evidence concerning this issue.

Target practice

A survey of UK businesses revealed mixed support for the idea of a target capital structure. The surveyed businesses ranged in size (as measured by total assets) from more than £17 billion to less than £1 million. The extent to which respondents adopted a target capital structure was as follows:

	Business size			Total	
	Large > £140m	*Medium* £140m − £27.7m	*Small* < £27.7m	*Number*	*%*
No target	22	35	38	95	49
Target	43	30	28	101	51
	65	65	66	196	100

The results indicate that large businesses were more likely to have a target capital structure and small businesses were less likely to have one. The reasons for this are not clear but may be because large businesses have more control over their capital structure or have better access to finance.

A worldwide survey of 260 businesses found that 68 per cent of respondents had a target capital structure. There were, however, significant variations between regions. This is shown in Figure 8.6.
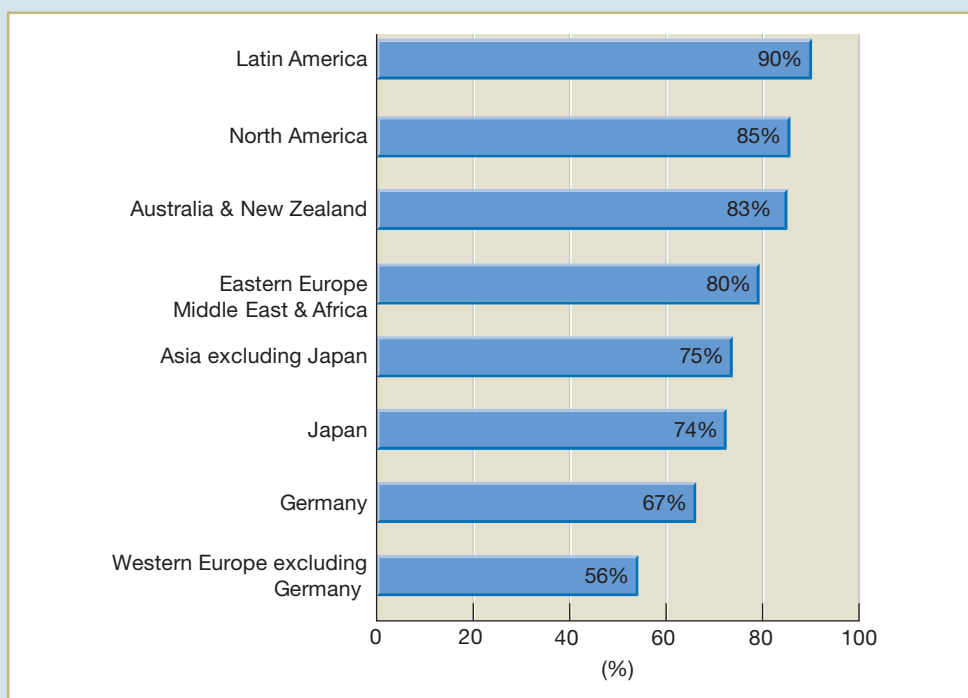
Figure 8.6 The extent to which businesses employ a target capital structure

Source: Adapted from Beattie, V., Goodacre, A. and Thomson, S.J. (2006) 'Corporate financing decisions: UK survey evidence', *Journal of Business Finance and Accounting*, vol. 33, no. 9–10, pp. 1402–34; Servaes, H. and Tufano, P. (2006) *The Theory and Practice of Corporate Capital Structure*, Deutsche Bank, January, p. 37.

A survey of London Stock Exchange businesses found that 62 per cent had a target ratio. It also found target structures were subject to fairly frequent revision in response to changes to the business and its external environment. 44 per cent of businesses surveyed maintained the same target for more than one year. Although 50 per cent of businesses surveyed based their target structure on factors specific to their particular business, 19 per cent adopted a target based on what they regarded as the norm for their particular industry.

A further survey of London Stock Exchange businesses found that, in the long run, most businesses adopt a target capital structure. However, those in 'old economy' industries, such as mineral extraction, construction and textiles, were more likely to adopt a target capital structure than those found in 'new economy' industries, such as IT and leisure. In contrast to established theory, the survey also found that businesses often seemed to base their target capital structures on statement of financial position values rather than on market values.

Sources: Adapted from Beattie, V., Goodacre, A. and Thomson, S.J. (2006) 'Corporate financing decisions: UK survey evidence', *Journal of Business Finance and Accounting*, vol. 33, no. 9–10, pp. 1402–34; Servaes, H. and Tufano, P. (2006) *The Theory and Practice of Corporate Capital Structure*, Deutsche Bank, January, p. 37; Tucker, J., Pointon, J. and Olugbode, M. (2010) 'Target gearing in the UK: a triangulation approach', *International Journal of Managerial Finance*, vol. 6, no. 1; Tucker, J. and Stoja, E. (2011) 'Industry membership and capital structure dynamics in the UK', *International Review of Financial Analysis*, vol. 20, no. 4.

SPECIFIC OR AVERAGE COST OF CAPITAL?

In practice, an investment project may be financed by raising funds from a particular source. It is tempting, therefore, to think that the appropriate cost of capital for the project will be the cost of the particular source of finance used. However, this is not the case. When new funds are needed for an investment project, it is not normally feasible to raise the funds in exactly the same proportions as in the existing capital structure. To minimise the cost of raising funds, it will usually make sense for a business to raise funds from one source and, later, to raise funds from another, even though this may lead to deviations in the required capital structure over the short term. The fact that a particular source of new funds is used for a project will be determined by the requirements for the long-term capital structure of the business rather than the requirements of the project.

Using the specific cost of funds raised for the project could lead to illogical decisions being made. Assume that a business is considering an investment in two identical machines and that each machine has an estimated IRR of 12 per cent. Let us further assume that the first machine will be financed using loan capital with an after-tax cost of 10 per cent. However, as debt capacity of the business will then be used up, the second machine must be financed by ordinary (equity) share capital at a cost of 14 per cent. If the specific cost of capital is used to evaluate investment decisions, the business would be in the peculiar position of accepting the investment in the first machine, because the IRR exceeds the cost of capital, and rejecting the second (identical) machine because the IRR is lower than the cost of capital! By using the WACC, we avoid this kind of problem. Each machine will be evaluated according to the average cost of capital, which should then result in consistent decisions being made.

Real World 8.5 reveals the weighted average cost of capital for businesses operating in different industries.

WACC in practice

The after-tax WACC figures for a sample of industries in Western Europe are set out below.

Industry	Cost of equity %	After-tax cost of debt %	WACC %
Air transport	9.30	4.27	7.11
Building materials	10.03	3.97	8.45
Construction supplies	10.16	3.97	7.93
Electrical equipment	10.38	4.27	10.50
Food processing	7.82	3.97	7.09
Homebuilding	9.22	3.97	8.67
Packaging and containers	9.04	3.97	7.14
Retail (Grocery and food)	8.13	3.97	5.32
Semiconductors	14.40	4.27	12.71
Tobacco	6.24	3.51	5.08
Transportation	9.03	3.57	5.83
Total market	**10.07**	**4.27**	**7.16**

Source: Extracts from table in Damodaran, A. *Useful Data Sets Costs of Equity and Capital*, www.stern.nyu.edu/~adamodar/New_Home_Page/data.html, accessed 12 January 2019.

LIMITATIONS OF THE WACC APPROACH

In practice, different investment opportunities are likely to have different levels of risk. Assuming investors are risk-averse, higher returns will be required to compensate for higher levels of risk. It would, therefore, be logical for the cost of capital to reflect the particular level of risk relating to each project.

Activity 8.15

Under what circumstances would the use of WACC still be suitable? Try to think of at least one.

The use of WACC would still be suitable where an investment project is:

■ expected to have the same level of risk as existing investments, or
■ fairly small and so would not significantly affect the overall risk level of the business.

We saw earlier that the WACC approach assumes that the capital structure of the business remains stable. In the real world, however, there will be changes in the market values and costs of various capital elements over time. To reflect these changes, businesses should therefore recalculate their WACC on a frequent basis.

Finally, measurement problems may conspire to make the WACC approach difficult to use. Some of these problems relate to the individual elements of capital. Not all shares and loan notes, for example, are frequently traded on well-regulated stock markets. This means that

reliable market values may be unavailable. Other problems relate to the valuation models used. We mentioned earlier, for example, that identifying dividend growth rate to use in the dividend growth model can be extremely difficult.

COST OF CAPITAL – SOME EVIDENCE

Real World 8.6 below provides evidence on the calculation of WACC by finance professionals. As we shall see, there are important deviations between theory and practice in certain areas.

Real World 8.6

Calculating the cost

The survey of 272, predominantly Western European, finance professionals mentioned in Real World 8.3 above asked respondents how they calculated various elements of the cost of capital. Key findings from the study were as follows:

- 76 per cent of respondents always, or almost always, used CAPM to calculate the cost of equity. No other method came close to this score.
- 70 per cent of respondents always, or almost always, relied on the yield on long-term government securities to calculate the risk-free rate.
- 72 per cent of respondents always, or almost always, used the risk-free rate plus a spread to calculate the cost of debt.
- Only 48 per cent of respondents stated that they always, or almost always, took account of a business's debt policy. Thus, tax relief from the use of debt was not always adjusted to take account of projected debt levels.
- 40 per cent of respondents never adjusted WACC to take account of future changes in capital structure.
- Almost 50 per cent of respondents failed to use the target capital structure of the business as the basis for assigning weights. The vast majority of those who failed to do so relied on current market weightings.

The study also found that 82 per cent of respondents always, or almost always, used WACC as the discount rate when discounting future cash flows.

Source: Mukhlynina, L. and Nyborg, K. (2016) *The Choice of Valuation Techniques in Practice: Education Versus Profession*, Swiss Finance Institute Research Paper Series, no. 16-36.

While businesses often use WACC as a basis for evaluating projects, there some evidence from the US that it is significantly increased before being used to discount project cash flows. One study, for example, found that discount rates are, on average, around twice the WACC (see reference 2 at the end of chapter). It seems that this may be due to financial constraints. Where there are not enough funds to accept all projects with a positive NPV, a high discount rate is used to provide a form of capital rationing. The study found, however, that operational constraints are more important in explaining this phenomenon. Operational constraints are associated with limited scarce resources such as a skilled workforce, production capacity and management expertise. Arbitrarily increasing the discount rate to deal with the constraints mentioned, however, has no clear theoretical justification.

THE CAPITAL STRUCTURE DEBATE

It may come as a surprise to discover that there is some debate in the finance literature over whether the capital structure decision really is important. There is controversy over whether the 'mix' of long-term funds employed can have an effect on the overall cost of capital of a business. If a particular mix of funds can produce a lower cost of capital, then the way in which the business is financed is important as it can affect its value. (In broad terms, the value of a business can be defined as the net present value of its future cash flows. Lowering the cost of capital, which is used as the discount rate, will increase the value of the business.)

There are two schools of thought concerning the capital structure decision, which we shall refer to as the traditional school and the modernist school. The position of each is described below.

The traditional view

According to the traditional school, the capital structure decision is very important. The traditionalists point out that the cost of loan capital is cheaper than the cost of ordinary (equity) share capital (see Chapter 6). This difference in the relative cost of finance suggests that, by increasing the level of borrowing (or gearing), the overall cost of capital of the business can be reduced. However, there are drawbacks to taking on additional borrowing. As the level of borrowing increases, ordinary shareholders will require higher levels of return on their investments to compensate for the higher levels of financial risk that they will have to bear. Existing lenders will also require higher levels of return.

The traditionalists argue, however, that at fairly low levels of borrowing, the benefits of raising finance through the use of loan capital will outweigh any costs that arise. This is because ordinary shareholders and lenders will not view low levels of borrowing as having a significant effect on the level of risk that they have to bear and so will not require a higher level of return in compensation. As the level of borrowing increases, however, things will start to change. Ordinary shareholders and existing lenders will become increasingly concerned with the higher interest charges that must be met and the risks this will pose to their own claims on the income and assets of the business. As a result, they will seek compensation for this higher level of risk in the form of higher expected returns.

The situation just described is set out in Figure 8.7. We can see that, where there are small increases in borrowing, ordinary shareholders and existing lenders do not require greatly increased returns. However, at significantly higher levels of borrowing, the risks involved take on greater importance for investors and this is reflected in the sharp rise in the returns required from each group. Note that the overall cost of capital (which is a weighted average of the cost of ordinary shares and loan capital) declines when small increases in the level of borrowing occur. However, at significantly increased levels of borrowing, the increase in required returns from ordinary (equity) shareholders and lenders will result in a sharp rise in the overall cost of capital.

The figure assumes that at low levels of borrowing, ordinary (equity) shareholders will not require a higher level of return to compensate for the higher risk incurred. As loan finance is cheaper than ordinary share finance, this will lead to a fall in the overall cost of capital. However, this situation will change as the level of borrowing increases. At some point, the increased returns required by ordinary shareholders will begin to outweigh the benefits of cheap loan capital and so the overall cost of capital will start to rise. The implication is, therefore, that there is an optimal level of gearing for a business.

Figure 8.7 The traditional view of the relationship between levels of borrowing and expected returns

An important implication of the above analysis is that managers of the business should try to establish that mix of loan/equity finance that will minimise the overall cost of capital. At this point, the business will be said to achieve an optimal capital structure. Minimising the overall cost of capital in this way will maximise the value of the business (that is, the net present value of future cash flows). This relationship between the level of borrowing, the cost of capital and business value is illustrated in Figure 8.8.

The first graph plots the cost of capital against the level of borrowing. We saw earlier that the traditionalist view suggests that, in the first instance, the cost of capital will fall as the level of borrowing increases. However, at higher levels of borrowing, the overall cost of capital will begin to increase. The second graph plots the level of borrowing against the value of the business. This is the inverse of the first graph. As the cost of capital decreases, so the value increases, and vice versa.

Figure 8.8 The relationship between the level of borrowing, the cost of capital and business value: the traditional view

We can see that the graph of the value of the business displays an inverse pattern to the graph of the overall cost of capital.

Activity 8.16

Can you figure out why this is the case? (*Hint*: Try to think how the value of the business is calculated.)

It is because a lower cost of capital will result in a higher net present value for the future cash flows of the business.

This relationship suggests that the financing decision is critical. Failure to identify and achieve the right financing 'mix' could have serious adverse consequences for shareholder wealth.

The modernist view

Modigliani and Miller (MM), who represent the modernist school, challenged the traditional view by arguing that the required returns to shareholders and to lenders would not follow the pattern as set out above. They argued that shareholders in a business with financial gearing will expect a return that is equal to the returns expected from investing in a similar ungeared business plus a premium, which rises in *direct proportion* to the level of gearing. Thus, the increase in returns required for ordinary shareholders as compensation for increased financial risk will rise in constant proportion to the increase in the level of borrowing over the *whole range of borrowing.* This pattern contrasts with the traditional view, of course, which displays an uneven change in the required rate of return over the range of borrowing.

The MM analysis also assumes that the returns required from borrowers would remain constant as the level of borrowing increases. This latter point may appear strange at first sight. However, if lenders have good security for the loans made to the business, they are unlikely to feel at risk from additional borrowing and therefore will not seek additional returns. This is provided, of course, that the business does not exceed its borrowing capacity.

The MM position is set out in Figure 8.9. As you can see, the overall cost of capital remains constant at varying levels of borrowing. This is because the benefits obtained from raising finance through borrowing, which is cheaper than share capital, are exactly offset by the increase in required returns from ordinary shareholders.

An important implication of the MM view is that the financing decision is not really important. Figure 8.9 shows that there is no optimal capital structure for a business, as suggested by the traditionalists, because the overall cost of capital remains constant. This means that one particular capital structure is no better or worse than any other and so managers should not spend time on evaluating different forms of financing 'mixes' for the business. Instead, they should concentrate their efforts on evaluating and managing the investments of the business.

The MM view assumes that the cost of capital will remain constant at different levels of gearing. This is because the benefits of cheap loan capital will be exactly offset by the increased returns required by ordinary shareholders. Thus, there is no optimal level of gearing.
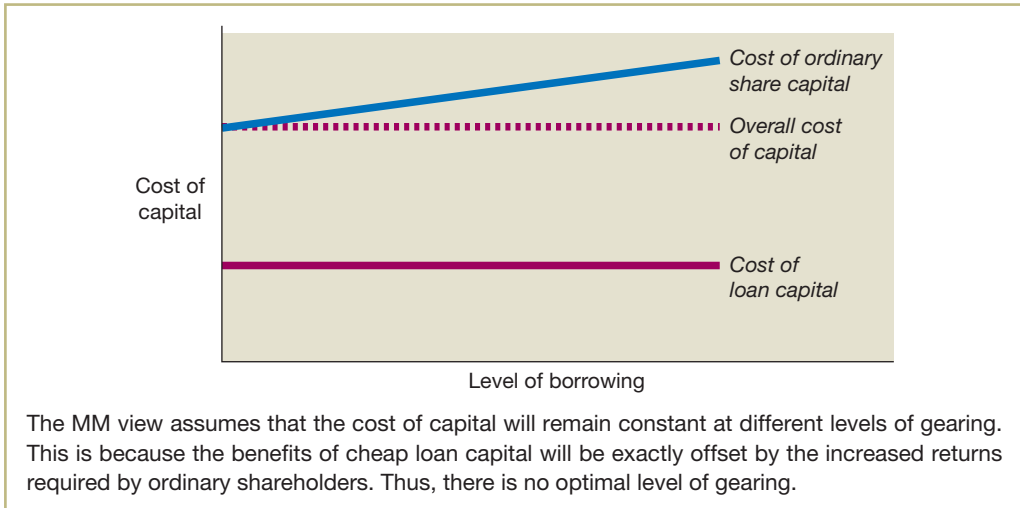
Figure 8.9 The MM view of the relationship between levels of borrowing and expected returns

Activity 8.17

In Figure 8.9 we saw the traditional view of the relationships between the cost of capital and the level of borrowing and the relationship between the value of the business and the level of borrowing. How would the MM view of these two relationships be shown in graphical form?

The relationship between (i) the level of borrowing and the cost of capital and (ii) the level of borrowing and the value of the business, as viewed by MM, is set out in Figure 8.10.

The first graph shows that, according to MM, the cost of capital will remain constant at different levels of borrowing. The second graph shows the implication of this for the value of the business. As the cost of capital is constant, the net present value of future cash flows from the business will not be affected by the level of borrowing. Hence, the value of the business will remain constant.

Figure 8.10 The relationship between the level of borrowing, the cost of capital and business value: the MM view

Although the views of Modigliani and Miller were first published in the late 1950s, they can be described as modernists because they base their position on economic theory (unlike the traditional school). They argue that the value of a business is determined by the future income from its investments, and the risk associated with those investments, and not by the way in which this income is divided among the different providers of finance. In other words, it is not possible to increase the value of a business (that is, lower the overall cost of capital) simply by borrowing, as the traditionalists suggest. MM point out that borrowing is not something that only businesses are able to undertake; borrowing can also be undertaken by individual investors. As business borrowing can be replicated by individual investors, there is no reason why it should create additional value for the investor. **(Un) Real World 8.7** explains the theory from a lighter perspective.

(Un) Real World 8.7

To really understand MM . . . start with a pizza

We have just seen that it is the income-generating power and risks associated with the underlying investments of the business, rather than the different ways in which a business may be financed, that determine the value of a business. This point was once explained by Miller (of Modigliani and Miller fame) as follows:

> Think of the firm as a gigantic pizza, divided into quarters. If now, you cut each quarter in half into eighths, the M&M proposition says that you will have more pieces, but not more pizza.

In other words, different financing methods have an effect on how the business investments and income stream will be divided up but do not affect the value of these.

Footnote: However, Miller's view of pizzas, like his view of capital structure, may be controversial. When Yogi Berra, a famous US baseball player, was asked whether he would like his pizza cut into six or eight pieces, he is reputed to have said, 'Better make it six, I don't think I can eat eight' (see reference 3 at the end of the chapter).

A simple example may help to illustrate the MM position that business borrowing should not create additional value for a business.

Example 8.4

Two businesses, Delta plc and Omega plc, are identical except for the fact that Delta plc is financed entirely by ordinary shares and Omega plc is 50 per cent financed by loans. The profit before interest for each business for the year is £2 million. The ordinary shareholders of Delta plc require a return of 12 per cent and the ordinary shareholders of Omega plc require a return of 14 per cent. Omega plc pays 10 per cent interest per year on the £10 million loans outstanding. (Tax is ignored for reasons that we shall discuss later.)

	Delta plc £m	Omega plc £m
Profits before interest	2.0	2.0
Interest payable	–	(1.0)
Available to ordinary shareholders	2.0	1.0

The market value of the total ordinary shares of each business will be equivalent to the profits capitalised at the required rate of return. Thus, the market value of each business is as follows:

	Delta plc £m	Omega plc £m
Market value of ordinary (equity) shares:		
(£2m/0.12)	16.7	
(£1m/0.14)		7.1
Market value of loan capital	–	10.0
Market value of each business	16.7	17.1

MM argue that differences in the way in which each business is financed cannot result in a higher value for Omega plc as shown above. This is because an investor who owns, say, 10 per cent of the shares in Omega plc would be able to obtain the same level of income from investing in Delta plc, for the same level of risk as the investment in Omega plc and for a lower net investment. The investor, by borrowing an amount equivalent to 10 per cent of the loans of Omega plc (that is, an amount proportional to the ownership interest in Omega plc), and selling the shares held in Omega plc in order to finance the purchase of a 10 per cent equity stake in Delta plc, would be in the following position:

	£000
Return from 10% equity investment in Delta plc (£2m × 10%)	200
Interest on borrowing (£1,000 × 10%)	(100)
Net return	100
Purchase of shares (10% × £16.7m)	1,670
Amount borrowed	(1,000)
Net investment in Delta plc	670

The investor with a 10 per cent stake in the ordinary share capital of Omega plc is, currently, in the following position:

	£000
Return from 10% investment in Omega plc (£1m × 10%)	100
Net investment in Omega plc: existing shareholding (10% × £7.1m)	710

As we can see, the investor would be better off by taking on personal borrowing in order to acquire a 10 per cent share of the ordinary share capital of the ungeared business, Delta plc, than by continuing to invest in the geared business, Omega plc. The effect of a number of investors switching investments in this way would be to reduce the value of the shares in Omega plc (thereby increasing the returns to ordinary shareholders in Omega plc), and to increase the value of shares in Delta plc (thereby reducing the returns to equity in Delta plc). This switching from Omega plc to Delta plc (which is referred to as an **arbitrage transaction**) would continue until the returns from each investment were the same, and so no further gains could be made from such transactions. At this point, the value of each business would be identical.

The MM analysis, while extremely rigorous and logical, is based on a number of restrictive assumptions. These include the following.

Perfect capital markets

The assumption of perfect capital markets means that there are no share transaction costs and investors and businesses can borrow unlimited amounts at the same rates of interest. Although these assumptions may be unrealistic, they may not have a significant effect on the arguments made. Where the prospect of 'arbitrage' gains (that is, selling shares in an overvalued business and buying shares in an undervalued business) is substantial, share transaction costs are unlikely to be an important issue as the potential benefits will outweigh the costs. It is only at the margin that share transaction costs will take on significance.

Similarly, the assumption that investors can borrow unlimited amounts at the same rate of interest may only take on significance at the margin. We have seen that the UK stock market is dominated by large investment institutions such as pension funds, unit trusts and insurance businesses that hold a very large proportion of all shares issued by listed businesses. These institutions may well be able to borrow very large amounts at similar rates to those offered to a business.

No bankruptcy costs

Assuming that there are no bankruptcy costs means that, if a business were liquidated, no legal and administrative fees would be incurred and the business assets could be sold at a price that would enable shareholders to receive cash equal to the market value of their shareholding prior to the liquidation. This assumption will not hold true in the real world where bankruptcy costs can be very high.

However, it is only at high levels of gearing that bankruptcy costs are likely to be a real issue. We saw in Chapter 6 that borrowing leads to a commitment to pay interest and to repay capital: the higher the level of borrowing, the higher the level of commitment and the higher the risk that this commitment will not be met. In the case of a low-geared, or moderately geared, business it may be possible to take on additional borrowing, if necessary, to meet commitments, whereas a highly geared business may have no further debt capacity.

Risk

It is assumed that businesses exist that have identical operating risks but with different levels of borrowing. Although this is unlikely to be true, it does not affect the validity of MM's arguments.

No taxation

A world without corporate or personal income taxes is clearly an unrealistic assumption. The real issue, however, is whether this undermines the validity of MM's arguments. We shall therefore consider next the effect on the MM position of introducing taxes.

MM and the introduction of taxation

MM were subject to much criticism for not dealing with the problem of taxation in their analysis. This led them to revise their position so as to include taxation. They acknowledged in their revised analysis that the tax relief from interest payments on loans provides a real benefit to ordinary shareholders. The more the level of borrowing increases, the more tax relief the business receives and so the smaller the tax liability of the business will become.

We should recall that the original MM position was that the benefits of cheap loan capital will be exactly offset by increases in the required rate of return by ordinary share investors. Tax relief on loan interest should, therefore, represent an additional benefit to shareholders. As the amount of tax relief increases with the amount of borrowing, the overall cost of capital (after tax) will be lowered as the level of borrowing increases. The implication of this revised position is that there is an optimal level of gearing.

Activity 8.18

Can you figure out what that optimal level of gearing is?

It is as near to 100 per cent gearing as possible without excluding some equity stake. At this point, the cost of capital will be minimised and the value of the business maximised.

In Figure 8.11, we can see the MM position after taxation has been introduced.

The figure shows the revised MM view. As the level of borrowing increases, the greater are the tax benefits to ordinary (equity) shareholders. These tax benefits will increase with the level of borrowing and so the overall cost of capital (after tax) will be lowered as the level of borrowing increases. This means that there is an optimal level of gearing and it is at the 100 per cent level of gearing.

Figure 8.11 The MM view of the relationship between levels of borrowing and expected returns (including tax effects)

Thus, the MM position moves closer to the traditional position in so far as it recognises a relationship between the value of the business and the way in which it is financed. It also recognises that there is an optimal level of gearing.

The relationship between (a) the level of borrowing and the cost of capital and (b) the level of borrowing and business value, after taking into account the tax effects, is set out in Figure 8.12.

The first graph displays the MM (including tax) view of the relationship between the cost of capital and the level of borrowing. We can see that as the level of borrowing increases, the overall cost of capital decreases. The second graph shows the relationship between the value of the business and the level of borrowing. A decrease in the overall cost of capital results in a rise in the value of the business and so, as the level of borrowing increases, the value of the business increases.

Figure 8.12 The relationship between the level of borrowing, the cost of capital and business value: the MM view (including tax effects)

Activity 8.19

What do you think is the main implication of the above analysis for managers who are trying to decide on an appropriate capital structure?

This revised MM analysis implies that a business should borrow to capacity as this will lower the post-tax cost of capital and thereby increase the value of the business.

In practice, however, few businesses follow the policy just described. When borrowing reaches very high levels, lenders are likely to feel that their security is threatened and ordinary share investors will feel that bankruptcy risks have increased. Thus, both groups are likely to seek higher returns, which will, in turn, increase the overall cost of capital. (A business would have to attract investors that are not risk-averse in order to prevent a rise in its cost of capital.) There is also the problem that there may be insufficient profits to exploit the benefits of tax relief on loan interest. In other words, a business may suffer **tax exhaustion** before reaching 100 per cent gearing.

The trade-off theory of capital structure

The **trade-off theory of capital structure** offers an explanation as to why many businesses settle for moderate levels of gearing. The theory takes into account the risk of bankruptcy mentioned above. It asserts that, when a business is deciding upon an appropriate level of gearing, it will weigh the benefits of taking on borrowing, in the form of tax benefits, against the costs involved, in the form of higher bankruptcy risk. The theory is set out in diagrammatic form in Figure 8.13.

By increasing the level of gearing, the value of the business will be increased until the point at which the value of the tax benefits is offset by the costs of bankruptcy. This point is the optimal capital structure for the business.
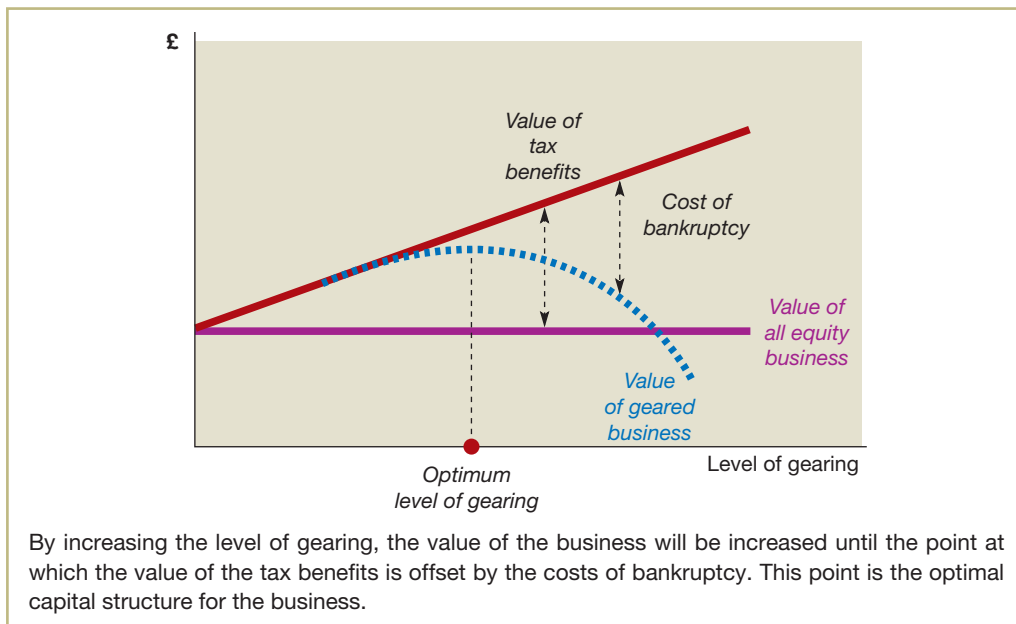
Figure 8.13 The trade-off theory of capital structure

The horizontal line represents the value of the business when it is entirely financed by equity. By increasing the level of gearing, the value of tax benefits from borrowing increases. The business has an incentive to take on additional gearing as long as these tax benefits are greater than the bankruptcy costs. Figure 8.13 shows that the value of the geared business, as represented by the curved line, increases under these circumstances. When the point is reached where the tax benefits gained are just offset by the costs of bankruptcy, the optimal level of gearing has been achieved. Beyond this point, the tax benefits are outweighed by the costs of bankruptcy and the value of the geared business starts to fall.

Trade-off theory has undoubted appeal: it is quite true that taking on loan capital can be tax efficient but it can also be risky. The difficulty is that, for many businesses, the tax benefits are substantial and certain, whereas bankruptcy risks may be neither. If this theory provided the complete answer, we should expect much higher levels of gearing among businesses than those which actually exist. Weighing tax benefits against bankruptcy risk may, nevertheless, play some role in the capital structure decision.

Activity 8.20

In Chapter 6 we came across pecking order theory, which offers an alternative explanation as to how different sources of finance are included in the capital structure of a business. Can you recall what this theory states and explain how it differs from the trade-off theory just described?

Pecking order theory is not concerned with balancing the costs and benefits of borrowing in the way just described. Instead, it asserts that businesses have a hierarchy of preferences when raising long-term capital. They will first look to retained earnings, followed by borrowing and, finally, to the issue of new equity shares. Thus, the key difference is not between borrowings and equity but rather between internal and external sources of funds.

The implication of pecking order theory is that there is no clearly defined optimal capital structure.

Some final points

The debate concerning capital structure rumbles on. The arguments of the traditional school have undoubtedly been undermined by the inexorable logic of MM. In the real world, however, it appears that businesses settle for moderate levels of gearing rather than the very high levels suggested by the MM (including tax) arguments. The trade-off theory offers some help in understanding why this may be so, but does not offer a complete explanation.

So far, no theory can fully explain why businesses adopt the particular capital structures that they do. It seems that many factors can influence the capital structure decision. Furthermore, these factors can vary in intensity between businesses. (How else can we explain why there is such variation in gearing levels?) Thus, while a particular business may have an optimal capital structure, searching for it could well end in failure.

Real World 8.8 reveals how one large utility business, Pennon Group plc, takes on high levels of gearing in order to minimise its cost of capital. The nature of its operation provides greater certainty of cash flows, which enables it to become highly geared.

Real World 8.8

All geared up

The Group's objectives when managing capital are to safeguard the Group's ability to continue as a going concern in order to provide returns for shareholders and benefits for other stakeholders and to maintain an optimal capital structure to minimise the cost of capital.

In order to maintain or adjust the capital structure, the Group seeks to maintain a balance of returns to shareholders through dividends and an appropriate capital structure of debt and equity for each business segment and the Group.

The Group monitors capital on the basis of the gearing ratio. This ratio is calculated as net borrowings divided by total capital. Net borrowings are analysed . . . and calculated as total borrowings less cash and cash deposits. Total capital is calculated as total shareholders' equity plus net borrowings.

The gearing ratios at the balance sheet (statement of financial position) date were:

	2018 £m	2017 £m
Net borrowings	2,801.5	2,664.9
Total equity	1,639.1	1,509.2
Total capital	4,440.6	4,174.1
Gearing ratio	63.1%	63.8%

Source: Extracts from Pennon Group plc, Annual Report and Accounts 2018, p. 112.

GEARING AND SIGNALLING

Managers will normally have better information about the business than its investors. Moreover, both managers and investors recognise this fact. An important consequence of this *information asymmetry,* is that investors examine managers' decisions in a search for clues about future

prospects. A decision to increase the level of borrowing, for example, may be seen as a signal of the managers' confidence in the future. As a result, share prices may rise.

These points do not imply that an increase in borrowing will increase the value of the business. They simply mean that, following a signal from managers, investors are better placed to assess the true value of the business. These points *do* imply, however, that managers must be sensitive to the possible signals that are being transmitted to investors through their actions and, where necessary, provide further explanation.

Gearing and the clientele effect

Shareholders may be attracted to a business because of the capital structure that it adopts. This is known as the **clientele effect**, where the policies chosen by a business will attract a particular type of investor. The existence of a clientele effect suggests existing investors are content with the risk/return trade off provided by the current level of gearing. As a consequence, any changes to the capital structure is likely to cause them concern. This may lead them to sell their shares, thereby causing some share price volatility, and invest in businesses with capital structures more suited to their needs.

Self-assessment question 8.1

Hackney Wholesalers plc is about to embark on an expansion programme that will have a significant impact on the size and nature of the business in forthcoming years. As at 31 July Year 6, the business has the following capital structure:

	£m
Equity	
£1 ordinary shares	10.0
Reserves	14.0
	24.0
10% £1 preference shares	6.0
12% Loan notes	8.0
	38.0

The ordinary shares have a current market value of £2.80 and the current dividend is £0.16 per share. Dividends are expected to increase by a compound rate of 5 per cent per year for the indefinite future. The preference shares are irredeemable and have a current market value of £1.20 per share. The loan notes are also irredeemable and have a current market value of £125 per £100 nominal.

→

The business has decided that any new finance will be raised in line with the target capital structure of 50 per cent ordinary shares, 20 per cent preference shares and 30 per cent loan notes.

The rate of corporation tax is 20 per cent.

Required:

(a) Calculate the weighted average cost of capital of the business based on the optimal financing mix. (Work to two decimal places.)

(b) Explain the advantages and disadvantages of a business having loan capital as part of its capital structure.

The solution to this question can be found at the back of the book on pp. 643–44.

SUMMARY

The main points of this chapter may be summarised as follows:

Cost of capital

- The opportunity cost reflects the returns from investments with the same level of risk.

- There are two major approaches to determining the cost of ordinary (equity) shares: the dividend-based approach and the risk/return (CAPM) approach.

- The dividend-based approach values shares according to the future dividends received.

- Dividend valuation models often assume constant dividends over time ($K_0 = D_1/P_0$) or that dividends will grow at a constant rate ($K_0 = (D_1/P_0) + g$).

- The risk/return approach is based on the idea that the cost of an ordinary share is made up of a risk-free rate of return plus a risk premium.

- The risk premium is calculated by measuring the risk premium for the market as a whole, then measuring the returns from a particular share relative to the market and applying this measure to the market risk premium ($K_0 = K_{RF} + b(K_m - K_{RF})$).

- The cost of irredeemable loan capital can be derived in a similar way to that of ordinary shares where the dividend stays constant ($K_d = I(1 - t)/P_d$). However, taxation must also be taken into account.

- The cost of redeemable loan capital can be computed using an IRR approach.

- The cost of preference share capital can be derived in a similar way to that of ordinary shares where the dividend stays constant ($K_p = D_p/P_p$).

- The weighted average cost of capital (WACC) is derived by taking the cost of each element of capital and weighting each element in proportion to the target capital structure.

The capital structure debate

- There are two schools of thought.

- The traditional view is that the capital structure decision is important whereas the modernist view (without taxes) is that it is not.

Traditional viewpoint

- Traditionalists argue that, at lower levels of gearing, shareholders and lenders are unconcerned about risk; however, at higher levels they become concerned and demand higher returns.

- This leads to an increase in WACC.

- WACC decreases at lower levels of gearing (because investors do not demand increased returns) but then increases.

- This means that there is an optimal level of gearing.

Modernist viewpoint

- Modernists (MM) argue that shareholders are always concerned about the level of gearing.

- Cheaper loan finance is offset by increasing the cost of ordinary shares and so the cost of capital remains constant.

- This means that there is no optimal level of gearing.

- If tax is introduced, the modernist view is changed.

- Tax benefits arising from interest payments should be exploited by taking on loan capital up to 100 per cent gearing.

- In practice, bankruptcy risk, the risk to lenders' security and tax exhaustion may prevent a business taking on very high levels of gearing.

- The trade-off theory of capital structure suggests that a business will take on additional gearing until the point is reached where the tax benefits from loan interest are just offset by the bankruptcy costs.

Gearing and signalling

- A decision by managers to change the level of gearing may be taken by investors as a signal concerning managers' views of the future.

Gearing and the clientele effect

- The gearing policy adopted by a business may attract a particular type of investor.

KEY TERMS

Capital asset pricing model (CAPM) p. 358

Beta p. 360

Optimal capital structure p. 371

Weighted average cost of capital (WACC) p. 372

Arbitrage transaction p. 383

Tax exhaustion p. 386

Trade-off theory of capital structure p. 386

Clientele effect p. 389

For definitions of these terms, see the Glossary, pp. 685–94.

REFERENCES

1 Mukhlynina, L. and Nyborg, K. (2016) *The Choice of Valuation Techniques in Practice*: *Education versus Profession*, Swiss Finance Institute Research Paper Series, No. 16-36.

2 Jagannathan, R., Matsa, D., Meier, I. and Tarhan, V. (2015) *Why Do Firms Use High Discount Rates?*, Kellogg School of Management, http://papers.ssrn.com, 29 June.

3 Quoted in Hawawini, G. and Viallet, C. (2002) *Finance for Executives*, 2nd edn, South Western/Thomson Learning, p. 353.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 8, 16 and 18.

Ehrhardt, M. and Brigham, E. (2019) *Corporate Finance: A Focused Approach*, 7th edn, Cengage Learning, Chapters 15

McLaney, E. (2017) *Business Finance: Theory and Practice*, 11th edn, Pearson, Chapters 10 and 11.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 9, 18 and 19.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 654–55.

8.1 How might a business find out whether a particular planned level of gearing would be acceptable to investors?

8.2 How might excessively high levels of borrowing adversely affect the ability of managers to run the business?

8.3 One study mentioned in the chapter found, amongst other things, that businesses often based their target capital structures on statement of financial position values rather than on market values. Another study found that businesses often used a discount rate higher than the WACC in order to deal with operational constraints. What are the implications of these findings on investment decision making for the businesses concerned?

8.4 What are the main implications for the financial manager of a business of the following approaches concerning capital structure?

(a) Traditional approach.
(b) MM (excluding tax effects) approach.
(c) MM (including tax effects) approach.

Exercises 8.5 to 8.7 are more advanced than 8.1 to 8.4. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

    If you wish to try more exercises, visit the students' side of this book's companion website.

8.1 Riphean plc and Silurian plc are two businesses operating in different industries. They are both financed by a mixture of ordinary share and loan capital and both are seeking to derive the cost of capital for investment decision-making purposes. The following information is available concerning the two businesses for the year to 30 November Year 8:

	Riphean plc	*Silurian plc*
Profit for the year	£3.0m	£4.0m
Dividends	£1.5m	£2.0m
Market value per ordinary share	£4.00	£1.60
Number of ordinary shares	5m	10m
Gross interest yield on loan capital	8%	12%
Market value of loan capital	£10m	£16m

The annual growth rate in dividends is 5 per cent for Riphean plc and 8 per cent for Silurian plc. Assume a 30 per cent tax rate.

Required:

(a) Calculate the weighted average cost of capital of Riphean plc and Silurian plc using the information provided.
(b) Discuss two possible reasons why the cost of ordinary share capital differs between the two businesses.
(c) Discuss two limitations of using the weighted average cost of capital when making investment decisions.

8.2 Celtor plc is a property development business operating in the London area. The business has the following capital structure as at 30 November Year 9:

	£000
£1 ordinary shares	10,000
Retained earnings	20,000
9% loan notes	12,000
	42,000

The ordinary shares have a current market value of £3.90 and the current level of dividend is 20p per share. The dividend has been growing at a compound rate of 4 per cent a year in recent years. The loan notes of the business are irredeemable and have a current market value of £80 per £100 nominal. Interest due on the loan notes at the year end has recently been paid.

    The business has obtained planning permission to build a new office block in a redevelopment area. The business wishes to raise the whole of the finance necessary for the project by the issue of more irredeemable 9 per cent loan notes at £80 per £100 nominal. This is in line with a target capital structure set by the business where the amount of loan capital will increase to 70 per cent of ordinary share capital within the next two years. The tax rate is 25 per cent.

Required:

(a) Explain what is meant by the term 'cost of capital'. Why is it important for a business to calculate its cost of capital with care?

(b) Calculate the weighted average cost of capital of Celtor plc that should be used for future investment decisions.

8.3 Consider each of the following:

■ Derwent plc and Plym plc have shares with beta values of 0.5 and 1.2 respectively. The expected rate of return for Derwent plc investors is 9 per cent and the expected returns to the market are 12 per cent.

■ Johar plc has earnings per share of £0.80 and a constant annual dividend payout ratio of 25 per cent. Its equity shares have a beta of 1.2. The risk-free rate of return is 5 per cent and the market rate of return is 8 per cent.

■ Chamba plc has 50 million £0.50 ordinary shares in issue with a total market capitalisation of £150 million. For the year just ended, after-tax profits were £20 million and are expected to rise by 25 per cent in the forthcoming year. Chamba plc has a constant dividend payout ratio of 40 per cent and intends to increase the dividend by 5 per cent per year for the foreseeable future.

Required:

(a) Calculate the cost of equity for:
   (i)   Plym plc
   (ii) Johar plc
   (iii) Chamba plc.

(b) Calculate the predicted value of a share in Johar plc.

8.4 Consider each of the following:

■ Mallard plc issues loan capital with a nominal value of £100 million at a price of £90 per £100 nominal value. The annual interest rate is 10 per cent of the nominal capital. The loan capital will be redeemed in two years' time at £110 per £100 nominal value. The effective rate of corporation tax for the business is 30 per cent.

■ Napa plc has 100 million £0.25 ordinary shares in issue with a current market value of £1.20 per share. The cost of ordinary shares is estimated at 12 per cent. The business also has 6 per cent irredeemable loan notes in issue with a nominal value of £75 million. These are currently quoted at £80 per £100 nominal value. The tax rate is 20 per cent.

■ Attis plc has reported pre-tax profits of £48 million and after-tax profits of £32 million for the year that has just ended. The business expects profits to increase by a further 25 per cent in the forthcoming year and then to stabilise at this figure. The business has 80 million £0.50 ordinary shares in issue and the market capitalisation of the business is £320 million. The dividend cover ratio of the business is held at a constant 2.5 times.

Required:

(a) For Mallard plc, what is the net cost of the loan capital (to the nearest per cent) to the business?

(b) For Napa plc, what is the weighted average cost of capital of the business?

(c) For Attis plc, what is the cost of the ordinary shares?

(d) How might employees respond where they believe their business is burdened with excessively high levels of borrowing?

8.5 Trexon plc is a major oil and gas exploration business that has most of its operations in the Middle East and South-East Asia. Recently, the business acquired rights to explore for oil and gas in the Gulf of Mexico. Trexon plc proposes to finance the new operations from the issue of ordinary shares. At present, the business is financed by a combination of ordinary share capital and loan capital. The ordinary shares have a nominal value of £0.50 and a current market value of £2.60. The current level of dividend is £0.16 per share and this has been growing at a compound rate of 6 per cent a year in recent years. The loan capital is irredeemable and has a current market value of £94 per £100 nominal. Interest on the loan capital is at the rate of 12 per cent and interest due at the year end has recently been paid. At present, the business expects 60 per cent of its finance to come from ordinary share capital and the rest from loan capital. In the future, however, the business will aim to finance 70 per cent of its operations from ordinary share capital.

When the proposal to finance the new operations via the rights issue of shares was announced at the annual general meeting of the business, objections were raised by two shareholders present, as follows:

■ *Shareholder A argued*: 'I fail to understand why the business has decided to issue shares to finance the new operation. Surely it would be better to reinvest profit, as this is, in effect, a free source of finance.'
■ *Shareholder B argued*: 'I also fail to understand why the business has decided to issue shares to finance the new operation. However, I do not agree with the suggestion made by Shareholder A. I do not believe that shareholder funds should be used at all to finance the new operation. Instead, the business should issue more loan capital, as it is cheap relative to ordinary share capital and would, therefore, reduce the overall cost of capital of the business.'

Tax is at the rate of 35 per cent.

Required:

(a) Calculate the weighted average cost of capital of Trexon plc that should be used in future investment decisions.
(b) Comment on the remarks made by:
  (i)   Shareholder A
  (ii) Shareholder B.

8.6 Averna plc is a research-based engineering business that has recently developed an electric scooter operated by solar batteries. The technology employed is highly sophisticated and so the scooter is expected to have a production life cycle of four years. Research and development costs to date have amounted to £10.5 million.

To exploit the potential of the new product, Averna plc has two possible options.

1 It could manufacture the scooters and then sell them through a major distributor of cars and scooters. Scooter production would begin almost immediately and over the four-year production life cycle, sales are forecast to be as follows:

	Year 1	Year 2	Year 3	Year 4
Sales volume (No. of scooters)	2,400	5,300	8,200	8,100
Selling price per scooter	£2,300	£2,100	£2,000	£1,800

Manufacturing equipment would have to be acquired immediately at a cost of £12.4 million. The equipment would have no further use at the end of the four-year period and could be sold for an estimated £3.2 million at that point.

An immediate injection of working capital of £2.8 million will be required, which would be released at the end of the production period. Estimated annual manufacturing fixed

costs are £5.5 million and include an annual depreciation charge of £2.3 million. Variable costs are £400 per scooter. At the end of the four-year production period, the production staff will be laid off and redundancy costs of £1.4 million will be incurred.

2 Averna plc could allow Edusa Engineering Co to manufacture the scooter under licence. It is expected that, under this option, sales volumes will be 10 per cent lower than the forecast figures shown above. The licence will provide for a royalty payment to be made to Averna plc of £250 per scooter. In addition, a further royalty payment of £2.5 million will be made to Averna plc at the end of the licence agreement. Averna plc will, however, provide an immediate interest-free loan to Edusa Engineering Co of £2.0 million for the four-year period, at the end of which it is repaid. Additional administration costs of £0.1 million per year will be incurred by Averna plc under this option in order to monitor the licensing agreement.

Averna plc is financed by a mixture of ordinary shares and loan notes. The ordinary shares have a beta of 1.4. Returns to the market are 8 per cent and the risk-free rate is 3 per cent. The loan notes are irredeemable and have a coupon rate of 4 per cent. They are currently being traded at £80 per £100 nominal value. The target capital structure of the business is 80 per cent ordinary shares and 20 per cent loan notes.

Ignore taxation.

Required:

(a) Calculate the net present value for each option.
(b) Briefly state any qualifications that you may wish to make concerning the validity of the calculations made in (a) above.
(c) On the basis of the information available, which option would you choose and why?

8.7 Ndovu plc is considering investing in a new project and, in the past, it would have used a cost of capital of 10 per cent as the discount rate to assess new projects. This rate had been calculated by a team of consultants about seven years ago. However, the business feels that it would like to re-calculate its cost of capital, based on its current capital structure. This will be used as the discount rate for future projects.

A summary of Ndovu plc's latest statement of financial position for the year ended 30 November Year 9 is given below, together with additional information:

Statement of financial position as at 30 November Year 9

	£000
ASSETS	
Total assets	708,680
EQUITY AND LIABILITIES	
Equity	
Share capital	50,000
Retained earnings	369,470
	419,470
Non-current liabilities	
8% Year 14 Loan notes	150,000
7% Bank loans	120,000
	270,000
Current liabilities	19,210
Total equity and liabilities	708,680

Each share has a nominal value of £0.25 and Ndovu plc's P/E ratio is 11. It is the business's policy to have a dividend payout ratio of 40 per cent and the most recently declared dividends for the year to 30 November Year 9 were £0.18 per share. The rate of increase of the dividends has been stable over the past five years, increasing from £0.14 per share to the current rate. The risk-free rate of return is currently estimated as 5 per cent and the market return is estimated to be 10 per cent. Ndovu plc's most recent beta was given as 0.75.

The loan notes are redeemable in exactly five years at par and are currently trading at £103 per £100. Both the loan notes and the bank loan are secured on the non-current assets of Ndovu plc.

Ndovu plc pays tax at 25 per cent and tax is payable in the year incurred.

Required:

(a) Calculate Ndovu plc's cost of equity using both the capital asset pricing model (CAPM) and the dividend growth model, and explain why the two methods give different answers.
(b) Calculate Ndovu plc's weighted average cost of capital, based on the CAPM computed cost of equity.
(c) Discuss the appropriateness of using the weighted average cost of capital calculated in part (b) above as Ndovu plc's discount rate.

Chapter 9

MAKING DISTRIBUTIONS TO SHAREHOLDERS

INTRODUCTION

Businesses normally make distributions to shareholders by paying cash dividends. In this chapter, we shall examine this form of distribution and the issues that surround it.

The payment of dividends has provoked much debate over the years. At the centre of this debate is whether the pattern of dividends adopted by a business has any effect on shareholder wealth. We examine the arguments raised on each side of the debate and discuss the key assumptions employed.

Although the importance of dividends to shareholders remains a moot point, there is evidence to suggest that managers perceive the dividend decision to be important. We shall, therefore, consider the attitudes of managers towards dividends and identify those factors likely to influence dividend policy in practice.

Dividends do not have to be paid in cash. Many businesses offer shareholders a scrip dividend as an alternative to a cash dividend. We shall examine the advantages and disadvantages of this type of distribution to shareholders and its effect on the business.

Share buybacks provide an alternative means of distributing cash to shareholders. In recent years they have become very popular. We end this chapter by considering why share buybacks may be preferred to cash dividends and how they may lead to a conflict of interest between managers and shareholders.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Describe the nature of dividends and evaluate the arguments concerning their potential impact on shareholder wealth.

■ Identify and discuss the factors that influence dividend policy in practice.

■ Describe the nature of scrip dividends and discuss the case for and against this form of distribution.

■ Explain what share buybacks involve and discuss the main issues that they raise.

PAYING DIVIDENDS

It is probably a good idea to begin our examination of dividends and dividend policy by describing briefly what dividends are and how they are paid. **Dividends** represent a return by a business to its shareholders. This is normally paid in cash, although it could be paid with assets other than cash. There are legal limits on the amount that can be distributed in the form of dividend payments to shareholders.

Activity 9.1

Why do you think the law imposes limits on the amount that can be distributed as dividends?

If there were no legal limits, shareholders could withdraw their investment from the business and leave lenders and other creditors in an exposed financial position. The law therefore seeks to prevent excessive withdrawals of shareholder capital. One way of doing this is to restrict the amount that can be distributed through dividend payments.

The law states that dividends can be paid to shareholders only out of *accumulated realised profits less any accumulated realised losses.* This will generally mean that the maximum amount available will be the accumulated trading profits *plus* any accumulated profits on the sale of non-current assets. (Both types of profit are after deducting any losses incurred and after tax.) Accumulated profits arising from the revaluation of non-current assets are *unrealised profits* (as the asset is still held) and so cannot be distributed. Public companies are subject to the further restriction that, following a dividend payment, net assets must not be less than the issued share capital plus any non-distributable reserves.

Activity 9.2

Bio-tech Ltd, a private limited company, started trading in Year 1 and made a trading profit of £200,000 in this year. In Year 2, the business made a trading loss of £150,000 but made a profit on the sale of its office buildings of £30,000. Other non-current assets were revalued during the year, leading to a revaluation gain of £60,000. Assuming that no dividend was paid in Year 1, what is the maximum dividend that could be paid by Bio-tech Ltd in Year 2?

The revaluation gain, which is unrealised profit, cannot be taken into account when deciding the maximum dividend. This maximum is calculated as follows:

	£
Trading profit Year 1	200,000
Profit on sale of non-current asset Year 2	30,000
	230,000
Trading loss Year 2	(150,000)
Maximum amount available for distribution	80,000

Businesses rarely make a dividend payment based on the maximum amount available for distribution. The dividend payment is normally much lower than the trading profits for the particular year and so will be 'covered' by a comfortable margin.

In the UK, dividends are often paid twice yearly by listed businesses. The first dividend is paid after the interim (half-yearly) results have been announced and represents a 'payment on account'. The second and final dividend is paid after the year end. It is paid after the annual financial reports have been published and after the shareholders have agreed, at the annual general meeting, to the dividend payment proposed by the directors.

As shares are bought and sold continuously, it is important to establish which shareholders have the right to receive any dividends declared. To do this, a **record date** is set by the business. Shareholders whose names appear in the share register on the record date will receive the dividends payable. When the share prices quoted on the Stock Exchange include accrued dividends payable, they are said to be quoted **cum dividend**. However, on a specified day before the record date, the quoted share prices will exclude the accrued dividend and so will become **ex dividend**. Assuming no other factors affect the share price, the ex-dividend price should be lower than the cum-dividend price by the amount of the dividend payable.

Activity 9.3

Why do you think this is?

It is because a new shareholder would not qualify for the dividend and so the share price can be expected to fall by the amount of the dividend.

Most listed businesses publish a calendar that sets out key dates for shareholders for the financial year. **Real World 9.1** provides an example for one large business.

Real World 9.1

Financial calendar

Halma plc, which produces safety products and monitoring equipment, published the following calendar for the financial year to 31 March 2018.

Date	Event
15 Aug 2018	2017/18 Final Dividend: payment date
19 Jul 2018	Annual General Meeting
13 Jul 2018	2017/18 Final Dividend: record date
19 Jun 2018	2017/18 Annual Report and Accounts issued
12 Jun 2018	2017/18 Final Results
31 Mar 2018	2017/18 Year End
22 Mar 2018	Trading Update
07 Feb 2018	2017/18 Interim Dividend: payment date
29 Dec 2017	2017/18 Interim Dividend: record date
21 Nov 2017	2017/18 Half Year Results
30 Sep 2017	2017/18 Half Year End

Source: Extracts from Financial calendar, Halma plc, www.halma.com/investors/financial-calendar, accessed 21 January 2019.

DIVIDEND DISTRIBUTIONS IN PRACTICE

We mentioned above that dividends paid are normally lower than the profits available for this purpose. The extent to which profits for a period, which are available for dividend, cover the dividend payment can be expressed in the *dividend cover ratio.* This ratio is calculated as follows:

$$\text{Dividend cover} \;=\; \frac{\textbf{Earnings for the year available for dividends}}{\textbf{Dividends announced for the year}}$$

The dividend cover ratio has already been discussed in Chapter 3. We may recall that the higher the ratio, the lower the risk that dividends will be affected by adverse trading conditions. The inverse of this ratio is known as the *dividend payout ratio,* which was also discussed in Chapter 3. The lower this ratio, the lower the risk that dividends will be affected by adverse trading conditions.

Real World 9.2 provides an impression of average dividend payout ratios for listed businesses in selected industries in Western Europe. Factors influencing the level of payout are considered later in the chapter.

Real World 9.2

Dividend payout ratios

Figure 9.1 shows the average dividend payout ratios for various industries in Western Europe.
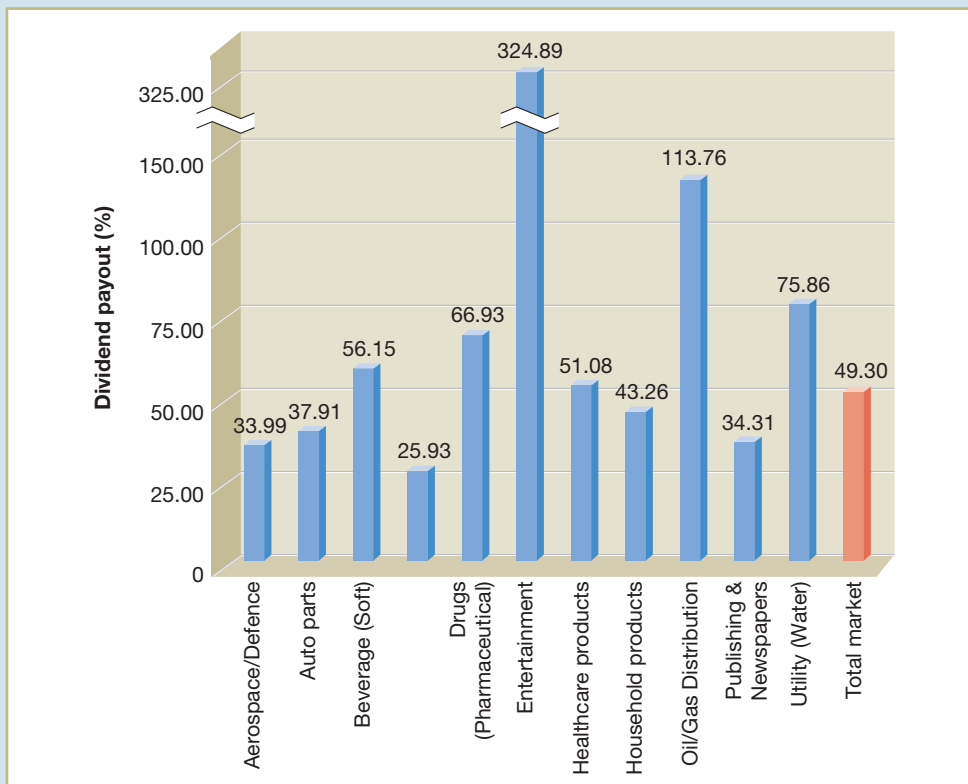
Figure 9.1 Average dividend payout ratios for businesses in selected industries in Western Europe

Source: Chart compiled from data in Damodaran, A., 'Useful Data Sets', http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html, accessed 23 January 2019.

Note that the average dividend payout ratio is over 100 per cent in some industries. This may indicate that businesses persist with a particular dividend policy even in the face of poor trading conditions. Note also there are significant variations in the payout ratio between the selected industries. Businesses in mature industries, for example, are likely to have higher payout ratios as their reinvestment needs are modest. Businesses in high growth industries, on the other hand, may wish to retain most, if not all, of their profits for reinvestment.

Dividend payout ratios may vary between countries according to the particular conditions that exist. Where there is easy access to capital markets, profit retention becomes less important and so dividend distributions can be higher. Other factors, such as the treatment of dividends for taxation purposes, can also exert an influence.

Setting dividend targets

Businesses will often set targets for dividend distributions. These may be expressed in various ways, such as a particular dividend payout ratio, an amount of dividend per share and a particular rate of growth in dividends. **Real World 9.3** provides some evidence of the dividend targets used by businesses.

Real World 9.3

Dividend targets

An international survey of 334 large businesses across a range of industries found that dividend targets varied. Figure 9.2 reveals the popularity of each type of target.

As the total percentage is greater than 100 per cent, some businesses clearly employ more than one target.
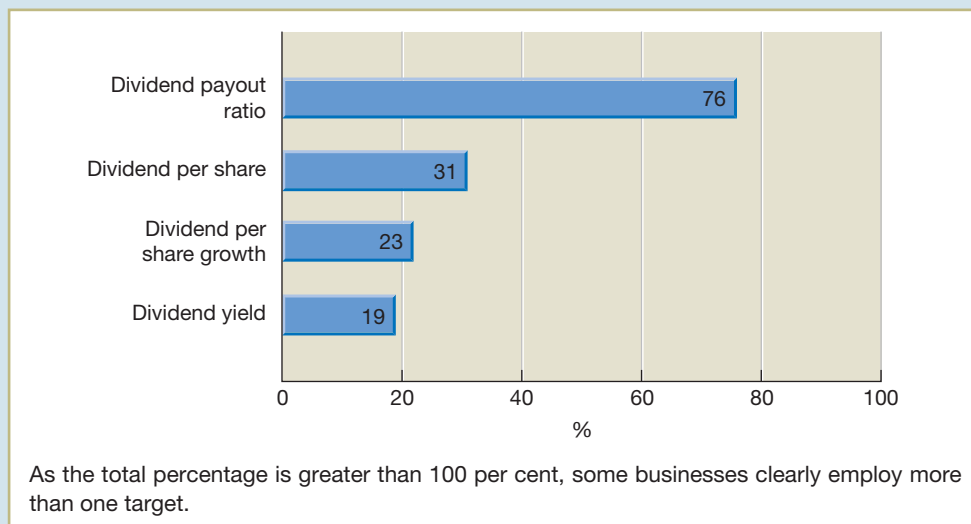
Figure 9.2 Dividend targets in practice

We can see that the dividend payout ratio (which presumably includes its variant, the dividend coverage ratio) is, by far, the most popular target. This applies to all geographical areas with the exception of Japan, where dividend per share is more popular. Dividends in Japan tend to be low, which may explain the focus on dividend level rather than the dividend payout ratio.

Source: Servaes, H. and Tufano, P. (2006) 'The theory and practice of corporate dividend and share repurchase policy', Deutsche Bank AG and Global Association of Risk Professionals, February, p. 26.

DIVIDEND POLICY AND SHAREHOLDER WEALTH

Much of the interest surrounding dividend policy is concerned with the relationship between dividend policy and shareholder wealth. Put simply, the key question to be answered is: can the pattern of dividends adopted by a business influence shareholder wealth? (Note that it is the *pattern* of dividends rather than dividends themselves that is the issue. Shareholders must receive cash at some point in order for their shares to have any value.) While the question may be stated simply, the answer cannot. After decades of research and debate, we have yet to solve this puzzle.

The notion that dividend policy is important may seem, on the face of it, to be obvious. In Chapter 8, for example, we considered various dividend valuation models, which suggest that dividends are important in determining share price. One such model, we may recall, was the dividend growth model, which is as follows:

$$P_0 = \frac{D_1}{K_0 - g}$$

where D_1 = expected dividend next year

g = a constant rate of growth

K_0 = the expected return on the share.

Looking at this model, it may appear that simply increasing the dividend ($D1$) will automatically increase the share price ($P0$). If the relationship between dividends and share price was as just described, then, clearly, dividend policy would be important. However, the relationship between these two variables is not likely to be as straightforward as this.

Activity 9.4

Why might an increase in the dividend (D_1) not lead to an increase in share price (P_0)? (*Hint:* Think of the other variables in the equation.)

An increase in dividend payments will result in an increase in share price only if there is no consequential effect on the dividend growth rate. It is likely, however, that an increase in dividend will result in a fall in this growth rate, as there will be less cash to invest in the business. Thus, the beneficial effect on share price arising from an increase in next year's dividend may be cancelled out by a decrease in future years' dividends.

The traditional view of dividends

The dividend policy issue, like the capital structure issue discussed in the previous chapter, has two main schools of thought: the traditional view and the modernist view. The early finance literature accepted the view that dividend policy was important for shareholders. It was argued that a shareholder would prefer to receive £1 today rather than to have £1 reinvested in the business, even though this might yield future dividends. The reasoning for this was that future dividends are less certain and so will be valued less highly. The saying

'a bird in the hand is worth two in the bush' is often used to describe this argument. Thus, if a business decides to replace an immediate and certain cash dividend with uncertain future dividends, shareholders will discount the future dividends at a higher rate in order to take account of this greater uncertainty. Referring back to the dividend growth model, the traditional view suggests that K_0 will rise if there is an increase in D_1 as dividends received later will not be valued so highly.

If this line of reasoning is correct, the effect of applying a higher discount rate to future dividends will be that the share price of a business intending to retain profits in order to pay dividends later will suffer. The implications for managers are therefore quite clear. They should adopt as generous a dividend distribution policy as possible, given the investment and financing policies of the business, as this will represent the optimal dividend policy. Furthermore, as the level of payout will affect shareholder wealth, the dividend decision is an important one.

The modernist (MM) view of dividends

Miller and Modigliani (MM) have challenged this view of dividend policy. They argue that, given perfect and efficient markets, the pattern of dividend payments adopted by a business has no effect on shareholder wealth. They make the point that shareholder wealth is affected only by the investment projects that the business undertakes. To maximise shareholder wealth, therefore, the business should take on all investment projects that have a positive NPV. The way in which returns from these investment projects are divided between dividends and retention is unimportant. Thus, a decision to pay a lower dividend will be compensated for by an increase in share price – and vice versa.

MM point out that it is possible for an individual shareholder to 'adjust' the dividend policy of a business to conform to his or her particular requirements. If a business does not pay a dividend, the shareholder can create 'home-made' dividends by selling a portion of the shares held. If, however, a business provides a dividend that the shareholder does not wish to receive, the amount can be reinvested in additional shares in the business. In view of this, there is no reason for a shareholder to value the shares of one business more highly than another simply because it adopts a particular dividend policy.

The implications of the MM position for managers are quite different from those of the traditional position described earlier. The MM view suggests that there is no such thing as an optimal dividend policy, and that one policy is as good as another (that is, the dividend decision is irrelevant to shareholder wealth). Thus, managers should not spend time considering the most appropriate policy to adopt, but should, instead, devote their energies to finding and managing profitable investment opportunities. A high dividend payout ratio will not convince investors to buy shares in a business with a poor record of exploiting investment opportunities. A low dividend payout ratio, on the other hand, will be accepted by investors if they believe a business is reinvesting its profits wisely.

The MM position explained

MM believe that dividends simply represent a movement of funds from inside the business to outside the business. This change in the location of funds should not have any effect on shareholder wealth. The MM position is set out in Example 9.1.

Example 9.1

Merton plc has the following statement of financial position as at 31 December Year 5:

Statement of financial position as at 31 December Year 5

	£m
Assets at market value (exc. cash)	60
Cash	30
Total assets	90
Ordinary (equity) share capital (30 million shares) plus reserves	90

Suppose that the business decides to distribute all the cash available (that is, £30m to shareholders by making a 100p dividend per share. This will result in a fall in the value of assets to £60m (that is, £90m – £30m) and a fall in the value of each share from £3 (that is, £90m/30m) to £2 (that is, £60m/30m). The statement of financial position following the dividend payment will therefore be as follows:

Statement of financial position following the dividend payment

	£m
Assets at market value (exc. cash)	60
Cash	–
Total assets	60
Ordinary (equity) share capital (30m shares) plus reserves	60

Before the dividend distribution, a shareholder holding 10 per cent of the shares in Merton plc will have:

	£m
3m shares at £3 per share	9

Following the distribution, the shareholder will have:

	£m
3m shares at £2 per share	6
plus a cash dividend of 3m × 100p	3
	9

In other words, the total wealth of the shareholder remains the same.

If the shareholder did not want to receive the dividends, the cash received could be used to purchase more shares in the business. Although the number of shares held by the shareholder will change as a result of this decision, his or her *total wealth* will remain the same. If, however, Merton plc did not issue a dividend and the shareholder wished to receive one, he or she could create the desired dividend by simply selling a portion of the shares held. Once again, this will change the number of shares held by the shareholder but will not change the total amount of wealth held.

What about the effect of a dividend payment on the amounts available for investment? We may feel that a high dividend payment will mean that less can be retained, which may, in turn, mean that the business cannot invest in all projects that have a positive NPV. If this occurs, then shareholder wealth will be adversely affected. However, if we assume that perfect and

efficient capital markets exist, the business will be able to raise the finance required for investment purposes and will not have to rely on profit retention. In other words, dividend policy and investment policy can be regarded as quite separate issues.

The wealth of existing shareholders should not be affected by raising finance from new issues rather than retention. Activity 9.5 reinforces this point.

Activity 9.5

Suppose that Merton plc (see Example 9.1) replaces the £30m paid out as dividends by an issue of shares to new shareholders. Show the statement of financial position after the new issue and calculate the value of shares held by existing shareholders after the issue.

The statement of financial position following the new issue will be almost the same as before the dividend payment was made. However, the number of shares in issue will increase. If we assume that the new shares can be issued at a fair value (that is, current market value), the number of shares in issue will increase by 15m shares (£30m/£2.00 = 15m).

Statement of financial position following the issue of new shares

	£m
Assets at market value (exc. cash)	60
Cash	30
Total assets	90
Ordinary (equity) capital (45m shares) plus reserves	90

The existing shareholders will own 30m of the 45m shares in issue and will, therefore, own net assets worth £60m ((30m/45m) × £90m)). In other words, their wealth will not be affected by the financing decision.

What about the traditional argument in support of dividend policy (that is, shareholders prefer 'a bird in the hand')? The answer is that they probably do not. The problem with this argument is that it is based on a misconception of the nature of risk. Risks borne by a shareholder will be determined by the nature of the business's operations and its level of borrowing. Risks do not necessarily increase over time, nor are they affected by the dividend policy of the business. Dividends will reduce risk for a shareholder only if the amount received is then placed in a less risky form of investment (with a lower level of return). This could equally be achieved, however, through the sale of the shares in the business.

Activity 9.6

There is one situation where even MM would accept that 'a bird in the hand is worth two in the bush' (that is, that immediate dividends are preferable). Can you think what it is? (*Hint*: Think of the way in which shareholder wealth is increased.)

Shareholder wealth is increased by the business accepting projects that have a positive NPV. If the business starts to accept projects with a negative NPV, this would decrease shareholder wealth. In such circumstances, a rational shareholder would prefer to receive a dividend rather than allow the business to reinvest any profits.

MM assumptions

The logic of the MM arguments has proved to be unassailable and it is now widely accepted that, in a world of perfect and efficient capital markets, dividend policy should have no effect on shareholder wealth. The burning issue, however, is whether or not the MM analysis can be applied to the real world of imperfect markets. There are four key assumptions on which the MM analysis rests, and these assumptions have aroused much debate. These assumptions are, in essence, that we live in a world where there are:

- no share issue costs
- no share transaction costs
- no taxes, and
- managers and investors behave rationally.

The first assumption means that money paid out in dividends can be replaced by the business through a new share issue without incurring additional costs. Thus, a business need not be deterred from paying a dividend simply because it needs cash to invest in a profitable project: this amount can be costlessly replaced. In the real world, however, share issue costs can be significant.

The second assumption means that shareholders can make 'home-made' dividends or reinvest in the business at no extra cost. In other words, there are no barriers to shareholders pursuing their own dividend and investment strategies. Once again, in the real world, costs will be incurred when shares are purchased or sold. The creation of 'home-made' dividends as a substitute for business dividend policy may pose other practical problems for the shareholder. These may include the indivisibility of shares, resulting in shareholders being unable to sell the exact amount of shares required, and the difficulty of selling shares in unlisted companies. Such problems, it is argued, can lead to shareholders becoming reliant on the dividend policy of the business as a means of receiving cash income. It can also lead them to have a preference for one business rather than another, because of the dividend policies adopted.

The third assumption concerning taxation is unrealistic and, in practice, tax may be an important issue for shareholders. It has been argued that, in the UK, taxation rules have a significant influence on shareholders' preferences. It may be more tax-efficient for shareholders to receive benefits in the form of capital gains rather than dividends. This is partly because, below a certain threshold (£11,700 for 2018/19), capital gains arising during a particular financial year are not taxable. Shareholders can also influence the timing of capital gains by choosing when to sell shares.

Activity 9.7

How might the taxation rules, as described above, affect the way in which the shares of different businesses are valued?

They are likely to lead shareholders to prefer capital gains to dividends. As a result, the shares of a business with a high dividend payout ratio would be valued less highly than those of a similar business with a low payout ratio.

Although differences between the tax treatment of dividend income and capital gains still exist, changes in taxation policy have narrowed these differences. One important change has been the creation of tax shelters (for example, Individual Savings Accounts, or ISAs),

which allow private shareholders to receive dividend income and capital gains free of taxation.

In recent years, the fourth and final assumption has been subject to much scrutiny. There is a growing body of research in behavioural finance that suggests managers and investors do not always behave in a rational manner. We shall see later that some of the evidence available indicates that investors may demonstrate an irrational bias concerning dividend-paying businesses.

The key assumptions identified undoubtedly weaken the MM analysis when applied to the real world. They do not appear so unreasonable, however, as to completely undermine their position. One way to assess the validity of MM's arguments is to see whether, in the real world, there is a positive relationship between share prices and dividends paid by businesses. The evidence available suggests that share values are related to the pattern of dividends. Although this is not good news for the MM position, the evidence is open to interpretation. Perhaps MM were broadly correct in their view that the dividend pattern does not affect share values. However, changes in dividends may also change investors' views concerning the future value of the business. In other words, it is the information that these dividend changes convey, rather than the dividends themselves that is important. We shall return to this point a little later in the chapter.

The thoughts of Chairman Buffett

Warren Buffett, chairman and chief executive officer of Berkshire Hathaway Inc., has consistently resisted calls for the business to pay dividends. He believes that it is better for shareholders to create 'home-made' dividends, despite the points made earlier. In **Real World 9.4**, he demonstrates the wealth-enhancing effects of adopting this strategy.

Real World 9.4

Dividend lesson

We'll start by assuming that you and I are the equal owners of a business with $2 million of net worth. The business earns 12% on tangible net worth – $240,000 – and can reasonably expect to earn the same 12% on reinvested earnings. Furthermore, there are outsiders who always wish to buy into our business at 125% of net worth. Therefore, the value of what we each own is now $1.25 million.

You would like to have the two of us shareholders receive one-third of our company's annual earnings and have two-thirds reinvested. That plan, you feel, will nicely balance your needs for both current income and capital growth. So you suggest that we pay out $80,000 of current earnings and retain $160,000 to increase the future earnings of the business. In the first year, your dividend would be $40,000, and as earnings grew and the one-third payout was maintained, so too would your dividend. In total, dividends and stock value would increase 8% each year (12% earned on net worth less 4% of net worth paid out).

After ten years, our company would have a net worth of $4,317,850 (the original $2 million compounded at 8%) and your dividend in the forthcoming year would be $86,357. Each of us would have shares worth $2,698,656 (125% of our half of the company's net worth). And we would live happily ever after – with dividends and the value of our stock continuing to grow at 8% annually.

There is an alternative approach, however, that would leave us even happier. Under this scenario, we would leave *all* earnings in the company and each sell 3.2% of our shares

→

annually. Since the shares would be sold at 125% of book value, this approach would produce the same $40,000 of cash initially, a sum that would grow annually. Call this option the 'sell-off' approach.

Under this 'sell-off' scenario, the net worth of our company increases to $6,211,696 after ten years ($2 million compounded at 12%). Because we would be selling shares each year, our *percentage* ownership would have declined, and, after ten years, we would each own 36.12% of the business. Even so, your share of the net worth of the company at that time would be $2,243,540. And, remember, every dollar of net worth attributable to each of us can be sold for $1.25. Therefore, the market value of your remaining shares would be $2,804,425, about 4% greater than the value of your shares if we had followed the dividend approach. Moreover, your annual cash receipts from the sell-off policy would now be running 4% more than you would have received under the dividend scenario. Voilà! – you would have both more cash to spend annually *and* more capital value.

This calculation, of course, assumes that our hypothetical company can earn an average of 12% annually on net worth and that its shareholders can sell their shares for an average of 125% of book value. To that point, the S&P 500 earns considerably more than 12% on net worth and sells at a price far above 125% of that net worth. Both assumptions also seem reasonable for Berkshire, though certainly not assured. Moreover, on the plus side, there also is a possibility that the assumptions will be exceeded. If they are, the argument for the sell-off policy becomes even stronger. Over Berkshire's history – admittedly one that won't come close to being repeated – the sell-off policy would have produced results for shareholders *dramatically* superior to the dividend policy.

Aside from the favourable maths, there are two further – *and important* – arguments for a sell-off policy. First, dividends impose a specific cash-out policy upon all shareholders. If, say, 40% of earnings is the policy, those who wish 30% or 50% will be thwarted. Our 600,000 shareholders cover the waterfront in their desires for cash. It is safe to say, however, that a great many of them – perhaps even most of them – are in a net-savings mode and logically should prefer no payment at all.

The sell-off alternative, on the other hand, lets each shareholder make his own choice between cash receipts and capital build-up. One shareholder can elect to cash out, say, 60% of annual earnings while other shareholders elect 20% or nothing at all. Of course, a shareholder in our dividend-paying scenario could turn around and use his dividends to purchase more shares. But he would take a beating in doing so: He would both incur taxes and also pay a 25% premium to get his dividend reinvested. (Keep remembering, open-market purchases of the stock take place at 125% of book value.)

The second disadvantage of the dividend approach is of equal importance: the tax consequences for *all* taxpaying shareholders are inferior – usually *far* inferior – to those under the sell-off program. Under the dividend program, all of the cash received by shareholders each year is taxed whereas the sell-off program results in tax on only the gain portion of the cash receipts.

THE IMPORTANCE OF DIVIDENDS

Whether or not we find the MM analysis, or the points made by Warren Buffett, compelling, there is little doubt that, in practice, the pattern of dividends is seen by shareholders and managers to be important. This implies that dividend policy must be carefully managed. There seems to be four main explanations for the perceived importance of dividends. These are:

- the clientele effect
- the catering effect
- the information signalling effect
- the need to reduce agency costs.

Each of these is considered below.

The clientele effect

We mentioned earlier that share transaction costs may result in shareholders becoming reliant on the dividend policies of businesses. It was also argued that the tax position of shareholders can exert an influence on whether dividends or capital gains are preferred. These factors may, in practice, mean that dividend policy will exercise an important influence on shareholder behaviour. Shareholders may seek out businesses whose dividend policies match closely their particular needs. Thus, individuals with high marginal tax rates may invest in businesses that retain their profits for future growth, whereas pension funds, which are tax exempt and require income to pay pensions, may invest in businesses with high dividend distributions. This phenomenon – that the particular policies adopted by businesses tend to attract different types of investors – is referred to as the *clientele effect*.

Activity 9.8

We came across the clientele effect in a previous chapter. Can you recall the context in which it was discussed?

We saw in the previous chapter that investors may be attracted to a particular business based on the gearing policy that it adopts.

The existence of a clientele effect has important implications for managers. First, dividend policy should be clearly set out and consistently applied. Shareholders attracted to a particular business because of its dividend policy will not welcome unexpected changes. It will create uncertainty in their minds and may well lead to a sell off of shares. Second, managers need not concern themselves with trying to accommodate the needs of different shareholders. The particular distribution policy adopted by the business will tend to attract certain types of shareholders depending on their needs and tax position.

Shareholders should be wary, however, of making investment decisions primarily based on dividend policy. To begin with, minimising costs may prove more difficult than expected. Suppose that shareholders requiring a regular cash income seek out businesses with high dividend payout ratios. By so doing, they may discover that savings in transaction costs are cancelled out by incurring other forms of cost.

Activity 9.9

What kind of costs may be borne by shareholders who invest in high dividend payout businesses?

Being committed to a high dividend payout may prevent a business from investing in profitable projects. Hence, there could be a loss of future benefits for shareholders. If, however, a business decides to raise finance to replace the amount distributed in dividends, the costs of raising the required finance will be borne by existing shareholders.

A further problem is that it can result in an unbalanced portfolio of investments. Certain types of businesses and industries will simply not feature. For example, in the search for a regular cash income, high-growth businesses that choose to re-invest their profits, may be excluded. It is, therefore, a good idea for shareholders to look beyond dividend policy when making investment decisions.

Evidence concerning the clientele effect is mixed, with studies supporting both sides of the debate. Overall, however, tax issues seem to be of only secondary importance in the dividend decision (see reference 1 at the end of the chapter).

The catering effect

The **catering effect** is really a dynamic version of the clientele effect. Here, it is argued that managers will try to cater to the wishes of investors. As a result, the amount of dividend paid will be based on investor demands. These demands will not be constant – they will change over time. When a change occurs, managers will try to respond. The catering effect provides one explanation as to why, over time, dividends seem to appear and then disappear from the corporate landscape.

Investor demands are often conveyed indirectly to managers through a higher, or lower, value being placed on dividend-paying businesses. What drives these demands? It is claimed that the key driver is sentiment, which can easily change. When seeking greater safety, for example, investors may value dividend-paying businesses at a premium. This is because they are considered less risky than growth-oriented businesses. When seeking growth in share value, however, investors may value dividend-paying businesses at a discount. They would prefer profits to be retained in order to fuel further growth. To support catering theory, there is evidence that dividends are initiated by businesses when investors place a premium on dividend-paying businesses (see reference 2 at the end of the chapter).

Activity 9.10

To what extent is catering theory consistent with MM theory?

Not at all. We have seen that, according to MM, the dividend decision has no effect on shareholder wealth. As a result, no dividend policy is better than any other. Thus, if shares of dividend-paying businesses trade at a premium, or at a discount, they are being mispriced by investors. (A key assumption of MM is that investors act in a rational manner.)

Catering theory implies that investors do not always act rationally. By responding to their demands, however, managers are acting rationally. They are taking advantage of share mispricing by paying dividends when dividend-paying businesses are trading at a premium and not paying dividends when they are trading at a discount. The short-term benefits accruing from such a policy are seen as outweighing any longer-term costs incurred when share prices eventually correct.

Information signalling

In an imperfect world, managers have greater access to information regarding the profits and performance of the business than shareholders. This **information asymmetry**, as it is called, may lead to dividends being used by managers as a means of conveying information to

shareholders. New information relating to future prospects may be signalled through changes in dividend policy. If, for example, managers are confident about future prospects, they may undertake **information signalling** by increasing the dividend to shareholders.

Activity 9.11

Why would managers use dividends as a means of conveying information about the business's prospects? Why not simply issue a statement to shareholders? Try to think of at least one reason why managers may prefer to use dividends as a means of signalling information.

At least two reasons have been put forward to explain why signalling through dividend payments may be used by managers, rather than a statement of future prospects. First, they do not want to disclose the precise nature of the events that will change the business's prospects. Suppose, for example, that a business has signed a large government defence contract, which will be formally announced by the government at some time in the future. In the intervening period, however, the share price may be depressed and the managers may be concerned that the business is vulnerable to a takeover. Under these circumstances, they may wish to boost the share price without specifying the nature of the good news.

Second, managers may feel that an explicit statement concerning future prospects will attract criticism from shareholders if things do not work out as expected. They may, therefore, prefer more coded messages to avoid being held to account at a later date.

Sending a positive signal to the market by increasing dividends is an expensive way to send a message. It may also seem wasteful (particularly where shareholders do not wish to receive higher dividends for tax reasons). However, it may be the only feasible way of ensuring that shareholders take seriously the good news that managers wish to convey. Issuing a statement about brighter future prospects may not be convincing, particularly if earlier statements by managers have proved incorrect. Managers may only be believed if their claims are accompanied by an increase in dividends. Statements are 'cheap' whereas an increase in dividends provides more solid evidence of the managers' confidence in the future.

Various studies have been carried out to establish the 'information content' of dividends. Some of these have looked at the share price reaction to *unexpected* changes in dividends. If signalling exists, an unexpected dividend announcement should result in a significant share price reaction. The results suggest that signalling does exist; that is, a dividend increase (positive signal) results in an increase in share price, and a dividend decrease (negative signal) results in a decrease in share price. One interesting finding is that market reaction to dividend reductions tends to be much greater than market reaction to dividend increases. It seems that shareholders regard negative signals much more seriously. It is not surprising, therefore, that managers are reluctant to cut dividends. They may even forgo value-enhancing investment opportunities to avoid doing so.

Activity 9.12

What does the evidence described on share price reaction to changes in dividend imply about the level of market efficiency?

→

It implies that markets are not efficient in the strong form. If they were, there would be no share price reaction to dividend changes. This information would already be incorporated in the share price.

While the evidence concerning signalling is, almost inevitably, mixed, there appears to be more support for this explanation concerning the importance of dividends than any other.

Real World 9.5 provides an example of one well-known business that restored its dividend after a difficult period. This was interpreted as an important signal of recovery.

Real World 9.5

Sending a signal

Tesco chief Dave Lewis will this week attempt to confirm the supermarket giant's comeback by restoring its dividend, even as the alleged 'colossal fraud' that blew a hole in its finances is laid bare in court.

Mr Lewis, who was drafted in to lead a salvage operation at Tesco three years ago after investigators uncovered hundreds of millions of pounds of missing profits, scrapped the dividend months into his reign to help repair the balance sheet (statement of financial position).

Its expected return as part of Tesco's half-year results on Wednesday comes as investor nerves are tested by the high-profile trial of three former senior executives accused of masterminding a scheme to 'cook the books'.

Bruno Monteyne, an analyst at Bernstein, has said that, while the size of any dividend may be small, it will be 'important symbolically, signalling the next stage of the Tesco recovery to the market'.

Source: Extracts from Armstrong, A. (2017) 'Tesco to signal comeback with return to dividend', *Daily Telegraph*, 30 September.

A final point worth mentioning is that the evidence in support of signalling theory suggests that the pattern of dividends can have an effect on shareholder wealth. Hence it provides a challenge to the MM position.

Reducing agency costs

In recent years, *agency theory* has become increasingly influential in the financial management literature. This theory views a business as a coalition of different interest groups (managers, shareholders, lenders and so on) in which each group is seeking to maximise its own welfare. According to agency theory, one group connected with the business may engage in behaviour that results in costs being borne by another group. However, the latter group may try to restrain the action of the former group, through contractual or other arrangements, so as to minimise these costs. Two examples of where a conflict of interest arises between groups, and their impact on dividend policy, are considered below.

The first example concerns a conflict of interest between shareholders and managers. If managers (who are agents of the shareholders) decide to invest in lavish offices, expensive cars and other 'perks', they are pursuing their own interests at the cost of shareholders' interests. (This point was discussed briefly in Chapter 1.) Similarly, managers who decide to pursue their own pet projects may also incur costs for shareholders. Unsurprisingly, shareholders may seek to avoid both types of cost.

What role might dividends play in helping shareholders avoid these costs?

Paying dividends reduces the cash available for managers to spend. Shareholders may, therefore, insist that surplus cash be distributed to them in the form of a dividend.

It is often in the interests of managers to support this move as agency costs can prevent them from receiving full recognition for their achievements. Helping to reduce these costs could therefore be to their benefit.

The second example concerns a conflict between shareholders and lenders. Shareholders may try to reduce their stake in the business through withdrawals in the form of dividends. This may be done to reduce exposure to the risks associated with the business. Lenders, however, may seek to prevent this from happening as it would lead to them becoming more exposed to these risks. They may, therefore, impose restrictions on the dividends paid to shareholders.

Activity 9.14

How can lenders go about restricting shareholders' rights to dividends? (*Hint:* Think back to Chapter 6.)

Lenders can insist that loan covenants, which impose a restriction on the level of dividends payable, be included in the loan agreement.

Note that action taken by shareholders to avoid agency costs may lead to an increase in dividends, whereas action taken by lenders to avoid agency costs may lead to a reduction in dividends.

There is some evidence to support the importance of agency costs in determining dividends. It is not, however, very strong.

Figure 9.3 summarises the main reasons why dividends are important in the real world.
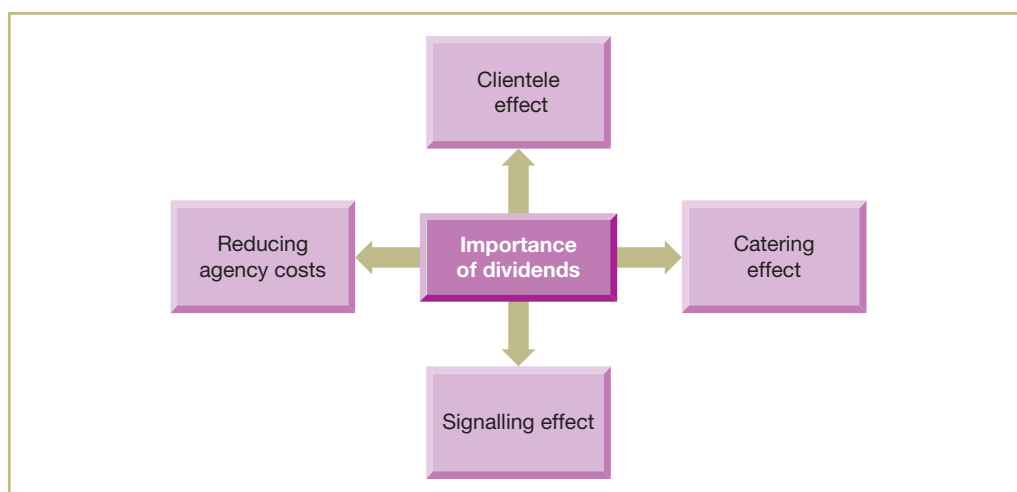
Figure 9.3 Reasons for the importance of dividends

To sum up, we can say that, while each of the reasons discussed offer some insights to the perceived importance of dividends, the evidence gathered to date suggests that none of them provides a dominant view.

FACTORS DETERMINING THE LEVEL OF DIVIDENDS

We have now seen that there are four possible reasons why shareholders and managers regard dividends as being important. In addition, there are various factors that have a bearing on the level of dividends paid by a business. Managers must somehow weigh these factors to arrive at an appropriate dividend. These factors include the following.

Investment opportunities

Businesses with good investment opportunities may try to retain profits rather than distribute them. Investment opportunities may vary over the life cycle of a business and so its retention/dividend policies may also vary. At an early stage, when opportunities abound, a policy of low dividends or no dividends may be chosen in order to retain profits for reinvestment. At a more mature stage of the cycle, however, when investment opportunities are limited, a policy of higher dividends may be chosen.

Asos plc, the online fashion retailer, has never paid a dividend so as to retain funds for expansion. **Real World 9.6**, which is an extract from its 2018 annual report, sets out the priorities of the business.

Real World 9.6

Dividends not fashionable

Dividend policy

> Once again, we've decided not to declare a dividend, but to reinvest capital to build strong foundations for our continued growth. We believe this is right for the business given the rate of return on our investments, and will help us to create significant value for our shareholders.

Source: Asos plc, Annual Report and Accounts 2018, p. 23.

Financing opportunities

Where raising external finance for new investment is a problem, profit retention may be the only option available. Under these circumstances, it may make sense for managers to regard dividends as simply a residual (assuming existing shareholders are indifferent towards dividends). Paying dividends would be appropriate only where the expected return from investment opportunities is below the required return for shareholders. This means that dividends may fluctuate each year according to the investment opportunities available. Where, however, a business can raise finance easily and cheaply from external sources, retained profits become less important and can be paid as dividends.

Legal requirements

UK company law restricts the amount that a business can distribute in the form of dividends. We saw earlier that the law states that dividends can only be paid to shareholders out of realised profits. In essence, the maximum amount available for distribution will be the accumulated trading profits (less any losses) plus any profits on the disposal of assets.

Loan commitments

Covenants included in a loan contract may restrict the dividends available to shareholders during the loan period. These covenants, as we saw in Chapter 6, are designed to protect the lenders' investment in the business. Even where a loan agreement does not impose any restriction on dividend payments, a business must retain its capacity to make interest and debt payments when they fall due. This may mean that dividends have to be restricted in order to conserve cash.

Profit stability

Businesses that have a stable pattern of profits over time are in a better position to make higher dividend payouts than those that have a volatile pattern of profits.

Activity 9.15

Why should this be the case?

Businesses with a stable pattern of profits are able to plan with greater certainty and are less likely to feel a need to retain profits for unexpected events.

Control

A high-profit-retention/low-dividend policy can help avoid the need to issue new shares, and so existing shareholders' control will not be diluted. (Even though existing shareholders may have pre-emptive rights, they may not always be in a position to buy new shares issued by the business.)

Threat of takeover

It has been suggested that a high-retention/low-dividend-distribution policy can increase the vulnerability of a business to takeover.

Activity 9.16

Can you figure out the possible reasoning behind this suggestion?

A predator business may try to convince shareholders in the target business that the existing managers are not maximising their wealth. Their record of low dividend payments may be cited as evidence.

However, dividends represent only part of the total return from the shares. A record of low dividends is, therefore, not clear evidence of mismanagement. Shareholders will normally recognise this fact. (If profits are retained rather than distributed, however, they must be employed in a profitable manner. Failure to do this will increase the threat of takeover.)

Dividends are sometimes used to try to avert the threat of takeover. Managers may increase the dividend payout to signal to shareholders their confidence in the future prospects of the business. If shareholders interpret the dividend in this way, there may be an increase in share price and an increase in the cost of the takeover for the predator business. However, shareholders may not interpret a large dividend payment in the way managers expect. They may simply regard it as a desperate attempt by managers to gain their support and so the share price will not respond positively to the news.

Real World 9.7 discusses a case where a dividend increase appears to have been used as a defensive move.

Real World 9.7

On the defensive

German utility Uniper has promised to raise its dividend by 25 per cent every year until 2020, as it battles to win over shareholders and fend off a hostile takeover from Finnish rival Fortum. 'We clearly believe that Uniper's shareholders get a great offer from us if they decide to keep their shares and decide not to tender into Fortum's current offer,' chief executive Klaus Schäfer told analysts and investors on Thursday.

Fortum has already signed an agreement to buy the 47 per cent stake in Uniper that is currently owned by another German utility Eon. The transaction has yet to be completed, though Eon would have to pay a significant break fee if the deal falls through.

Uniper's management has made clear it wants to keep the company independent, insisting that Fortum's offer does not reflect the utility's 'true value'. Thursday's strategy update was designed to bolster that case, presenting Uniper's plans to return more cash to shareholders in the years ahead. The company had already said it would raise its annual dividend by 25 per cent next year. On Thursday, Uniper extended that promise into the medium term, saying annual dividends would increase by an average 25 per cent until 2020.

Market expectations

Shareholders may have developed certain expectations concerning the level of dividend to be paid. These expectations may be formed by various events such as earlier management announcements and past dividend payments. If these expectations are not met, there may well be a loss of shareholder confidence in the business. Where, for example, the market expects an increase in dividend payments and the actual increase is less than expected, the share price is likely to fall.

Inside information

Managers may have inside information concerning future prospects that cannot be published. However, this information may indicate that the shares are currently undervalued. To raise

equity finance by an issue of shares under such circumstances would involve selling them at an undervalued price. This would, in effect, result in a transfer of wealth from existing shareholders to those investors who take up the new share issue. In such a situation, it would be more sensible to raise further equity finance by retaining profits rather than by issuing more shares.

Activity 9.17

With which theory, which we have already discussed, would this behaviour be consistent? (*Hint*: Think back to Chapter 6.)

Pecking order theory suggests that retained profits will be used by a business before the issue of new debt or equity finance.

Figure 9.4 sets out the main influences on the level of dividends declared by a business.

These factors influencing the level of dividends have been discussed in this section.
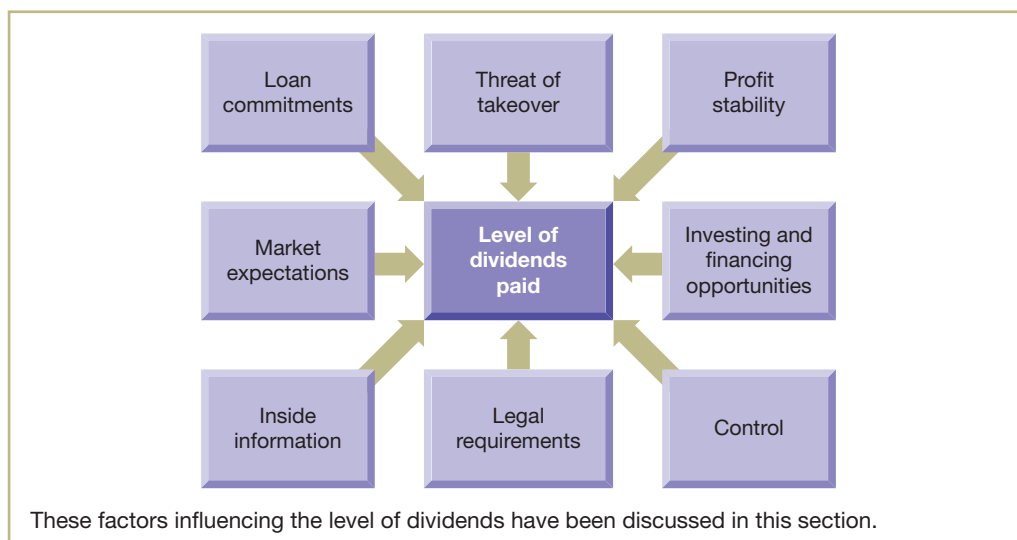
Figure 9.4 Factors influencing the level of dividends

The dividend policy of other businesses

It has been argued that shareholders make comparisons between businesses. Any significant deviation in dividend policy from the industry norm will, therefore, attract criticism. The implication seems to be that managers should shape the dividend policy of their business according to what comparable businesses are doing. This, however, may be neither practical nor desirable.

To begin with, there is the problem of identifying comparable businesses as a suitable benchmark. Significant differences often exist between businesses concerning risk characteristics and rates of growth as well as other key factors influencing dividend policy such as financing opportunities, loan covenants and so on. There is also the problem that, even if comparable businesses could be found, it cannot be automatically assumed that they adopt optimal dividend policies.

These problems suggest that dividend policy is best determined according to the particular requirements of the business. If the policy adopted differs from the norm, managers should be able to provide valid reasons.

DIVIDEND POLICY AND MANAGEMENT ATTITUDES: SOME EVIDENCE

An important aspect of the dividend policy debate is the attitudes and behaviour of managers. One of the earliest pieces of research on this topic was undertaken in the US by Lintner (see reference 3 at the end of the chapter), who carried out interviews with managers in 28 businesses. Although this research is now pretty old, it is still considered to be one of the most accurate descriptions of how managers set dividend policy in practice.

Lintner found that managers considered the dividend decision to be an important one and were committed to long-term target dividend payout ratios. He also found that managers were concerned more with variations in dividends than with the absolute amount of dividends paid. Managers took the view that shareholders preferred a smooth increase in dividend payments over time and were reluctant to increase the level of dividends in response to a short-term increase in profits. They wished to avoid a situation where dividends would have to be cut in the future, and so dividends were increased only when it was felt that the higher level of dividends could be sustained through a permanent increase in earnings. As a result, there was a time lag between dividend growth and earnings growth.

Activity 9.18

Is the reluctance of managers to cut dividends, found by Lintner, consistent with another view of dividends discussed earlier?

It is consistent with more recent work concerning the use of dividends as a means of information signalling. The managers interviewed seem aware of the fact that a dividend cut would send negative signals to shareholders.

Since Lintner's seminal work, more recent surveys have largely supported his findings.

Fama and Babiak (see reference 4 at the end of the chapter) found that businesses distributed about half of their profits in the form of dividends. However, significant increases in earnings would only be followed by a *partial adjustment* to dividends in the first year. On average, the increase in dividends in the first year was only about one-third of the increase that would have been consistent with maintaining the target payout ratio. The smooth and gradual adjustment of dividends to changes in profits revealed by this study is consistent with the earlier study by Lintner and confirms that managers wish to ensure a sustainable level of dividends.

Where a business experiences adverse trading conditions, DeAngelo and others (see reference 5 at the end of the chapter) found that managers are often reluctant to reduce dividend payments immediately. Instead, they try to maintain the existing level of dividends until it becomes clear that former profit levels cannot be achieved. At this point, they will usually make a single large reduction, rather than a series of small reductions to a new level of dividends.

A study by Baker and others (see reference 6 at the end of the chapter) asked US managers to express their views concerning dividend policy. Some of the key findings regarding managers' attitudes are shown in **Real World 9.8**.

Managers' attitudes towards dividends

Baker and others surveyed 188 managers of US, dividend-paying, listed businesses. The researchers wished to establish the views of managers concerning dividend policies adopted, why dividends are important and whether dividends affected the value of the business. Figure 9.5 sets out some of the key statements that managers were asked to consider and their responses.

	Agree %		Disagree %		No opinion %
1 A firm should avoid increasing its regular dividend if it expects to reverse the dividend decision in a year or so	93.1		5.3		1.6
2 A firm should strive to maintain an uninterrupted record of dividend payments	95.2		1.6		3.2
3 Dividends generally follow a smoother path than earnings	92.0		3.7		4.3
4 A firm should formulate its dividend policy to produce maximum value for its shareholders	80.7		6.9		12.3
5 A change in a firm's cash dividends affects its value	65.2		10.2		24.6
6 Investors generally regard dividend changes as signals about a firm's future prospects	77.7		6.5		15.8
7 Investors generally prefer cash dividends today to uncertain future price appreciation	17.2		54.9		28.0
8 A firm should be responsive to the dividend preferences of its shareholders	59.6		18.3		22.0
9 The payment of dividends encourages a firm's managers to act in the interest of the firm's outside shareholders	38.9		24.3		36.8

The figure sets out some of the key results of the study by Baker and others.

Figure 9.5 The attitude of managers towards dividends

The study reveals that the majority of managers acknowledge the importance of a smooth, uninterrupted pattern of dividends. This is in line with the earlier findings of Lintner. The majority of managers acknowledge the signalling effect and clientele effect but not the role of dividends in reducing agency costs. Their views, therefore, do not fully support the reasons concerning why dividends are important. Finally, the study reveals that the majority of managers do not support the bird-in-the-hand argument, and they therefore reject the traditional view. A more recent survey of the attitudes of managers of Canadian businesses, by Baker and others, found similar results to those above (see reference 7 at the end of the chapter).

DIVIDEND SMOOTHING IN PRACTICE

For many businesses, the pattern of dividends tends to be smoother than the pattern of underlying earnings. Given the attitude of managers as described above, this should come as no surprise. The question is, however, why does such an attitude persist? Is a smooth pattern of dividends linked to higher share returns? The evidence suggests that no such link exists. (See, for example, reference 8 at the end of the chapter.) When confronted with such evidence, the attitude of managers is difficult to understand.

Real World 9.9 provides one example of a business where dividend smoothing is very evident.

Real World 9.9

A real smoothie

BP plc is a major energy business. Over the seven-year period to 31 December 2017, basic earnings per share (EPS) and dividends per share (DPS) for the business were as set out in Figure 9.6.

The figure shows that, whereas the basic earnings per share have been erratic, dividends per share have followed a smooth path over the seven-year period.
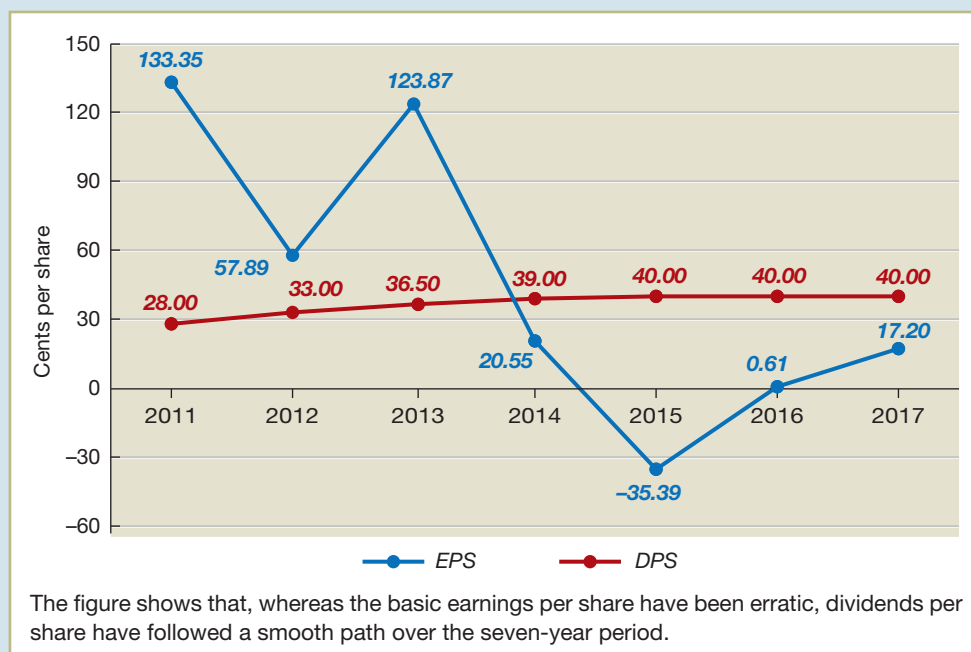
Figure 9.6 Earnings and dividends per share for BP plc over time

Sources: Based on information in BP Annual Report and Form 20 F 2015, p. 216, and 2017, p.153 www.bp.com.

WHAT SHOULD MANAGERS DO?

We have now seen that setting a dividend policy involves taking account of many different, and often competing, issues. You may be wondering, therefore, what advice we should give managers who are wrestling with this problem. The following broad guidelines should be of some help:

- each business has its own unique characteristics. Hence, no 'one size fits all' approach can be applied.
- dividend policy is intertwined with the investment and financing decisions of the business. It should not, therefore, be considered in isolation.
- the dividend policy of the business must be made clear to shareholders and every effort should be made to stick to it. Shareholders do not welcome 'surprises'. They may react by selling their shares and investing in businesses with more stable and predictable dividend policies.
- if, for any reason, the dividends for a particular period must be cut, managers should prepare shareholders for the change and state clearly the reasons.

Dividends and financial policy

So far in this book we have dealt with three major areas of financial policy: the investment decision, the financing decision and the dividend decision. **Real World 9.10** provides some evidence concerning the importance of each to chief financial officers.

Real World 9.10

And the winner is . . .

A survey of investment and financing practices in five different countries was carried out by Cohen and Yagil (see Real World 4.7). This survey, based on a sample of the largest 300 businesses in each country, asked chief financial officers to rate the importance of the investment, financing and dividend decisions for their business using a scale from 1 (not important) through to 5 (very important). The survey results revealed the following scores:

	Mean score
Investment	4.23
Financing	3.90
Dividend	2.78

Although the dividend decision scored significantly lower than both the investment and financing decisions, there were significant differences in the importance assigned to the dividend decision between countries. It was considered more important in the UK (3.40) and Japan (3.57) than in the USA (2.58) and Canada (2.06).

Source: Cohen, G. and Yagil, J. (2007) 'A multinational survey of corporate financial policies', *Journal of Applied Finance*, vol. 17, no. 1.

ALTERNATIVES TO CASH DIVIDENDS

A business may make distributions to shareholders in a form different from a cash dividend. The two most important of these are scrip dividends and share buybacks. Below we consider each of these options.

Scrip dividends

A **scrip dividend** (or bonus share dividend) involves the issue of shares rather than the payment of cash to shareholders. The number of shares issued to each shareholder will be in proportion to the number of shares held. Thus, a 1-for-20 scrip dividend will mean that each shareholder will receive 1 new share for every 20 shares held. Making a scrip dividend simply involves the transfer of an amount from reserves to ordinary share capital. Total equity remains unchanged. Shares are then issued to shareholders that are equivalent in value to the amount transferred. Shareholder wealth should be unaffected by this procedure and so we might well ask why scrip dividends are made.

From the business's perspective, an important advantage is that making a scrip dividend conserves the cash balance whereas a cash dividend does not. From the shareholders' perspective, it provides the opportunity to increase their investment in the business without incurring share transaction costs. If the intention is to reinvest in the business, it is preferable to a cash dividend.

Activity 9.19

Often, shareholders are given the choice as to whether they wish to receive dividends in the form of cash or new shares. How might a business benefit by offering its shareholders this choice?

It may widen the appeal of the shares by making them attractive to both income-seeking and growth-seeking shareholders. In addition, the more shareholders opting for the scrip dividend, the less cash the business will have to pay out.

Real World 9.11 provides evidence of the recent trend towards businesses offering their shareholders scrip dividend in order to help conserve cash.

Real World 9.11

Keeping hold of the cash

European companies have reduced their cash dividend payouts by £55bn over the past three years by offering scrips instead, in a move that has gone 'largely unnoticed' and resulted in 'overstated' equity yields, according to new research. One in eight UK and European companies have used scrip dividends – which give investors the option of being paid in shares rather than cash – since 2014, analysis from equity research house Redburn showed on Monday.

Scrips are offered as a way of reducing cash outflow without cutting headline dividends per share. However, they come at the cost of diluting existing shareholders. Companies have been able to 'reduce' their cash dividend payouts by £55bn in this way between the financial years of 2014 and 2017, Redburn said, which is equivalent to about £1 in every £14 of all dividends declared. Redburn forecasts that a further £13bn in cash will be saved through issuing scrips in the latest financial year to the end of June.

In the wake of the financial crisis, a number of companies – including most large European banks – turned to paying investors partly in new shares, rather than cash. Large oil companies such as Shell, Total and BP also initiated scrip dividend programmes following the 2014 oil price crash, although some are now returning to cash. Redburn argued that scrips are 'wrongly considered by the market as part of the value returned to shareholders through dividends'. Based on this assumption, it said companies have preserved 34 per cent of the total dividend value they have declared through offering scrips over the three-year period. [The extent to which companies use scrip dividends is shown in Figure 9.7.]
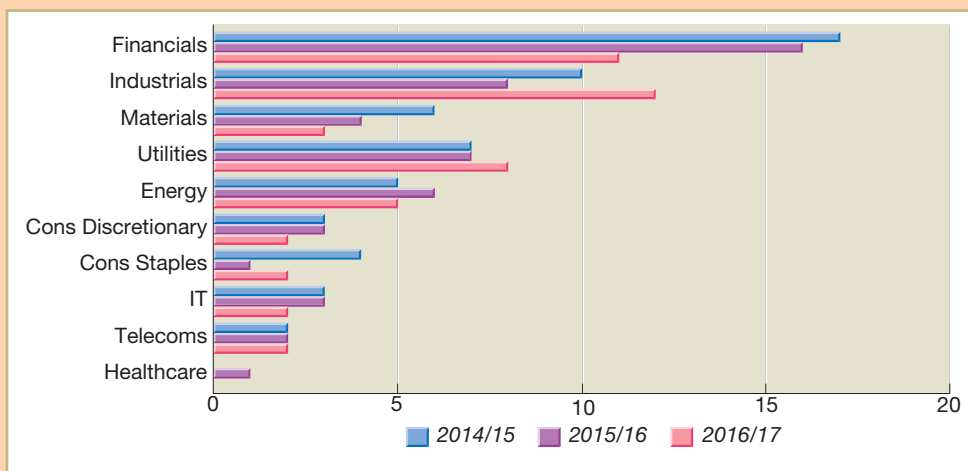
Figure 9.7 Companies issuing scrip dividends

'Faced with the imperative to demonstrate that they are delivering a healthy yield in a low interest rate environment, dozens of companies have turned to scrips instead,' said Margot von Aesch, equity income analyst at Redburn. 'But the shares issued have the same economic effect as a rights issue.' As a result, 'companies across the UK and Europe have effectively retained billions of capital, and this has gone largely unnoticed,' she said. 'The market notion is that the yield you see is fully cash backed – that's not necessarily the case.'

The data found that France had the greatest number of scrips although the UK had the highest value at £25bn over the period. Broken down by sector, banking used the most scrips because it 'has been the keenest to preserve capital', the report said. Where the mining sector aggressively slashed dividends during the oil price slump, the oil sector largely opted to use scrips. However, the research noted many companies were now reinstating their cash payouts, thanks to improved economic conditions. The number of companies offering scrips to shareholders has fallen to 38 at the end of 2017 from 57 in the 2014/2015 financial year, it said. Recently, Shell, one of the UK's biggest dividend payers, said it would cancel its programme.

Thomas Buckingham, a European equities portfolio manager at JPMorgan Asset Management, said some scrip programmes were indicative of balance sheet weakness. 'We proactively seek to avoid such companies as they often present a yield trap: optically high dividend yields which are low in quality and unsustainable.' But he noted that not all

Shareholders who elect to receive shares will increase their proportion of the total shares in issue compared with those taking the cash option. In the UK, taxation considerations should not be an issue when deciding between cash dividends and scrip dividends as they are both treated as income for tax purposes.

By making a scrip dividend a business helps to keep total equity intact whereas a cash dividend will deplete total equity (by depleting reserves). For businesses struggling to keep within gearing limits demanded by lenders, this difference can be very important.

Activity 9.20

How is the gearing ratio of a business affected by:

(a) a scrip dividend
(b) a cash dividend?

The gearing ratio (that is, long-term borrowing/(long-term borrowing + equity share capital and reserves)) will not be affected by a scrip dividend. We saw earlier that total equity is kept intact. A cash dividend, however, will deplete equity and shift the balance in favour of borrowings. This will increase the gearing ratio which, in turn, indicates an increase in financial risk.

Although a scrip issue will not, of itself, create value, shareholders may respond positively to a scrip dividend if it is interpreted as a sign of the managers' confidence in the future. They may believe that the managers will maintain the same dividend per share in the future, despite the increase in the number of shares in issue. Various studies have shown a positive market response to scrip dividend announcements. If a business does not maintain or increase its dividend per share in subsequent periods, however, the positive effect on share prices will be lost.

As scrip dividends increase the number of shares in issue, there is a risk that they will undermine the prospects of future rights issues. Shareholders may not wish to invest in the business beyond their scrip dividends. Some businesses have therefore abandoned scrip dividends and replaced them with a dividend re-investment plan (DRIP). Under such a plan, a business will buy shares in the open market on behalf of shareholders wishing to reinvest their cash dividends in the business. By operating a DRIP there is no increase in the number of shares in issue. However, cash will not be retained within the business and shareholders will incur (relatively small) transaction costs.

Share buybacks

A **share buyback** occurs when a business buys its own shares. Once purchased, the shares may be cancelled or held for re-issue at a later date. Share buybacks have become very popular throughout the major industrialised world and now represent an important alternative to cash dividends. To implement a share buyback, a business may acquire its shares:

1 in the open market in much the same way as any other shareholder, or
2 through a tender offer, usually where a fixed number of shares is acquired at a particular price over a particular period or at a particular date, or
3 through an agreement with particular shareholders.

Open market purchases will mean that the business buys its shares at their current market price. The other two methods described often involve paying a premium above the current market price to shareholders.

Buybacks or dividends?

Both share buybacks and cash dividends lead to funds being returned to shareholders. This raises the question as to which of the two methods shareholders would prefer. If we assume perfect capital markets, they should be indifferent between the two. A simple example should make this point clear (see Example 9.2).

Example 9.2

Chang plc has 1 million shares in issue and surplus cash of £2 million, which is to be distributed to shareholders. Following this distribution, earnings are expected to be £1 million per year and the price/earnings ratio is expected to be 8 times. The distribution will be made by either:

(i)   a dividend of £2.00 per share, or
(ii) a tender offer of 200,000 shares at £10 per share.

Evaluate each of these options.

Solution

The risk and growth prospects of the business will be unaffected by the choice of distribution method and so the total market value (TMV) of the shares following distribution will be unaffected. The TMV (whichever distribution method is used) will therefore be:

$$\text{TMV} = \text{Earnings} \times \text{P/E ratio}$$
$$= \text{£1 million} \times 8 = \text{£8 million.*}$$

Under the dividend option, however, there will be 1 million shares in issue and under the buyback option there will be 800,000 shares in issue. This means that the value per share will be £8 (£8m/1m) under the dividend option and £10 (£8m/800,000) under the buyback option.

Let us now consider the situation of a shareholder with 10,000 shares under both the dividend option and the buyback option – where there is a choice of either holding or selling the shares.

	Dividend option	Buyback option Hold	Buyback option Sell
	£	£	£
10,000 shares held at £8 per share	80,000		
10,000 shares held at £10 per share		100,000	
10,000 shares sold at £10 per share			100,000
Dividend received (10,000 × £2)	20,000		
	100,000	100,000	100,000

We can see that total wealth is the same under each option and so the shareholder should be indifferent between them.

*We know from Chapter 3 that the price/earnings (P/E) ratio is MV/EPS. This can be rearranged so that MV = EPS × PE ratio (where MV = market value per share and EPS = earnings per share).

To find the TMV of the shares, rather than the value of a single share, it is therefore:

$$\text{TMV} = (\text{Total}) \text{ Earnings} \times \text{P/E ratio}$$

Activity 9.21

Can you see any similarities between this line of argument and one that we considered earlier in the chapter?

The argument is similar to the MM argument concerning shareholder indifference between dividends and capital gains.

Share buybacks and imperfect markets

The above example relies on the assumptions underpinning perfect capital markets mentioned earlier such as no transaction costs, no taxation and so on. In our world of imperfect markets, however, managers may view share buybacks differently to dividends. We have seen that managers usually feel committed to maintaining a sustainable level of dividend payments. This means they will avoid increasing dividends, which then have to be decreased in subsequent periods.

Share buybacks, on the other hand tend to be regarded as a residual. Thus, where there is a need to make exceptional distributions to shareholders, a buyback may be viewed as the better option. While the same effect may be achieved by a 'special' dividend to shareholders, a buyback focuses on those shareholders wishing to receive cash. There is also the advantage that payments to shareholders can be spread over a longer period.

The circumstances under which a share buyback may be used include the following:

Supporting the share price. Share buybacks may be undertaken to support the share price when it is temporarily depressed. However, managers must be able to correctly spot a period of temporary price weakness. This is no easy task. To add to this identification problem, managers often exhibit a bias towards believing that the share price of their business is below its intrinsic value. They should, therefore, be aware of this possible bias before making a buyback decision.

Assuming managers can identify a period of temporary price weakness, open market buybacks can benefit shareholders who continue to hold at the expense of those that sell.

Activity 9.22

Why would this be the case?

Buying back shares at below their intrinsic value will transfer wealth from those shareholders that sell to those that hold.

There is evidence that small investors, who tend to be less sophisticated, are more likely to sell their shares to the business when the price is temporarily depressed than large institutional investors (see reference 9 at the end of the chapter).

If investors become aware that the buyback indicates the shares are undervalued, the share price can rise quickly. Assuming the shares rise to their intrinsic value, the real wealth of shareholders that continue to hold will then be reflected in the share price. In addition, those that sell will do so at a price that reflects the intrinsic value of the shares. The end result, therefore, will be greater equity between those shareholders that sell and those that continue to hold.

To alter the capital structure. A business may use buybacks to achieve an optimal capital structure. The effect of a buyback is to reduce the amount of equity in relation to borrowings. By shifting the capital structure in favour of borrowings, the cost of capital may be lowered, which may, in turn, boost the share price. This will not, however, automatically occur: the additional benefits of higher gearing must outweigh any additional risks. A survey of finance directors of the top 200 UK businesses found that altering the capital structure was the main reason cited for share buybacks (see reference 10 at the end of the chapter).

Defence against takeover. Where a business is vulnerable to takeover, a share buyback may help to increase the share price and so make the cost of any takeover bid more expensive. It can also help to get rid of disaffected shareholders who may be more inclined to support a takeover bid.

Returning surplus funds. Where a business has no profitable investment opportunities in which to invest, returning any surplus funds may be the best option for shareholders. More mature, low-growth businesses are more likely to find themselves in this position than younger, high-growth businesses.

Where funds are not being used profitably, a share buyback will boost earnings per share.

Activity 9.23

Why should this be the case?

Earnings per share will increase because profits will be unaffected by the buyback decision whereas the number of shares in issue will decrease.

Real World 9.12 sets out the views of Warren Buffett, chairman and chief executive of Berkshire Hathaway Inc. towards share buybacks. (It should be mentioned that he is not really sold on the idea of efficient markets. He believes that share prices do become disconnected from their intrinsic value.) In this extract, Warren Buffett argues that shares must be undervalued by the market for buybacks to be worthwhile.

Real World 9.12

Let's all join hands

In the investment world, discussions about share repurchases often become heated. But I'd suggest that participants in this debate take a deep breath: Assessing the desirability of repurchases isn't that complicated. From the standpoint of exiting shareholders, repurchases

$\rightarrow$

are always a plus. Though the day-to-day impact of these purchases is usually minuscule, it's always better for a seller to have an additional buyer in the market.

For continuing shareholders, however, repurchases only make sense if the shares are bought at a price below intrinsic value. When that rule is followed, the remaining shares experience an immediate gain in intrinsic value. Consider a simple analogy: If there are three equal partners in a business worth $3,000 and one is bought out by the partnership for $900, each of the remaining partners realizes an immediate gain of $50. If the exiting partner is paid $1,100, however, the continuing partners each suffer a loss of $50. The same math applies with corporations and their shareholders. Ergo, the question of whether a repurchase action is value-enhancing or value-destroying for continuing shareholders is entirely purchase-price dependent.

It is puzzling, therefore, that corporate repurchase announcements almost never refer to a price above which repurchases will be eschewed. That certainly wouldn't be the case if a management was buying an outside business. There, price would always factor into a buy-or-pass decision. When CEOs or boards are buying a small part of their own company, though, they all too often seem oblivious to price. Would they behave similarly if they were managing a private company with just a few owners and were evaluating the wisdom of buying out one of them? Of course not. It is important to remember that there are two occasions in which repurchases should not take place, even if the company's shares are underpriced.

One is when a business both needs all its available money to protect or expand its own operations and is also uncomfortable adding further debt. Here, the internal need for funds should take priority. This exception assumes, of course, that the business has a decent future awaiting it after the needed expenditures are made. The second exception, less common, materializes when a business acquisition (or some other investment opportunity) offers far greater value than do the undervalued shares of the potential repurchaser.

Long ago, Berkshire itself often had to choose between these alternatives. At our present size, the issue is far less likely to arise. My suggestion: Before even discussing repurchases, a CEO and his or her Board should stand, join hands and in unison declare, 'What is smart at one price is stupid at another.'

The views of Warren Buffett appear to chime with those of other managers. There is evidence that a significant motive for undertaking buybacks is where the share price is below its intrinsic value. (See reference 11 at the end of the chapter.)

Postponing, or even abandoning, a share buyback does not incur the kind of adverse reaction from shareholders that normally accompanies a cut in dividends. This may explain, in part, why managers do not always display the same commitment to carrying out buybacks as they do to paying dividends. Where, however, the original intention was to support a share price, which then recovers, the rationale for the buyback programme ends.

The main reasons for a share buyback are summarised in Figure 9.8.
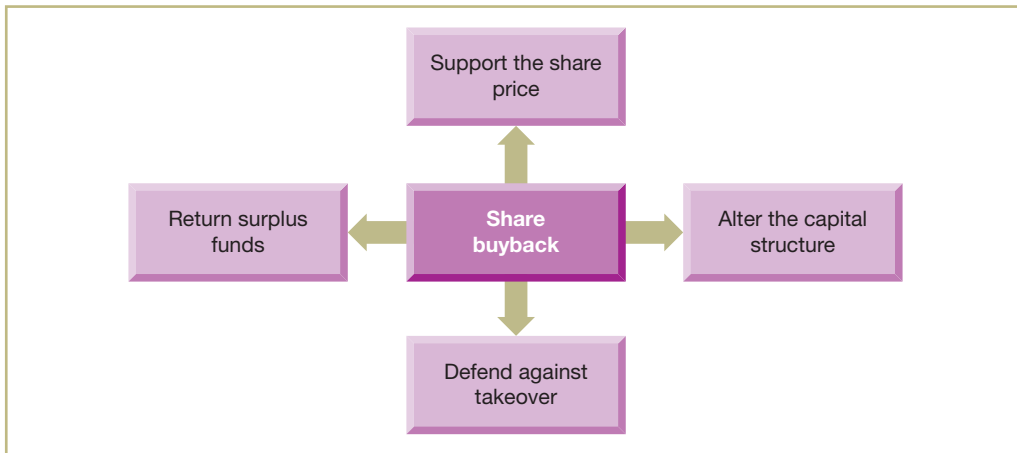
Figure 9.8 Main reasons for a share buyback

Further issues

We saw earlier that four reasons were identified as to why dividends were considered important. Let us now consider these in the context of share buybacks.

Clientele effect

We have seen that the tax position of shareholders can exert an influence over whether capital gains or dividends are preferred. Any profits arising from the sale of shares are normally treated as capital gains and taxation rules tend to treat these more leniently than dividends. This means that share buybacks may be a more tax-efficient method of returning funds to shareholders. Where buybacks are made on a regular and frequent basis, however, the tax authorities may conclude that their purpose is simply to avoid taxation. This runs the risk that they will be treated as dividends for tax purposes.

Catering effect

It seems that the catering effect can be extended to share buybacks. There is evidence that, when the shares of businesses engaging in share buybacks trade at a premium, it has a positive effect on buyback activity. (See, for example, reference 12 at the end of the chapter.)

Market signalling

In an imperfect world, managers may have access to information that shareholders do not have. Thus, if managers believe that the market undervalues the shares, they may wish to send a signal to the market concerning this fact. Whereas shareholders may discount bullish predictions, concrete actions such as share buybacks, or increased dividends, are taken more seriously. Furthermore, where a premium is offered for share repurchases, the higher the premium the more credible the signal.

Activity 9.24

Why do you think this is?

The higher the premium above the current market price, the more expensive it is for managers to buy back shares. Investors are, therefore, likely to take the buyback decision more seriously.

Generally speaking, the announcement of a share buyback has a positive effect on the share price. Sometimes, however, an announcement can send an ambiguous signal. This is because buybacks can benefit managers rather than shareholders, as we shall see later. All relevant information should therefore be examined by shareholders when interpreting the announcement. To decide whether a proposed buyback really signals that shares are underpriced, supporting evidence may be needed, such as a decision by managers to hold on to their shares.

Reducing agency costs

We saw earlier that managers may use business resources in ways that benefit themselves rather than shareholders. Where managers distribute any temporary cash surplus to shareholders through a share buyback, however, this risk can be reduced. If fresh capital is required at a later date, managers will then have to submit to the judgement of the market. When a buyback is used to alter the capital structure, agency costs may also be reduced. If borrowings are substituted for equity capital, there will be an increase in interest payments. This will subject managers to much tighter financial discipline as it will reduce the discretionary funds available.

Share buybacks and managers' incentives

There is a risk that poorly designed management incentive plans will encourage share buybacks, even though they may not benefit shareholders. This can arise when incentive plans focus on achieving certain financial targets without sufficient regard to their nature or the ways in which they may be achieved. Two examples illustrate the problems that can arise.

Buybacks and management share options

One form of incentive plan is to give managers **share options**. These options give managers the right, but not the obligation, to purchase shares in the business at an agreed price at some future date. If the current market value exceeds the agreed price at that due date, they will make a gain by taking up the options. Managers are therefore given an incentive to increase share price in an attempt to align their interests with those of shareholders.

Excessive focus on share price, however, may not be in the best interests of shareholders. Share price represents only one part of the shareholders' total return: the other part is dividend payments. Undue concern for share price may lead managers to restrict dividend payments. We have seen that, following a dividend payment, share prices will be lower than if a share buyback for the same amount took place. Managers therefore have an incentive to employ buybacks rather than dividend payments as it can increase the value of their options.

Buybacks and earnings per share

Where a business has surplus funds, buying back shares will reduce the number of shares in issue but may have little or no effect on earnings. This will lead to an increase in earnings per share (EPS). As this measure is often used in managers' long-term incentive plans, there is a risk that managers will try to improve this measure through a share buyback in order to boost their rewards.

Increasing earnings per share, however, is not the same as increasing shareholder value. This investment ratio is influenced by accounting policy choices and fails to take account of the cost of capital and future cash flows, which are the determinants of value. Thus, a change in this ratio may be of no real significance to shareholders.

Are share buybacks a good thing?

In recent years, there has been a growing concern over the use of share buybacks. It is claimed that they simply enrich corporate managers while, at the same time, they divert funds from productive investment. Regulators have, therefore, been urged to take a closer look at this form of distribution. In **Real World 9.13**, however, Professor Edmans at London Business School rejects these criticisms and puts the case for buybacks.

Real World 9.13

The case for the defence

Buybacks are a way of responsibly returning money to shareholders. That, in turn, allows pension funds, insurance companies, and ordinary people saving for retirement to use the cash elsewhere. Critics claim that a buyback starves companies of cash that could otherwise have been invested. But investment does not always create value for companies. It should only be undertaken if the long-term pay-off exceeds the cost. Nor does investment always create value for society. It diverts financial, human and physical resources away from alternative potential uses. Indeed, evidence shows that the money paid out in buybacks is redeployed to other companies with better investment opportunities.

In one well known critique, University of Massachusetts Lowell professor William Lazonick calculated that 91 per cent of the net income of companies in the S&P 500 went to buybacks and dividends. He argues that figure leaves 'very little for investments in productive capabilities or higher incomes for employees'. That statistic is meaningless because net income is calculated after deducting a company's expenses including wages and research and development. But many people accept the argument because it confirms their bias against buybacks.

Furthermore, a survey of nearly 400 chief financial officers found that they made investment decisions first and only repurchase shares using money left over. The same CFOs admitted that they would cut investment to maintain dividend levels, which suggests that they would also have admitted to myopic behaviour around buybacks.

Critics of buybacks are right that they boost short-term share prices. But two studies have found that they also lead to even higher prices in the long run. That suggests buybacks are a good use of corporate cash. The first paper analysed US companies in the 1980s, while the second one, published this year, looked at companies in 31 other countries and found that the results generally held.

In truth, the evidence isn't all one way. Studies show that executives sometimes turn to buybacks to meet quarterly earnings forecasts or boost the stock price when they are about to sell their own shares. Those uses are destructive for both companies and society. Yet such cases are merely a symptom of a larger problem: poorly-designed executive incentive plans. Evidence shows that chief executives also cut investment to meet quarterly earnings forecasts or to boost profits when they are about to sell their own shares.

The solution is not to crack down on buybacks. This would stifle the many value-creating repurchases that do occur and fail to address self-interested investment cuts. What we need to do is remove the cause of the problem and pay CEOs with shares that must be held for the long-term. This will help ensure that all decisions – repurchases, investment, and actions that affect employees, customers, and the environment – are taken with the long-term in mind.

Informing shareholders

As share buybacks may be for the benefit of managers rather than shareholders, there is a case for a much stronger light to be shone on them. This case is further strengthened by the fact that huge sums are now allocated to share buyback programmes. There have been calls for buyback announcements to be accompanied by clear explanations as to why they are taking place as well as the likely effect on future profits, capital structure and dividends. There have also been calls for reporting the costs of share buybacks and the extent to which past buybacks achieved their stated objectives.

Self-assessment question 9.1

Sandarajan plc has recently obtained a listing on the Stock Exchange. The business operates a chain of supermarkets and was the subject of a management buyout five years ago. Since the buyout, the business has grown rapidly. The managers and a private equity firm owned 80 per cent of the shares prior to the Stock Exchange listing. However, this has now been reduced to 20 per cent. The record of the business over the past five years leading up to the listing is as follows:

Year	Profit for the year	Dividend	No. of shares issued
	£000	£000	000s
1	420	220	1,000
2	530	140	1,000
3	650	260	1,500
4	740	110	1,500
5 (most recent)	880	460	1,500

Required:
(a) Comment on the dividend policy of the business leading up to the Stock Exchange listing.
(b) What advice would you give to the managers of the business concerning future dividend policy?

The solution to this question can be found at the back of the book on p. 644.

SUMMARY

The main points of this chapter may be summarised as follows:

Dividends

- Represent a return by a business to its shareholders.
- There are legal limits on dividend distributions to protect lenders and editors.
- Are usually paid twice a year by large listed businesses.
- Cum-dividend share prices include the accrued dividend; ex-dividend prices exclude the dividend.
- Businesses often have a target dividend payout ratio, or target dividend cover ratio.

Dividend policy and shareholder wealth

- There are two major schools of thought concerning the effect of dividends on shareholder wealth.
- The traditional school argues that shareholders prefer dividends now because the amounts are more certain.
- The implications for managers are that they should adopt as generous a dividend policy as possible.
- The modernists (MM) argue that, given perfect and efficient markets, the pattern of dividends has no effect on shareholder wealth.
- The implication for managers is that one dividend policy is as good as another and so they should not spend time considering which policy should be adopted.
- The MM position assumes no share issue costs, no share transaction costs, no taxation; and rational behaviour by managers and investors. These assumptions weaken (but do not necessarily destroy) their arguments.

Dividends in practice

- Dividends are considered important despite the MM arguments.
- The main reasons for this are the clientele effect, the catering effect, the signalling effect and the need to reduce agency costs.
- The level of dividends distributed is dependent on various factors, including investment and financing opportunities, legal and loan requirements, profit stability, control issues (including takeover threats), market expectations and inside information.

Management attitudes

- Managers perceive dividends as being important for shareholders.
- They prefer a smooth increase in dividends and are reluctant to cut dividends.

Scrip dividends

- Do not, of themselves, create value, but may be interpreted as a sign of managers' confidence in the future and so share prices may rise.
- Allow shareholders to increase their investment in the business without incurring transaction costs.
- May undermine future rights issues as existing shareholders may not wish to invest in more shares.

Share buybacks

- Involve repurchasing shares through a tender offer, open market operations or agreements with particular shareholders.
- May be preferred to dividends for exceptional distributions.
- May be used to support the share price, to alter the capital structure, to defend against a takeover and return surplus funds to shareholders.
- The clientele effect, the catering effect, reducing agency costs and the signalling effect mentioned in respect of dividends are also relevant in share buybacks.
- Poorly designed management incentive plans may lead to share buybacks that do not benefit shareholders.

KEY TERMS

Dividend p. 400
Record date p. 401
Cum dividend p. 401
Ex dividend p. 401
Catering effect p. 412

Information asymmetry p. 412
Information signalling p. 413
Scrip dividend p. 424
Share buyback p. 426
Share options p. 432

For definitions of these terms, see the Glossary, pp. 685–94.

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FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapter 19.

Baker, H. K. (2009) *Dividends and Dividend Policy*, John Wiley & Sons, Chapters 1, 4, 5 and 6.

Brealey, R., Myers, S. and Allen, F. (2019) *ISE Principles of Corporate Finance*, 13th edn, McGraw-Hill Education, Chapter 16.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapter 17.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found in at the back of the book on p. 655.

9.1   Consider the following businesses:

   (i) Alpha plc, a house builder, has reported a surge in profits. Following two years of low economic growth, the economy has recently started to improve and housebuilding has now picked up.

   (ii) Beta plc, a book publisher, has reported record profits as a result of a recently published bestseller.

   (iii) Delta plc, a cosmetics business, has reported a steady rise in profits over recent years, reflecting the quality of its products.

   Which one of the above is most likely to announce an increase in dividend payments in the near future and why?

9.2   'The business's dividend decision is really a by-product of its capital investment decision.' Discuss.

9.3   It was mentioned in the chapter that the catering effect has been cited as a possible explanation as to why dividends seem to appear and then disappear from the financial landscape. Can you think of at least two other possible explanations for this phenomenon?

9.4   Gamma plc recently announced a dividend increase of 10 per cent. Can you think of three reasons why this announcement might be greeted with disappointment by shareholders?

EXERCISES

Exercises 9.4 to 9.7 are more advanced than 9.1 to 9.3. Those with coloured numbers have solutions at the back of the book, starting on p. 659.
   If you wish to try more exercises, visit the students' side of this book's companion website.

9.1   What are the arguments for and against issuing a scrip dividend rather than a cash dividend?

9.2   The managers of Gripton plc are currently deciding between a dividend payment and a share buyback as a means of distributing funds to shareholders.

   Required:
   Which of the two do you think is more appropriate, assuming that the managers are concerned with:

   (i)   flexibility regarding the level of distribution
   (ii) ensuring equity between different shareholders
   (iii) signalling information clearly to the markets?

   Explain each of your answers.

9.3   The dividend policy of businesses has been the subject of much debate in the financial management literature.

   Required:
   Discuss the view that the pattern of dividend can increase the wealth of shareholders.

9.4 The following listed businesses each have different policies concerning distributions to shareholders:

- North plc pays all profits available for distribution to shareholders in the form of a cash dividend each year.
- South plc has yet to pay any cash dividends to shareholders and has no plans to make dividend payments in the foreseeable future.
- West plc buys back shares from shareholders as an alternative to a dividend payment.
- East plc offers shareholders the choice of either a small but stable cash dividend or a scrip dividend each year.

Required:
Discuss the advantages and disadvantages of each of the above policies.

9.5 Fellingham plc has 20 million ordinary £1 shares in issue. No shares have been issued during the past four years. The business's earnings and dividends record taken from the past financial statements showed:

	Year 1	Year 2	Year 3	Year 4 (most recent)
Earnings per share	11.00p	12.40p	10.90p	17.20p
Dividend per share	10.00p	10.90p	11.88p	12.95p

At the annual general meeting for Year 1, the chairman indicated that it was the intention to consistently increase annual dividends by 9 per cent, anticipating that, on average, this would maintain the spending power of shareholders and provide a modest growth in real income.

In the event, subsequent average annual inflation rates, measured by the general index of prices, have been:

Year 2	11%
Year 3	10%
Year 4	8%

The ordinary shares are currently selling for £3.44, excluding the Year 4 dividend.

Required:
Comment on the declared dividend policy of the business and its possible effects on both Fellingham plc and its shareholders, illustrating your answer with the information provided.

9.6 Mondrian plc is a new business that aims to maximise the wealth of its shareholders. The board of directors is currently trying to decide upon the most appropriate dividend policy to adopt for the business's shareholders. However, there is strong disagreement among three of the directors concerning the benefits of declaring cash dividends:

- Director A argues that cash dividends would be welcomed by shareholders and that as high a dividend payout ratio as possible would reflect positively on the market value of the business's shares.
- Director B argues that whether a cash dividend is paid or not is irrelevant in the context of shareholder wealth maximisation.
- Director C takes an opposite view to Director A and argues that dividend payments should be avoided as they would lead to a decrease in shareholder wealth.

Required:

(a) Discuss the arguments for and against the position taken by each of the three directors.

(b) Assuming the board of directors decides to pay a dividend to shareholders, what factors should be taken into account when determining the level of dividend payment?

9.7 Traminer plc provides software solutions for the airline industry. At present, shares in the business are held by the senior managers and by a venture capital business. However, Traminer plc intends to seek a Stock Exchange listing and to make 75 per cent of the ordinary shares available to the investing public. The board of directors recently met to decide upon a dividend policy for the business once it has become listed. However, the meeting ended without agreement.

Information relating to the business over the past five years is set out below:

Year ended 30 April	Ordinary shares in issue 000	Profit for the year £000	Ordinary share dividends £000
2015	500	840	420
2016	500	1,190	580
2017	800	1,420	340
2018	1,000	1,940	450
2019	1,000	2,560	970

Required:

Evaluate the dividend policy pursued by Traminer plc over the past five years and discuss whether any changes to this policy are required.

MANAGING WORKING CAPITAL

INTRODUCTION

This chapter considers the factors to be taken into account when managing the working capital of a business. Each element of working capital will be identified and the major issues surrounding them will be discussed.

Working capital represents a significant investment for many businesses and so its proper management and control can be vital. We saw in Chapter 4 that an investment in working capital is typically an important aspect of many new investment proposals.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Identify the main elements of working capital.

■ Discuss the purpose of working capital and the nature of the working capital cycle.

■ Explain the importance of establishing policies for the control of working capital.

■ Explain the factors that have to be taken into account when managing each element of working capital.

WHAT IS WORKING CAPITAL?

Working capital is usually defined as current assets less current liabilities. The major elements of current assets are:

- inventories
- trade receivables
- cash (in hand and at bank).

The major elements of current liabilities are:

- trade payables
- bank overdrafts.

The size and composition of working capital can vary between industries. For some types of business, the investment in working capital can be substantial. A manufacturing business, for example, will often invest heavily in inventories in the form of raw material, work in progress and finished goods. It will also normally sell its goods on credit, giving rise to trade receivables. A retailer, on the other hand, holds only one form of inventories (finished goods) and will normally sell its goods for cash, rather than on credit. Many service businesses will hold no inventories and may well make sales on credit.

Most businesses buy goods and/or services on credit, giving rise to trade payables. Few, if any, businesses operate without a cash balance. In some cases, however, it is a negative one (a bank overdraft).

Working capital represents a net investment in short-term assets. These assets are continually flowing into and out of the business and are essential for day-to-day operations. The various elements of working capital are interrelated and can be seen as part of a short-term cycle. For a manufacturing business, the working capital cycle can be depicted as shown in Figure 10.1.

Cash is used to pay trade payables for raw materials, or raw materials are bought for immediate cash settlement. Cash is also spent on labour and other items that turn raw materials into work in progress and, finally, into finished goods. The finished goods are sold to customers either for cash or on credit. In the case of credit customers, there will be a delay before the cash is received from the sales. Receipt of cash completes the cycle.

Figure 10.1 The working capital cycle

For a retailer, the situation would be as in Figure 10.1 except that there will be only inventories of finished goods. There will be no work in progress or raw materials. For a purely service business, the working capital cycle would also be similar to that depicted in Figure 10.1 except that there would be no inventories of finished goods or raw materials. There may well be work in progress, however, since many forms of service take time to complete. A legal case handled by a firm of solicitors, for example, may take several months. During this period, costs will build up before the client is billed for them.

Managing working capital

The management of working capital is an essential part of the business's short-term planning process. Management must decide how much of each element should be held. As we shall see later, there are costs associated with holding either too much or too little of each element. Management must be aware of these costs, which include opportunity costs, in order to manage working capital effectively. Potential benefits must then be weighed against likely costs in order to achieve the optimum investment.

The working capital needs of a business are likely to vary over time as a result of changes in the business environment. Managers must monitor these changes to ensure that the business retains an appropriate level of investment in working capital.

Activity 10.1

What kinds of changes in the business environment might lead to a decision to change the level of investment in working capital? Try to identify three possible changes that could affect the working capital needs of a business.

These may include the following:

- changes in interest rates
- changes in market demand for the business's output
- changes in the seasons
- changes in the state of the economy.

You may have thought of others.

Changes arising within the business could also alter working capital needs. These internal changes might include using different production methods (resulting, perhaps, in a need to hold a lower level of inventories) and changes in the level of risk that managers are prepared to take.

THE SCALE OF WORKING CAPITAL

It is tempting to think that, compared with the scale of investment in non-current assets, the amounts invested in working capital are trivial. However, this is not the case. For many businesses, the scale of investment in working capital is vast.

Real World 10.1 gives some impression of the working capital investment for five UK businesses that are either very well known by name, or whose products are everyday commodities for most of us. These businesses were randomly selected, except that each one is

high profile and from a different industry. For each business, the major items appearing on the statement of financial position are expressed as a percentage of the total investment by the providers of long-term finance (equity and non-current liabilities).

Real World 10.1

A summary of the statements of financial position of five UK businesses

Business:	Next plc	Ryanair Holdings plc	Babcock Int Group plc	Tesco plc	Severn Trent plc
Statement of financial position date:	27.1.18	31.3.18	31.3.18	24.2.18	31.3.18
ASSETS					
Non-current assets	46	91	99	121	103
Current assets					
Inventories	30	–	3	9	–
Trade and other receivables	76	1	22	6	5
Other current assets	–	5	1	19	–
Cash and near cash	3	41	6	20	1
	109	47	32	54	6
Total assets	155	138	131	175	109
EQUITY AND LIABILITIES					
Equity and non-current liabilities	100	100	100	100	100
Current liabilities					
Trade and other payables	35	31	29	35	5
Other short-term liabilities	9	7	1	34	–
Overdrafts and short-term borrowings	11	–	1	6	4
	55	34	31	75	9
Total equity and non-current liabilities	155	134	131	175	109

The non-current assets, current assets and current liabilities are expressed as a percentage of the total long-term investment (equity plus non-current liabilities) of the business concerned. Next plc is a major retail and home shopping business. Ryanair is a leading airline. Babcock International Group plc is a large engineering and support business. Tesco plc is one of the UK's leading supermarkets. Severn Trent plc is an important supplier of water, sewerage services and waste management, mainly in the UK.

Source: Table constructed from information appearing in the financial statements for the year ended during 2018 for each of the five businesses concerned.

Real World 10.1 shows quite striking differences in the make-up of the statement of financial position between businesses. Take, for example, the current assets and current liabilities. Although the totals for current assets are pretty large when compared with the total long-term investment, these percentages vary considerably from one business to another. When looking at the mix of current assets, we can see that only Next, Babcock and Tesco, which produce and/or sell goods, hold some inventories. The other two businesses are service providers and so inventories are an insignificant item. We can also see that very few of the sales of Tesco, Ryanair and Severn Trent are on credit, as they have relatively little invested in trade receivables.

Note that Tesco's trade payables are very much higher than its inventories. Since trade payables broadly represent amounts due to suppliers of inventories, it means that Tesco receives the cash from a typical trolley load of groceries well in advance of paying for them. The relatively large 'Other current assets' and 'Other short-term liabilities' for Tesco arises from advances to and deposits from customers, respectively, that arise from the business's involvement in banking.

In the sections that follow, we shall consider each element of working capital separately and how they might be properly managed. Before doing so, however, it is worth looking at **Real World 10.2**, which suggests that there is considerable scope for improving working capital management among businesses worldwide.

Real World 10.2

Working capital not working hard enough

According to a survey of the world's largest listed businesses, working capital is not as well managed as it could be. The survey, conducted in 2018 by PwC, suggests that these businesses had, in total, about €1.3 trillion tied up in working capital that could be released through better management of inventories, trade receivables and trade payables. If businesses could improve their working capital performance to reach the next performance quartile, they could release enough cash to increase their capital investment (that is, expand their productive capacity) by 55 per cent. This increase could be achieved without recourse to external funding, or putting their cash flows under pressure.

The average investment (in days) by the world's largest businesses, for each of the main elements of working capital over a five-year period is set out in Figure 10.2. As the figure shows, the working capital performance of businesses has not altered much over the period. Within each average, however, some businesses have improved while others have deteriorated.
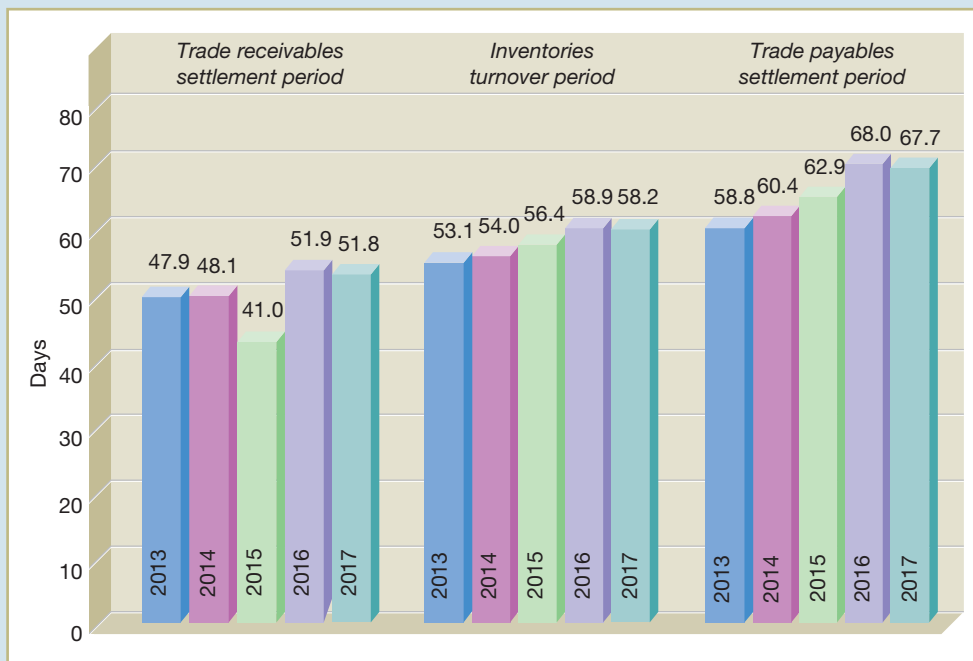
Figure 10.2 Average investment (in days) for the main working capital elements

The survey results also showed that fairly significant differences in average working capital performance exist between regions of the world. Australasia performed best in 2017, with the Middle East in last place.

Source: Compiled from information in 'Navigating uncertainty: PwC's annual global working capital study', 2018/19, www.pwc.com.

Real World 10.2 focuses on the working capital problems of large businesses. For smaller businesses, however, these problems may be even more acute.

Activity 10.2

Why might smaller businesses carry more excess working capital than larger ones? Try to think of at least one reason.

Two possible reasons are:

1 Smaller businesses tend to be less well managed than larger ones. They often lack the resources to employ people with the same level of expertise as those employed by larger businesses.
2 Economies of scale may be a factor. For example, a business with twice the sales revenue of a competitor business would not normally need twice the level of inventories.

You may have thought of other reasons.

MANAGING INVENTORIES

A business may hold inventories for various reasons, the most common of which is to meet the immediate day-to-day requirements of customers and production. However, a business may hold more than is necessary for this purpose where there is a risk that future supplies may be interrupted or scarce. Similarly, if there is a risk that the cost of inventories will increase in the future, a business may decide to buy in large quantities.

Mining businesses and businesses that trade in commodities, such as precious metals, oil, coffee and so on, can benefit by holding large amounts of inventories when commodity prices are rising. When prices are falling, however, large inventories' holdings can be a burden.

For some types of business, inventories held may represent a substantial proportion of total assets held. A car dealership, for example, that rents its premises may have nearly all of its total assets in the form of inventories. Manufacturers also tend to invest heavily in inventories as they need to hold three kinds of inventories: raw materials, work in progress and finished goods. Each form of inventories represents a particular stage in the production cycle.

For businesses with seasonal demand, the level of inventories held may vary substantially over the year. One such example might be greetings card manufacturers. For those businesses with fairly stable demand, the level of inventories held may vary little throughout the year.

Businesses that hold inventories simply to meet the day-to-day requirements of their customers, and for production, will normally seek to minimise the amount of inventories held.

This is because there are significant costs associated with holding inventories. These costs include:

- storage and handling costs
- the cost of financing the inventories
- the cost of pilferage and obsolescence
- the cost of opportunities forgone in tying up funds in this form of asset.

To gain some impression of the cost involved in holding inventories, **Real World 10.3** estimates the *financing* cost of inventories for five large businesses.

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Real World 10.3

</div>

Inventories financing cost

The financing cost of inventories for each of five large businesses, based on their respective opportunity costs of capital, is calculated below.

Business	Type of operations	Cost of capital (a) %	Average inventories held* (b) £m	Financing cost of holding inventories (a) × (b) £m	Operating profit £m	Financing cost as a % of operating profit/(loss) %
Associated British Foods plc	Food producer	14.2	2,144	304.4	1,404	21.7
BT Group plc	Telecoms	8.4	233	19.5	20,342	0.1
Go-ahead Group plc	Transport operator	5.2	17	0.9	161	0.6
Kingfisher plc	DIY retailer	10.1	2,437	246.1	685	35.9
Tesco plc	Supermarket	9.5	2,282	216.8	1,837	11.8

*Based on opening and closing inventories for the relevant financial period.

We can see that for three of the five businesses, inventories financing costs are significant in relation to their operating profits. The nature of their businesses requires Associated British Foods, Kingfisher and Tesco to invest heavily in inventories. Tesco, however, is likely to turn over its inventories more quickly than the other two. For BT and Go-ahead, inventories financing costs are not significant. This is because they are service providers with a much lower investment in inventories.

These figures do not take account of other costs of inventories' holding mentioned earlier, such as the cost of providing secure storage. As these other costs may easily outweigh the costs of finance, the total cost of maintaining inventories may be very high in relation to operating profits.

The five businesses were not selected because they have particularly high inventories' costs but simply because they are among the relatively few that publish their costs of capital.

Source: Annual reports of the businesses for the years ended during 2017 and 2018.

Given the potentially high cost of holding inventories, it may be tempting to think that a business should seek to hold few or no inventories. There are, however, costs that may arise when the level of inventories is too low.

Activity 10.3

What costs might a business incur as a result of holding too low a level of inventories? Try to jot down at least three types of cost.

In answering this activity, you may have thought of the following costs:

- loss of sales, from being unable to provide the goods required immediately
- loss of customer goodwill, for being unable to satisfy customer demand
- purchasing inventories at a higher price than might otherwise have been necessary in order to replenish inventories quickly
- high transport costs incurred to ensure that inventories are replenished quickly
- lost production due to shortage of raw materials
- inefficient production scheduling due to shortages of raw materials.

To help manage inventories, a number of procedures and techniques may be employed. We shall now consider the more important of these.

Forecasting future demand

Preparing appropriate projections, or forecasts, is one of the best ways to ensure that inventories will be available to meet future production and sales requirements. These projections should deal with each product that the business makes and/or sells. It is important that they are realistic, as they will determine future ordering and production levels. We saw in Chapter 2 that projections may be developed in various ways, such as the use of statistical techniques and reliance on the opinions of sales and marketing staff.

Financial ratios

One ratio that can be used to help monitor inventories levels is the **average inventories turnover period ratio**, which we examined in Chapter 3. This ratio is calculated as follows:

$$\text{Average inventories turnover period} = \frac{\text{Average inventories held}}{\text{Cost of sales}} \times 365$$

The ratio provides a picture of the average period for which inventories are held. This can be useful as a basis for comparison. The average inventories turnover period can be calculated for individual product lines as well as for inventories as a whole.

Recording and reordering systems

A sound system of recording inventories movements is a key element in managing inventories. There should be proper procedures for recording inventories purchases and usages. Periodic checks should be made to ensure that the amount of physical inventories held corresponds with what is indicated by the inventories' records.

There should also be clear procedures for the reordering of inventories. Authorisation for both the purchase and the issue of inventories should be confined to a few nominated members of staff. This should avoid problems of duplication and lack of co-ordination. To determine the point at which inventories should be reordered, information will be required concerning the **lead time** (that is, the time between the placing of an order and the receipt of the goods) and the likely level of demand.

An electrical wholesaler sells a particular type of light switch. The annual demand for the light switch is 10,400 units and the lead time for orders is four weeks. Demand for the light switch is steady throughout the year. At what level of inventories of the light switch should the business reorder, assuming that it is confident of the information given above?

The average weekly demand for the switch is $10,400/52 = 200$ units During the time between ordering new switches and receiving them, the quantity sold will be 4×200 units $= 800$ units. So the business should reorder no later than when the level held reaches 800 units. This should avoid running out of inventories.

For most businesses, there will be some uncertainty surrounding the level of demand, pattern of demand and lead time. To avoid the risk of running out of inventories, a buffer, or safety, inventories level may be maintained. The amount of buffer inventories is a matter of judgement. In forming this judgement, the following should be taken into account:

- the degree of uncertainty concerning the above factors
- the likely costs of running out of the item concerned
- the cost of holding the buffer inventories.

The effect of holding a buffer will be to raise the inventories level at which an order for new inventories is placed (the reorder point).

Activity 10.5

Assume the same facts as in Activity 10.4. However, we are also told that the business maintains buffer inventories of 300 units. At what level should the business reorder?

Reorder point = expected level of demand during the lead time *plus* the level of buffer
$$= 800 + 300$$
$$= 1,100 \text{ units}$$

Carrying buffer inventories will increase the cost of holding inventories. This must, however, be weighed against the cost of running out of inventories, in terms of lost sales, production problems and so on.

Real World 10.4 describes how recent political uncertainty had a dramatic effect on the amount of buffer inventories held by some businesses.

Real World 10.4

Don't panic!

UK manufacturers are stockpiling goods at the fastest rate since records began almost three decades ago as companies brace themselves for the prospect of a chaotic exit from the EU. In recent weeks, anecdotal evidence has been mounting that companies in multiple sectors, including pharmaceuticals and automakers, were moving to build up stocks in case Britain crashes out of the EU without a deal on March 29, with several warning about potential disruption of supply chains.

→

But the closely watched purchasing managers' index compiled by IHS Markit/CIPS on Friday showed concrete evidence that stockpiling was becoming widespread – particularly in the food and drink, clothing, chemical and plastics, and electrical and electronics sectors – and was being implemented at more larger companies than small ones. 'The start of 2019 saw UK manufacturers continue their preparations for Brexit,' said Rob Dobson, director at IHS Markit. 'Stocks of inputs increased at the sharpest pace in the [index's] 27-year history, as buying activity was stepped up to mitigate against potential supply-chain disruptions in coming months.' [The extent of recent stockpiling is shown in Figure 10.3.]

Markit PMI stock of purchases, above 50 = expansion
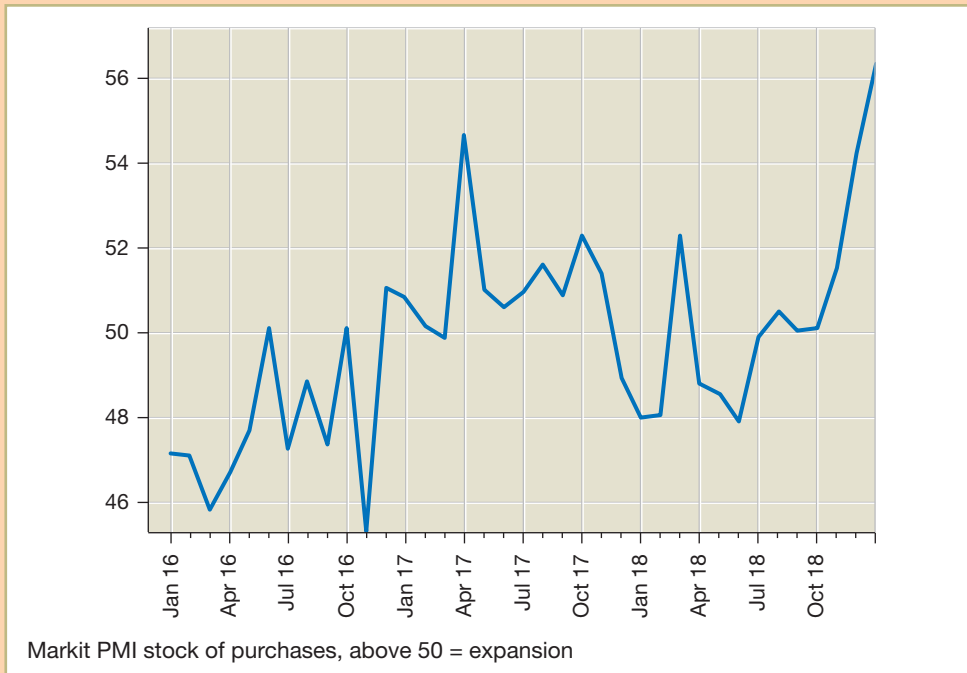
Figure 10.3 UK manufacturing stockpiling accelerates

On Thursday, Unilever became the latest consumer goods maker to reveal stockpiling plans, saying it would hold extra supplies of products such as Ben & Jerry's ice cream and Magnum bars as well as materials used to package goods. 'People are stocking because, in the case of goods they ship in from Europe, they are concerned about delays at the ports,' said Duncan Brock of the Chartered Institute of Procurement and Supply, a body representing the procurement industry. 'Take toilet rolls: if you sell these and you understand that many of the paper-producing mills are in Scandinavia, you are going to protect yourself on that basis.' Mr Brock noted that it was not the end retailers, such as supermarket groups, that were piling items such as food ingredients or cleaning products in warehouses but the manufacturers and distributors of such items.

Retailers would likely be relying on their suppliers to stockpile instead of taking the increased inventories on to their own balance sheets, Mr Brock said. 'The big chemical manufacturers are based in Holland and Germany,' he said. 'So while you have a lot of people making, say, plastic bottles or packaging in the UK, the materials that go into them will likely come from somewhere else in Europe.' The PMI stock of purchases index rose to 56.3 in January, up from 48 in the same month last year and the highest level since records began in 1992. Inventories of finished goods rose at the third-fastest rate in the survey's history.

Alastair Hughes, managing director of West London luxury bedmaker Savoir Beds, said his company had spent £250,000 on extra stock since October, forcing the group to delay previously planned investments such as buying new vans. 'Our biggest raw material is horse tail [used in high-end mattresses] from Argentina, which is processed in Switzerland and comes by road on the Calais–Dover route,' he said. 'The lead time from ordering it to receiving it is five months, and we decided it's the one thing we definitely cannot do without.' Mr Hughes added that other items Savoir has stockpiled included steel, wool, and components made by UK suppliers because 'the material that goes into them comes from overseas'.

Stockpiling has been good news for some landlords. Industrial and logistics warehouse take-up in the UK reached record levels last year, according to CBRE, the consultancy. Hill's Panel Products in Oldham, which makes furniture for fitted kitchens, has had to find space for more hardboard. Keith Wardrope, managing director, said: 'We have upped our stock levels from suppliers who are not UK based.' Hinges and other accessories come from Blum of Germany. 'They have a two- to three-week window after Brexit where they are not bringing anything over. It will all be in the country before Brexit.'

Activity 10.6

Hora plc holds inventories of a particular type of motor car tyre, which is ordered in batches of 1,200 units. The supply lead times and usage rates for the tyres are:

	Maximum	*Most likely*	*Minimum*
Supply lead times	**25 days**	**15 days**	**8 days**
Daily usage	**30 units**	**20 units**	**12 units**

The business wishes to avoid the risk of running out of inventories.

At what minimum level of inventories should Hora plc place a new order, such that it can guarantee not to run out?

What is the size of the buffer inventories based on the most likely lead times and usages?

If Hora plc were to place an order based on the maximum lead time and usage, but only the minimum lead time and usage were actually to occur, what would be the level of inventories immediately following the delivery of the new inventories? What does this inventories figure represent?

To be certain of avoiding running out of inventories, the business must assume a reorder point based on the maximum usage and lead time. This is 750 units (that is, 30×25).

The most likely usage during the lead time will be only 300 units (that is, 20×15). Thus, the buffer inventories based on most likely usage and lead time is 450 units (that is, $750 - 300$).

The level of inventories when a new order of 1,200 units is received, immediately following the minimum supply lead time and minimum daily usage during the lead time, is 1,854 units (that is, $1,200 + 750 - (8 \times 12)$). This represents the maximum inventories holding for the business.

Levels of control

Deciding on the appropriate level of inventories control to adopt requires a careful weighing of costs and benefits. This may lead to the implementation of different levels of control according to the nature of the inventories held. The **ABC system of inventories control** is based on the

idea of selective levels of control. A business may find it possible to divide its inventories into three broad categories: A, B and C. Each category will be based on the value of inventories held, as illustrated in Example 10.1.

Example 10.1

Alascan Products plc makes door handles and door fittings. It makes them in brass, in steel and in plastic. The business finds that brass fittings account for 10 per cent of the physical volume of the finished inventories that it holds, but these represent 65 per cent of the total value. These are treated as Category A inventories. There are sophisticated recording procedures, tight control is exerted over inventories movements and there is a high level of security where the brass fittings are stored. This is economically viable because these inventories represent a relatively small proportion of the total volume.

The business finds that steel fittings account for 30 per cent of the total volume of finished inventories and represent 25 per cent of the total value. These are treated as Category B inventories, with a lower level of recording and management control being applied.

The remaining 60 per cent of the volume of inventories is plastic fittings, which represent the least valuable items, accounting for only 10 per cent of the total value of finished inventories held. These are treated as Category C inventories, so the level of recording and management control would be lower still. Applying to these inventories the level of control used for Category A or even Category B inventories would be uneconomic.

Categorising inventories in this way helps to direct management effort to the most important areas. It also helps to ensure that the costs of controlling inventories are proportionate to their value.

Figure 10.4 provides a graphical depiction of the ABC approach to inventories control.

Category A contains inventories that, though relatively few in quantity, account for a large proportion of the total value. Category B inventories consists of those items that are less valuable but more numerous. Category C comprises those inventories items that are very numerous but relatively low in value. Different inventories' control rules would be applied to each category. For example, only Category A inventories would attract the more expensive and sophisticated controls.

Figure 10.4 ABC method of analysing and controlling inventories

INVENTORIES MANAGEMENT MODELS

Economic order quantity

Decision models may be used to help manage inventories. The **economic order quantity (EOQ)** model is concerned with determining the quantity of a particular inventories item that should be ordered each time. In its simplest form, the EOQ model assumes that demand is constant. This implies that inventories will be depleted evenly over time to be replenished just at the point that they run out. These assumptions would lead to a 'saw-tooth' pattern to represent inventories movements, as shown in Figure 10.5.

Here we assume that there is a constant rate of usage of the inventories item and that inventories are reduced to zero just as new inventories arrive. At time 0 there is a full level of inventories. This is steadily used as time passes and just as it falls to zero it is replaced. This pattern is then repeated.
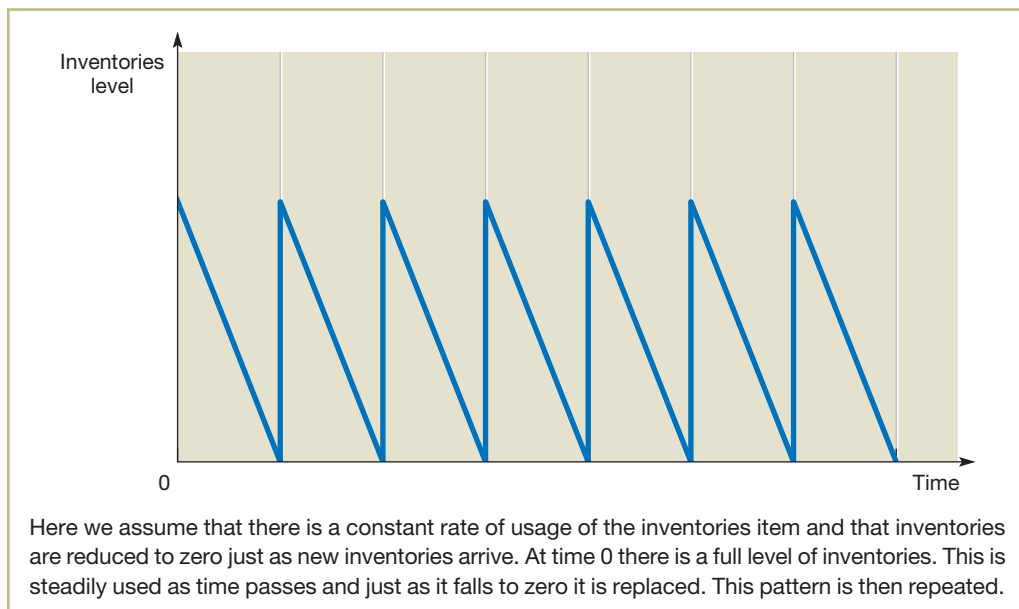
Figure 10.5 Patterns of inventories movements over time

The EOQ model recognises that the key costs associated with inventories' management are the cost of holding the inventories and the cost of ordering them. The cost of holding inventories can be substantial. Management may, therefore, try to minimise the average amount of inventories held and with it, the holding cost. It will, however, increase the number of orders placed during the period and so ordering costs will rise. The EOQ model seeks to calculate the optimum size of a purchase order that will balance both of these cost elements.

Figure 10.6 shows how, as the level of inventories and the size of inventories orders increase, the annual costs of placing orders will decrease because fewer orders will be placed. However, the cost of holding inventories will increase, as there will be higher average inventories levels. The total costs curve, which is based on the sum of holding costs and ordering costs, will fall until the point E, which represents the minimum total cost. Thereafter, total costs begin to rise. The EOQ model seeks to identify point E, at which total costs are minimised. This will represent half of the optimum amount that should be ordered on each occasion. Assuming, as we are doing, that inventories are used evenly over time and that they fall to zero before being replaced, the average inventories level equals half of the order size.

Small inventories levels imply frequent reordering and high annual ordering costs. Small inventories levels also imply relatively low inventories holding costs. High inventories levels imply exactly the opposite. There is, in theory, an optimum order size that will lead to the sum of ordering and holding costs (total costs) being at a minimum.
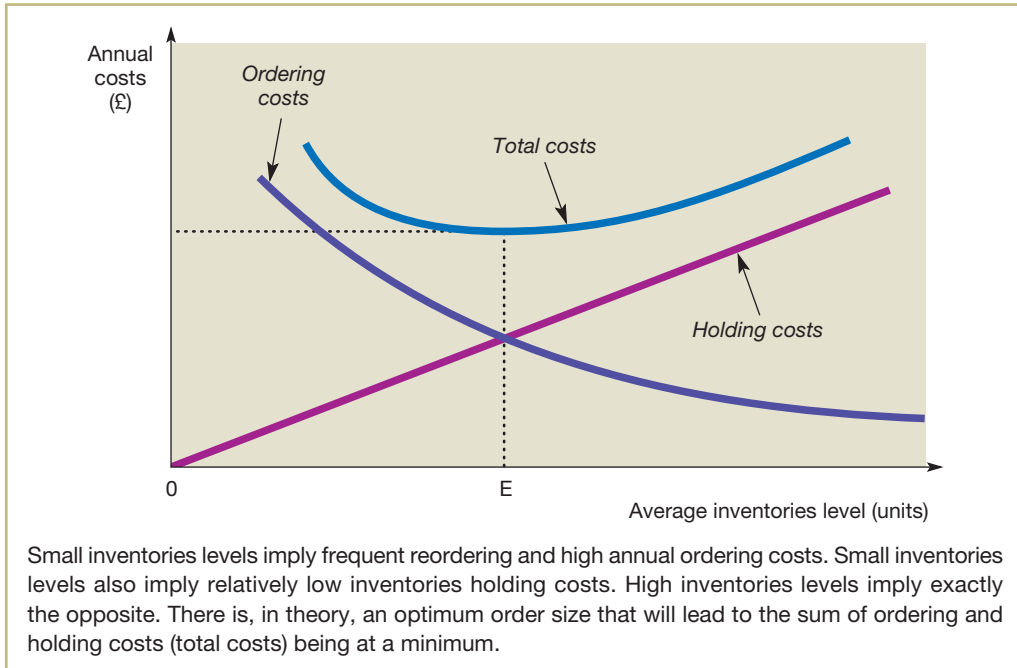
Figure 10.6 Inventories holding and order costs

The EOQ model, which can be used to derive the most economic order quantity, is:

$$EOQ = \sqrt{\frac{2DC}{H}}$$

where D = annual demand for the inventories item (expressed in units of the inventories item)
$\quad\quad C$ = cost of placing an order
$\quad\quad H$ = the cost of holding one unit of the inventories item for one year.

Activity 10.7

HLA Ltd sells 2,000 bags of cement each year. It has been estimated that the cost of holding one bag of cement for a year is £4. The cost of placing an order for new inventories is estimated at £250.
Calculate the EOQ for bags of cement.

Your answer to this activity should be as follows:

$$EOQ = \sqrt{\frac{2 \times 2,000 \times 250}{4}}$$
$$= 500 \text{ bags}$$

This will mean that the business will have to order bags of cement four times each year (that is, 2,000/500) in batches of 500 bags so that sales demand can be met.

Note that the cost of inventories, which is the price paid to the supplier, does not directly affect the EOQ model. It is concerned only with the administrative costs of placing and handling each order and the costs of holding the inventories. However, more expensive inventories items tend to have greater holding costs. This may be because an ABC system of inventories

control is in place or because they tie up more finance than less expensive inventories, or both. Thus, the cost of inventories may have an indirect influence on the economic order size that is calculated.

The basic EOQ model has a number of limiting assumptions. In particular, it assumes that:

- demand for an inventories item can be predicted with accuracy
- demand is constant over the period and does not fluctuate through seasonality or for other reasons
- no 'buffer' inventories are required
- there are no discounts for bulk purchasing.

The model can be modified, however, to overcome each of these limiting assumptions. Many businesses use this model (or a development of it) to help in the management of inventories.

Activity 10.8

Petrov plc sells 10,000 tonnes of sand each year and demand is constant over time. The purchase cost of each tonne is £15 and the cost of placing and handling an order is estimated to be £32. The cost of holding 1 tonne of sand for one year is estimated to be £4. The business uses the EOQ model to determine the appropriate order quantity and holds no buffer inventories.

Calculate the total annual cost of trading in this product.

The total annual cost will be made up of three elements:

- the cost of purchases
- the cost of ordering
- the cost of holding this item in inventories.

The annual cost of purchases is $10,000 \times £15 = £150,000$
The annual cost of ordering is calculated as follows:
The EOQ is:

$$EOQ = \sqrt{\frac{2 \times 10,000 \times 32}{4}}$$
$$= 400 \text{ tonnes}$$

This will mean that $10,000/400 = 25$ orders will be placed each year. The annual cost of ordering is therefore $25 \times £32 = £800$.

The annual cost of holding inventories is calculated as follows:
The average quantity of inventories held will be half the optimum order size, as mentioned earlier. That is, $400/2 = 200$ tonnes.

The annual holding cost is therefore $200 \times £4 = 800$.
The total annual cost of trading in this product is therefore:

$$£150,000 + £800 + £800 = £151,600*$$

*Note that the annual ordering cost and annual holding cost are the same. This is no coincidence. If we look back at Figure 10.6 we can see that the economic order quantity represents the point at which total costs are minimised. At this point, annual order costs and annual holding costs are equal.

Enterprise resource planning systems

Enterprise resource planning (ERP) systems provide an automated and integrated approach to managing a business. They consist of a suite of software applications (modules) that record, report, analyse and interpret data for a range of business operations, including production,

marketing, human resources, accounting and inventories management. These integrated software applications are supported by a common database, which is operated on a real (or near real) time basis and which can be accessed remotely.

An ERP software application for the management of inventories will carry out a wide range of tasks such as:

■ forecasting demand using statistical formulae
■ making reorder decisions based on forecast future demand
■ ordering the transfer of goods between locations
■ tracking and reporting inventories according to type, serial numbers and so on
■ providing real time information concerning shipping costs, trends in inventories holdings, on-time deliveries and so on
■ allocating warehouse space for where goods are to be stored
■ helping inventories audits by setting tolerance levels for variations between actual and reported inventories held
■ pricing inventories being shipped, to take account of required profit margins, bulk discounts and so on.

The software application will normally embed best practice within a particular industry, but may be customised to meet the needs of an individual business.

ERP inventories' management applications greatly enhance the quality, range and timeliness of information to managers. This can be of enormous benefit in driving efficiencies and in responding to changing circumstances. These applications can, however, be costly to introduce.

Activity 10.9

Try to identify at least *three* types of cost that may be incurred when adopting an ERP inventories' management application.

They include:

■ initial outlay cost
■ customising the application
■ staff training and development
■ converting existing files to fit the application
■ testing
■ re-engineering business processes to accommodate the application.

Just-in-time inventories management

In recent years, many businesses have tried to eliminate the need to hold inventories by adopting **just-in-time (JIT) inventories management**. This approach was originally used in the US defence industry during the Second World War, but was adopted on a widespread basis by Japanese manufacturing businesses. The essence of JIT is, as the name suggests, to have supplies delivered to the business just in time for them to be used in the production process or in a sale. By adopting this approach, the inventories holding cost rests with suppliers rather

than with the business itself. A failure by a particular supplier to deliver on time, however, could cause enormous problems and costs to the business. Thus, JIT may save cost, but it tends to increase risk.

For JIT to be successful, there needs to be a close relationship between a business and its suppliers. It is important that a business informs suppliers of its inventories' requirements in advance so that suppliers can schedule their own production to that of the business. Suppliers must then deliver materials of the right quality at the agreed times. Any delivery failures could lead to a dislocation of production and could be very costly. Successful JIT tends to require that suppliers are geographically near to the business.

Activity 10.10

Superlec plc makes electrical appliances. One of its major component suppliers is Technicalities Ltd. The two businesses have recently established a comprehensive JIT relationship.

Would you expect that the inventories of Technicalites Ltd to:

- increase,
- reduce, or
- stay the same

as a result of the change of relationship?

The introduction of JIT by Superlec Ltd will pass the inventories holding problem to Technicalities Ltd. As a result, Technicalities inventories' holdings could increase. However, the close working relationship that a JIT approach requires, should lead to a reduction in the total amount of inventories held by the supplier. Knowing Superlec's inventories' requirements in advance should help Technicalities to schedule its own production and inventories to those requirements. It may encourage Technicalites to introduce a system of JIT from its own suppliers.

Adopting JIT may well require re-engineering a business's production process. To ensure that orders are quickly fulfilled, factory production must be flexible and responsive. This may require changes to both the production layout and working practices. Production flows may have to be redesigned and employees may have to be given greater responsibility to allow them to deal with unanticipated problems and to encourage greater commitment. Information systems must also be installed that facilitate an uninterrupted production flow.

Although a business that applies JIT will not have to hold inventories, there may be other costs associated with this approach. For example, the close relationship necessary between the business and its suppliers may prevent the business from taking advantage of cheaper sources of supply that become available. Furthermore, where suppliers need to hold inventories for the customer, it may try to recoup this additional cost through increased prices.

JIT is widely viewed as more than simply an inventories control system. The philosophy underpinning this approach is that of *total quality management.* This is concerned with eliminating waste and striving for excellence. There is an expectation that suppliers will always deliver inventories on time and that there will be no defects in the items supplied.

There is also an expectation that, for manufacturers, the production process will operate at maximum efficiency. This means that there will be no production breakdowns and the queuing and storage times of products manufactured will be eliminated, as only time spent directly on processing the products is seen as adding value. While these expectations may be impossible to achieve, they can help to create a culture that is dedicated to the pursuit of excellence and quality.

Real World 10.5 shows how two well-known businesses operating in the UK use JIT to their advantage.

XYZ inventories management

XYZ inventories management classifies inventories into three categories according to variability of customer demand. Category X items are those that display relatively little variation in demand over time. In other words, sales follow a fairly steady path. This pattern of sales demand makes it possible to produce forecasts with a high degree of accuracy. Category Y items display greater variability in demand. Sales of these items may be affected by seasonal factors, changes in the competitive environment, changes in interest rates and so on. Nevertheless, it is still possible to identify and to predict, to a reasonable degree, the impact of these factors. It should, therefore, be possible to forecast sales demand with some accuracy. Category Z items display a high level of variability in demand. Sales may fluctuate dramatically from one period to the next. The underlying reasons for these fluctuations may be difficult to identify and, even where this can be done, their impact may be difficult to predict. Under these conditions, accurate sales forecasting becomes impossible.

Possible patterns of demand for each of the three categories of inventories are shown in Figure 10.7.
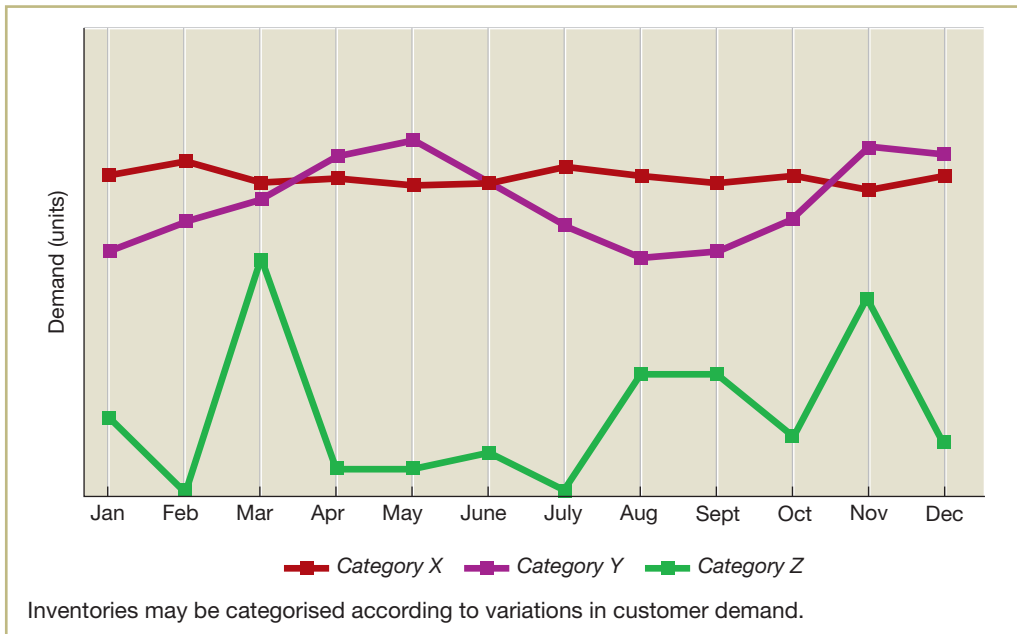
Figure 10.7 Patterns of inventories demand

By classifying inventories according to their variability in demand, a business can manage them more effectively. Demand for Category X items can be forecast with a high degree of accuracy, which means that automated ordering and processing systems can be implemented. It also means that there is no need to keep significant buffer inventories in case of unexpected surges in demand. Demand for Category Y items is less easy to predict, which makes complete automation of ordering and processing inventories more difficult. Some manual involvement is likely to be needed. Furthermore, the higher risk of error in forecasting demand means that a higher level of buffer inventories should be maintained. Demand for Category Z items is unpredictable, which makes accurate forecasting impossible. As a result, automated ordering and processing systems cannot be employed. Raising purchase orders, setting buffer inventories' levels and so on must, therefore, be carried out manually. In some cases, it may be necessary to hold significant buffer inventories. However, where sales fluctuate dramatically and product life cycles are short, this can lead to high costs of obsolescence. It may be better to have no buffer inventories and to raise purchase orders only after customer orders have been received.

Activity 10.11

For which one of the above categories of inventories would a JIT system fit most comfortably?

A JIT system would be most suitable for Category X items. Customer demand is predictable and this, in turn, makes it possible to arrange with suppliers a regular stream of deliveries. Problems in predicting customer demand would make the implementation of a JIT system difficult for Category Y items and, probably, impossible for Category Z items.

Some businesses combine the ABC inventories control approach discussed earlier with the XYZ approach. When this occurs, both the value of the inventories held and their variation in demand are taken into account. This can help in clarifying how particular inventories should be treated. Let us say, for example, a batch of inventories are categorised as AX – that is, A (high value) and X (steady demand). This will mean that they should be monitored closely, that ordering can be fully automated and that only low buffer inventories are needed. These inventories may also be suitable for the implementation of a JIT system.

MANAGING TRADE RECEIVABLES

Selling goods or services on credit will result in costs being incurred by a business. These costs include the costs of credit administration, of bad debts and of opportunities forgone to use the funds for other purposes. However, these costs must be weighed against the benefits of increased sales revenue resulting from the opportunity for customers to delay payment.

Selling on credit is the norm outside the retail industry. When a business offers to sell its goods or services on credit, it must have clear policies concerning:

- which customers should receive credit
- how much credit should be offered
- what length of credit it is prepared to offer
- whether discounts will be offered for prompt payment
- what collection policies should be adopted
- how the risk of non-payment can be reduced.

In this section, we consider each of these issues.

Which customers should receive credit and how much should they be offered?

A business offering credit runs the risk of not receiving payment for goods or services supplied. Care must, therefore, be taken over the type of customer to whom credit facilities are offered and how much credit is allowed. When considering a proposal from a customer for the supply of goods or services on credit, a business should take into account a number of factors. The following **five Cs of credit** provide a useful checklist:

- *Capital.* The customer must appear to be financially sound before any credit is extended. Where the customer is a business, its financial statements should be examined. Particular regard should be given to the customer's likely future profitability and liquidity. In addition, any major financial commitments (such as outstanding borrowings, capital expenditure commitments and contracts with suppliers) should be taken into account.
- *Capacity.* The customer must appear to have the capacity to pay for the goods acquired on credit. The customer's payment record to date should be examined to provide important clues. To help further assess capacity, the type of business and the amount of credit required in relation to the customer's total financial resources should be taken into account.
- *Collateral.* On occasions, it may be necessary to ask for some kind of security for goods supplied on credit. When this occurs, the business must be convinced that the customer is able to offer a satisfactory form of security.

- *Conditions.* The state of the industry in which the customer operates, as well as the general economic conditions of the particular region or country, should be taken into account. The sensitivity of the customer's business to changes in economic conditions can also have an important influence on the ability of the customer to pay on time.
- *Character.* It is important to make some assessment of the customer's character. The willingness to pay will depend on the honesty and integrity of the individual with whom the business is dealing. Where the customer is a business, this will mean assessing the characters of its senior managers as well as their reputation within the industry. The selling business must feel confident that the customer will make every effort to pay any amounts owing.

To help assess the above factors, various sources of information are available. They include:

- *Trade references.* Some businesses ask potential customers to provide references from other suppliers that have extended credit to them. This can be extremely useful as long as the references provided are truly representative of the opinions of all the customer's suppliers. There is a danger that a potential customer will be selective when giving details of other suppliers, in an attempt to create a more favourable impression than is deserved.
- *Bank references.* It is possible to ask the potential customer for a bank reference. Although banks are usually prepared to supply references, their contents are not always very informative. The bank will usually charge a fee for providing a reference.
- *Published financial statements.* A limited company is obliged by law to file a copy of its annual financial statements with the Registrar of Companies. These are available for public inspection and can provide a useful insight into performance and financial position. Many companies also publish their annual financial statements on their websites or on computer-based information systems.
- *The customer.* Interviews with the directors of the customer business and visits to its premises may be carried out to gain an impression of the way that the customer conducts its business. Where a significant amount of credit is required, the business may ask the customer for access to internal forecasts and other unpublished financial information to help assess the level of risk involved.
- *Credit agencies.* Specialist agencies exist to provide information that can be used to assess the creditworthiness of a potential customer. The information that a credit agency supplies may be gleaned from various sources, including the customer's financial statements and news items relating to the customer from both published and unpublished sources. The credit agencies may also provide a credit rating for the business. Agencies will charge a fee for their services.
- *Register of County Court Judgments.* Any money judgments given against the business or an individual in a county court will be maintained on the register for six years. This register is available for inspection by any member of the public for a small fee.
- *Other suppliers.* Similar businesses will often be prepared to exchange information concerning slow payers or defaulting customers through an industry credit circle. This can be a reliable and relatively cheap way of obtaining information.

Activity 10.12

It was mentioned above that although banks are usually prepared to supply references, their contents are not always very informative. Why might this be the case?

If a bank customer is in financial difficulties, the bank may be unwilling to add to its problems by supplying a poor reference. It is worth remembering that the bank's loyalty is likely to be with the customer rather than the enquirer.

Once a customer is considered creditworthy, credit limits should be established. When doing so, the business must take account of its own financial resources and risk appetite. Unfortunately, there are no theories or models to guide a business when deciding on the appropriate credit limit to adopt; it is really a matter of judgement. Some businesses adopt simple 'rule of thumb' methods based on the amount of sales made to the customer (say, twice the monthly sales figure for the customer) or the maximum the business is prepared to be owed (say, a maximum of 20 per cent of its working capital) by all of its customers.

Length of credit period

A business must determine what credit terms it is prepared to offer its customers. The length of credit offered to customers can vary significantly between businesses. It may be influenced by such factors as:

- the typical credit terms operating within the industry
- the degree of competition within the industry
- the bargaining power of particular customers
- the risk of non-payment
- the capacity of the business to offer credit
- the marketing strategy of the business.

The last point may require some explanation. If, for example, a business wishes to increase its market share, it may decide to be more generous in its credit policy in an attempt to stimulate sales. Potential customers may be attracted by the offer of a longer credit period. However, any such change in policy must take account of the likely costs and benefits arising. To illustrate this point, consider Example 10.2.

Example 10.2

Torrance Ltd produces a new type of golf putter. The business sells the putter to wholesalers and retailers and has an annual sales revenue of £600,000. The following data relate to each putter produced:

	£
Selling price	40
Variable cost	(20)
Fixed cost apportionment	(6)
Profit	14

The business's cost of capital is estimated at 10 per cent a year.

Torrance Ltd wishes to expand the sales volume of the new putter. It believes that offering a longer credit period can achieve this. The business's average trade receivables settlement period is currently 30 days. It is considering three options in an attempt to increase sales revenue. These are as follows:

	Option		
	1	2	3
Increase in average settlement period (days)	10	20	30
Increase in sales revenue (£)	30,000	45,000	50,000

To help the business to decide on the best option, the benefits of the various options should be weighed against their respective costs. Benefits will be represented by the increase in profit from the sale of additional putters. From the information supplied we can see that the contribution to profit (that is, selling price (£40) less variable costs (£20)) is £20 a putter. This represents 50 per cent of the selling price. So, whatever increase occurs in sales revenue, the additional contribution to profit will be half of that figure. The fixed cost can be ignored in our calculations, as it will remain the same whichever option is chosen.

The increase in contribution under each option will therefore be:

	Option		
	1	2	3
50% of the increase in sales revenue (£)	15,000	22,500	25,000

The increase in trade receivables under each option will be as follows:

	Option		
	1	2	3
	£	£	£
Projected level of trade receivables:			
40 × £630,000/365 (Note 1)	69,041		
50 × £645,000/365 (Note 2)		88,356	
60 × £650,000/365			106,849
Current level of trade receivables:			
30 × £600,000/365	(49,315)	(49,315)	(49,315)
Increase in trade receivables	19,726	39,041	57,534

The increase in receivables that results from each option will mean an additional finance cost to the business.

The net increase in the business's profit arising from the projected change is:

	Option		
	1	2	3
	£	£	£
Increase in contribution (see above)	15,000	22,500	25,000
Increase in finance cost (Note 3)	(1,973)	(3,904)	(5,753)
Net increase in profits	13,027	18,596	19,247

The calculations show that Option 3 will be the most profitable one.

Notes:
1 If the annual sales revenue totals £630,000 and 40 days' credit is allowed (both of which will apply under Option 1), the average amount that will be owed to the business by its customers, at any point during the year, will be the daily sales revenue (that is, £630,000/365) multiplied by the number of days that the customers take to pay (that is 40).
2 Exactly the same logic applies to Options 2 and 3 and to the current level of trade receivables.
3 The increase in the finance cost for Option 1 will be the increase in trade receivables (£19,726) × 10 per cent. The equivalent figures for the other options are derived in a similar way.

Example 10.2 illustrates the broad approach that a business should take when assessing changes in credit terms. However, by extending the length of credit, other costs may be incurred. These may include bad debts and additional collections costs, which should also be taken into account in the calculations.

Real World 10.6 reveals how long large businesses take to pay their bills.

Real World 10.6

Supplier payment periods

Figure 10.8 shows the range of trade credit periods for large UK businesses in late 2017/early 2018. The median time to pay suppliers across the companies that have submitted reports to date is 37 days. While this may be seen as a reasonable credit term, there is a wide distribution and there are businesses that take much longer to pay suppliers.
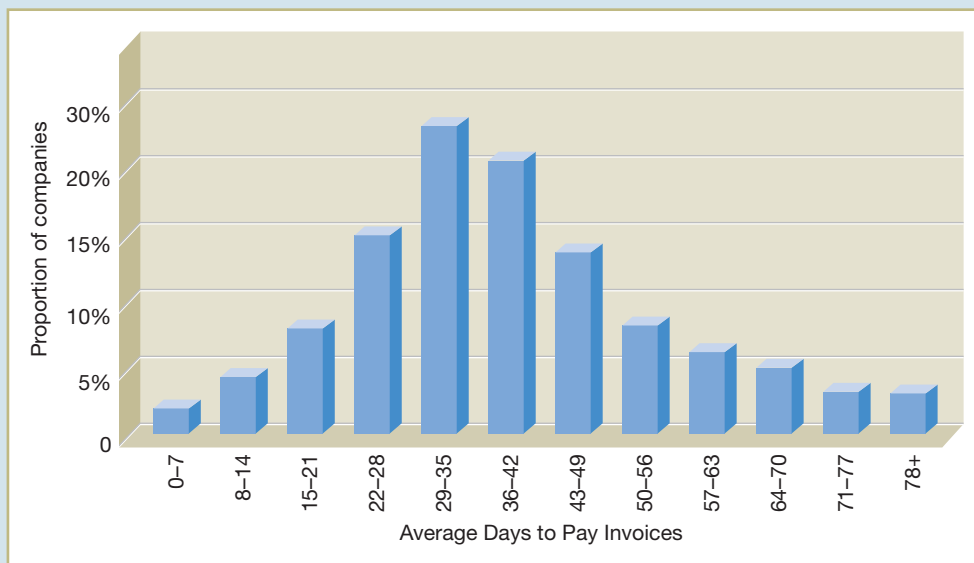
Figure 10.8 UK large companies – average time to pay suppliers

Source: Extracts from Elmes, S. (2018) 'Payment practices of large companies', www.mycreditcontrollers.co.uk/research/payment-practices-18-03.html, 12 March.

An alternative approach to evaluating the credit decision

It is possible to view the credit decision as a capital investment decision. Granting trade credit involves an opportunity outlay of resources in the form of cash (which has been temporarily forgone) in the expectation that future cash flows will be increased (through higher sales) as a result. A business will usually have choices concerning the level of investment to be made in credit sales and the period over which credit is granted. These choices will result in different returns and different levels of risk. There is no reason in principle why the NPV investment appraisal method, which we considered in Chapter 4, should not be used to evaluate these choices. The NPV method takes into account both the time value of money and the level of risk involved.

Approaching the problem as an NPV assessment is not different in principle from the way that we dealt with the decision in Example 10.2. In both approaches the time value of money is considered, but in Example 10.2 we did it by charging a financing cost on the outstanding trade receivables.

Cash discounts

To encourage prompt payment from its credit customers, a business may offer a **cash discount** (or discount for prompt payment). The size of any discount will be an important influence on whether a customer decides to pay promptly.

From the business's viewpoint, the cost of offering discounts must be weighed against the likely benefits in the form of a reduction both in the cost of financing trade receivables and in the amount of bad debts. Example 10.3 shows how this may be done.

Example 10.3

Williams Wholesalers Ltd currently asks its credit customers to pay by the end of the month after the month of delivery. In practice, customers take rather longer to pay – on average 70 days. Sales revenue amounts to £4 million a year and bad debts to £20,000 a year.

It is planned to offer customers a cash discount of 2 per cent for payment within 30 days. Williams estimates that 50 per cent of customers will accept this facility but that the remaining customers, who tend to be slow payers, will not pay until 80 days after the sale. At present the business has an overdraft facility at an interest rate of 13 per cent a year. If the plan goes ahead, bad debts will be reduced to £10,000 a year and there will be savings in credit administration expenses of £6,000 a year.

Should Williams Wholesalers Ltd offer the new credit terms to customers?

Solution

The first step is to determine the reduction in trade receivables arising from the new policy.

		£	£
Existing level of trade receivables	(£4m × 70/365)		767,123
New level of trade receivables:	£2m × 80/365	438,356	
	£2m × 30/365	164,384	(602,740)
Reduction in trade receivables			164,383

The costs and benefits of offering the discount can be set out as follows:

Cost and benefits of policy	£	£
Cost of discount (£2m × 2%)		40,000
Less		
Interest saved on the reduction in trade receivables		
(£164,383* × 13%)	21,370	
Administration cost saving	6,000	
Cost of bad debts saved (£20,000 − £10,000)	10,000	(37,370)
Net cost of policy		2,630

These calculations show that the business will be worse off by offering the new credit terms.

*It could be argued that the interest should be based on the amount expected to be received; that is the value of the trade receivables *after* taking account of the discount. Basing it on the expected receipt figure would not, however, alter the conclusion that the business should not offer the new credit terms.

Activity 10.13

In practice, there is always the danger that a customer may be slow to pay and yet may still take the discount offered. Where the customer is important to the business, it may be difficult to insist on full payment. How might a business overcome this problem?

Instead of allowing customers to deduct a discount, those who pay promptly can be rewarded separately, say on a three-monthly basis. The reward could be a cash payment to the customer or, perhaps, a credit note. The value of the reward would be equal to the cash discounts earned by each customer during the three months.

Debt factoring and invoice discounting

Trade receivables can, in effect, be turned into cash by either factoring them or having sales invoices discounted. Both are forms of asset-based finance, which involves a financial institution providing a business with an advance of 80 per cent or more of the value of the trade receivables outstanding. These methods, which are popular approaches to managing receivables, were discussed in Chapter 6.

Credit insurance

It is often possible for a supplier to insure its entire trade receivables, individual customer accounts or the outstanding balance relating to a particular transaction.

Collection policies

A business offering credit must ensure that receivables are collected as quickly as possible so that non-payment risk is minimised and operating cash flows are maximised. Various steps can be taken to achieve this, including the following.

Develop customer relationships

For major customers it is often useful to cultivate a relationship with the key staff responsible for paying sales invoices. By so doing, the chances of prompt payment may be increased. For less important customers, the business should at least identify the key members of staff responsible for paying invoices, who can be contacted in the event of a payment problem.

Publicise credit terms

The credit terms of the business should be made clear in all relevant correspondence, such as order acknowledgements, invoices and statements. In early negotiations with the prospective customer, credit terms should be openly discussed and an agreement reached.

Issue invoices promptly

An efficient collection policy requires an efficient accounting system. Invoices (bills) must be sent out promptly to customers, as must monthly statements. Reminders must also be dispatched promptly to customers who are late in paying. If a customer fails to respond to a reminder, the accounting system should alert managers so that a stop can be placed on further deliveries.

Use financial ratios to monitor outstanding receivables

Managers can monitor the effectiveness of collection through the use of ratios. They can, for example, calculate the **average settlement period for trade receivables ratio**, which we met in Chapter 3. This ratio is calculated as follows:

$$\text{Average settlement period for trade receivables} = \frac{\text{Average trade receivables}}{\text{Credit sales}} \times 365$$

Although this ratio can be useful, it is important to remember that it produces an *average* figure for the number of days for which debts are outstanding. This average may be badly distorted by a few large customers who are very slow, or very fast, payers.

A further ratio that may be of assistance is the **trade receivables to sales ratio**. This ratio is calculated as follows:

$$\text{Trade receivables to sales} = \frac{\text{Trade receivables outstanding at end of the period}}{\text{Sales revenue for the period}}$$

In practice, this ratio is normally calculated on a monthly basis and can be used to detect trends. Where, for example, the ratio is increasing each month, it means that trade receivables are growing faster than sales revenue. Since it uses the month-end figure as the numerator, it has more immediacy than a ratio calculated on an annual basis.

Activity 10.14

Why might a trend showing increases in this ratio be a cause of concern?

This suggests that the business is slow in collecting its receivables, which may signal future cash flow problems.

Where trade receivables exceed the current monthly sales revenue, the ratio will be greater than one. Calculating this ratio for seasonal businesses can be tricky as the ratio will tend to increase or decrease as the seasons change. Thus, comparisons with similar months in previous years may be more useful in detecting trends.

Produce an ageing schedule of trade receivables

A more detailed and informative approach to monitoring receivables may be to produce an **ageing schedule of trade receivables**. Receivables are divided into categories according to the length of time they have been outstanding. An ageing schedule can be produced, on a regular basis, to help managers see the pattern of outstanding receivables. An example of an ageing schedule is set out in Example 10.4.

Example 10.4

Ageing schedule of trade receivables at 31 December

Customer	Days outstanding				Total
	1 to 30 days	31 to 60 days	61 to 90 days	More than 90 days	
	£	£	£	£	£
A Ltd	12,000	13,000	14,000	18,000	57,000
B Ltd	20,000	10,000	–	–	30,000
C Ltd	–	24,000	–	–	24,000
Total	32,000	47,000	14,000	18,000	111,000

This shows a business's trade receivables figure at 31 December, which totals £111,000. Each customer's balance is analysed according to how long the amount has been outstanding. (This business has just three credit customers.) To help focus management attention, accounts may be listed in order of size, with the largest debts first.

We can see from the schedule, for example, that A Ltd still has £14,000 outstanding for between 61 and 90 days (that is, arising from sales during October) and £18,000 outstanding for more than 90 days (that is, arising from sales during September or even before). This information can be very useful for credit control purposes.

Many accounting software packages include this ageing schedule as one of the routine reports available to managers. These packages often have the facility to put customers 'on hold' when they reach their credit limits. Putting a customer on hold means that no further credit sales will be made to that customer until amounts owing from past sales have been settled.

Many businesses use ageing summaries to assess the effectiveness of their receivables collection processes. Some of these show an end-of-reporting period summary in their annual report. **Real World 10.7** is an extract from the annual report of Sky plc, the satellite broadcaster.

Real World 10.7

Ageing receivables

Sky plc publishes an analysis of its trade receivables each year according to how long they are overdue. Figures for the previous year are also published for comparison purposes.

The ageing of the group's net trade receivables which are past due date but not impaired is as follows:

	2018
	£m
Up to 30 days past due date	59
30 to 60 days past due date	18
60 to 120 days past due date	19
120+ days past due	3
	99

Seventy-five per cent of Sky's unimpaired trade receivables were still within due date (30 days) at the business's 2018 year end.

Source: Sky plc, Annual report 2018, p. 102.

Identify the pattern of receipts

A slightly different approach to exercising control over receivables is to identify the pattern of receipts from credit sales on a monthly basis. This involves monitoring the percentage of credit sales that are paid in the month of sale and the percentage that is paid in subsequent months. To do this, credit sales for each month must be examined separately. Example 10.5 illustrates this.

Example 10.5

A business made credit sales of £250,000 in June. It received 30 per cent of that amount during June, 40 per cent during July, 20 per cent during August and 10 per cent during September. The pattern of credit sales receipts and amounts owing is:

Pattern of credit sales receipts

	Receipts from June credit sales £	Amounts received %	Amount outstanding from June sales at month end £	Amount outstanding %
June	75,000	30	175,000	70
July	100,000	40	75,000	30
August	50,000	20	25,000	10
September	25,000	10	0	0

This information can be used as a basis for control. Targets may be established for the pattern of cash received from credit sales. The actual pattern can then be compared with the target pattern of receipts to see whether there is any significant deviation (see Figure 10.9). Where this is the case, managers should consider corrective action.

It can be seen that 30 per cent of the sales income for June is received in that month; the remainder is received in the following three months. The expected (target) pattern of cash receipts for June sales, which has been assumed, is also depicted. By comparing the actual and expected pattern of receipts, it is possible to see whether credit sales are being properly controlled and to decide whether corrective action is required.

Figure 10.9 Comparison of actual and expected (target) receipts over time for Example 10.5

Answer queries quickly

It is important for relevant staff to deal with customer queries on goods and services supplied quickly and efficiently. Payment is unlikely to be made by customers until their queries have been dealt with.

Deal with slow payers

A business making significant sales on credit will, almost inevitably, be faced with customers who do not pay. When this occurs, there should be established procedures for dealing with the problem. There should be a timetable for sending out reminders and for adding customers to a 'stop list' for future supplies. The timetable may also specify the point at which the unpaid amount is passed to a collection agency for recovery. These agencies often work on a 'no collection – no fee' basis. Charges for their services vary but can be up to 15 per cent of the amounts collected.

Legal action may also be considered against delinquent credit customers. The cost of such action, however, must be weighed against likely returns. There is little point, for example, in incurring large legal expenses to try to recoup amounts owing if there is evidence that the customer has no money. Where possible, an estimate of the cost of bad debts should be taken into account when setting prices for products or services.

As a footnote to our consideration of managing receivables, **Real World 10.8** outlines some of the excuses that long-suffering credit managers must listen to when chasing payment for outstanding debts.

Real World 10.8

It's in the post

Satago Ltd, a credit management specialist, asked nearly 400 businesses for the most common excuse they had heard for late payment of outstanding debts. The replies are set out below:

1 Invoice not received/lost (44%)
2 Unable to pay because they were awaiting late payment (32%)
3 Invoice dispute – after contract agreed (13%)
4 Person responsible for payment has left the business (12%)
5 Customers attempting to renegotiate payment terms mid contract (11%)
6 Invoice dispute – with no contract in place (7%)
7 Payment paid to different company/account (5%)

Some of the more unusual excuses that were offered by late payers included:

- The dog ate the invoice
- I thought I was going to inherit some money from my mother, but she is still alive
- I accidentally shredded the invoice
- Someone stole all the paperwork.

Source: Renwick, S. (2014) 'Top 7 late payment excuses', www.satago.com, 17 July.

Reducing the risk of non-payment

Efficient collection policies are important in reducing the risk of non-payment. There are, however, other ways in which a business can reduce this type of risk. Possibilities include:

- requiring customers to pay part of their sale value in advance of the goods being sent
- agreeing to offset amounts owed for the purchase of goods against amounts due for goods supplied to the same business

- requiring a third-party guarantee from a financially sound business such as a bank or parent company
- making it a condition of sale that the legal title to the goods is not passed to the customer until the goods are paid for
- taking out insurance to cover the cost of any legal expenses incurred in recovering the amount owed. (Some customers may refuse to pay if they feel the business does not have the resources to pursue the debt through the courts.)

MANAGING CASH

Why hold cash?

Most businesses hold a certain amount of cash. There are broadly three reasons why they do so.

Activity 10.15

Can you think what these reasons may be? Try to think of at least one.

The three reasons are:

1 *To meet day-to-day commitments.* A business needs a certain amount of cash to pay for wages, overhead expenses, goods purchased and so on, when they fall due. Cash has been described as the lifeblood of a business. Unless it circulates through the business and is available to meet maturing obligations, the survival of the business will be put at risk. Simply being profitable is not enough to ensure survival.

2 *For precautionary purposes.* If future cash flows are uncertain, it would be prudent to hold a balance of cash. For example, a major customer that owes a large sum to the business may be in financial difficulties. This could lead to an expected large receipt not arriving. By holding cash, the business could retain its capacity to meet its obligations. Similarly, if there is uncertainty concerning future outlays, a cash balance will be needed.

3 *To exploit opportunities.* A business may decide to hold cash to put itself in a position to exploit profitable opportunities as and when they arise. For example, it may enable the acquisition of a competitor business that suddenly becomes available at an attractive price.

An example of the precautionary motive for holding cash is provided in **Real World 10.9**.

Real World 10.9

Petty cash balance . . .

Warren Buffett, chairman and chief executive of the giant conglomerate Berkshire Hathaway, has pledged that the business will:

> . . . always hold at least $20 billion in cash equivalents to guard against external calamities. We have also promised to avoid any activities that could threaten our maintaining that buffer. Berkshire will forever remain a financial fortress. In managing, I will make expensive mistakes of commission and will also miss many opportunities, some of which should have been obvious to me. At times, our stock will tumble as investors flee from equities. But I will never risk getting caught short of cash.

Source: Buffett, W. (2018) Shareholders letter, Berkshire Hathaway Inc., www.berkshirehathaway.com/letters/2018ltr.pdf, p. 6.

How much cash should be held?

The amount of cash held tends to vary considerably between businesses. The decision as to how much cash a business should hold is a difficult one. Various factors can influence the final decision.

Activity 10.16

Try to think of four possible factors that might influence the amount of cash that a business holds.

You may have thought of the following:

- *The nature of the business.* Some businesses, such as utilities (for example, water, electricity and gas suppliers), have cash flows that are both predictable and reasonably certain. This will enable them to hold lower cash balances. For some businesses, cash balances may vary greatly according to the time of year. A seasonal business may accumulate cash during the high season to enable it to meet commitments during the low season.
- *The opportunity cost of holding cash.* Where there are profitable opportunities in which to invest, it may not be wise to hold a large cash balance.
- *The level of inflation.* Holding cash during a period of rising prices will lead to a loss of purchasing power. The higher the level of inflation, the greater will be this loss.
- *The availability of near-liquid assets.* If a business has marketable securities or inventories that may easily be liquidated, high cash balances may not be needed.
- *The availability of borrowing.* If a business can borrow easily (and quickly) there is less need to hold cash.
- *The cost of borrowing.* When interest rates are high, the option of borrowing becomes less attractive.
- *Economic conditions.* When the economy is in recession, businesses may prefer to hold cash so that they can be well placed to invest when the economy improves. In addition, during a recession, businesses may experience difficulties in collecting trade receivables. They may therefore hold higher cash balances than usual in order to meet commitments.
- *Relationships with suppliers.* Too little cash may hinder the ability of the business to pay suppliers promptly. This can lead to a loss of goodwill. It may also lead to discounts being forgone.

Controlling the cash balance

Several models have been developed to help control the cash balance of the business. One such model proposes the use of upper and lower control limits for cash balances and the use of a target cash balance. The model assumes that the business will invest in marketable investments that can easily be liquidated. These investments will be purchased or sold, as necessary, in order to keep the cash balance within the control limits.

The model proposes two upper and two lower control limits (see Figure 10.10). If the business exceeds either of the *outer* limits, the managers must decide whether, over the next few days, the cash balance is likely to return to a point within the *inner* control limits set. If this seems likely, then no action is required. If, however, it does not seem likely, managers should change the cash position by either buying or selling marketable investments. In Figure 10.10 we can see that the lower outer control limit has been breached for four days. If a four-day period is unacceptable, managers should sell marketable investments to replenish the cash balance.

Management sets the upper and lower limits for the business's cash balance. When the balance goes beyond either of these limits, unless it is clear that the balance will return fairly quickly to within the limit, action will need to be taken. If the upper limit is breached, some cash will be placed on deposit or used to buy some marketable securities. If the lower limit is breached, the business will need to borrow some cash or sell some securities.

Figure 10.10 Controlling the cash balance

The model relies heavily on management judgement to determine where the control limits are set and the length of the period within which breaches of the control limits are acceptable. Past experience may be useful in helping managers decide on these issues. There are other models, however, that do not rely on management judgement. Instead, these use quantitative techniques to determine an optimal cash policy. One model proposed is the cash equivalent of the inventories economic order quantity model, discussed earlier in the chapter.

Projected cash flow statements and managing cash

To manage cash effectively, it is useful for a business to prepare a projected cash flow statement. This is a very important tool for both planning and control purposes. Projected cash flow statements were considered in Chapter 2 and so we shall not consider them again in detail. However, it is worth repeating that these statements enable managers to see how planned events are expected to affect the cash balance. The projected cash flow statements will identify periods when cash surpluses and cash deficits are expected.

When a cash surplus is expected to arise, managers must decide on the best use of the surplus funds. When a cash deficit is expected, managers must make adequate provision by borrowing, liquidating assets or rescheduling cash payments or receipts to deal with this. Projected cash flow statements can help to control the cash held. Actual cash flows can be compared with the projected cash flows for the period. If there is a significant divergence between the projected cash flows and the actual cash flows, explanations must be sought and corrective action taken where necessary.

To refresh your memory on projected cash flow statements it would probably be worth looking back at Chapter 2, pp. 38–41.

Operating cash cycle

When managing cash, it is important to be aware of the **operating cash cycle (OCC)** of the business. For a business that purchases goods on credit for subsequent resale on credit, such as a wholesaler, it represents the period between the outlay of cash for the purchase of inventories and the ultimate receipt of cash from their sale. The OCC for this type of business is as shown in Figure 10.11.

The OCC is the time lapse between paying for goods and receiving the cash from the sale of those goods. The length of the OCC has a significant impact on the amount of funds that the business needs to apply to working capital.
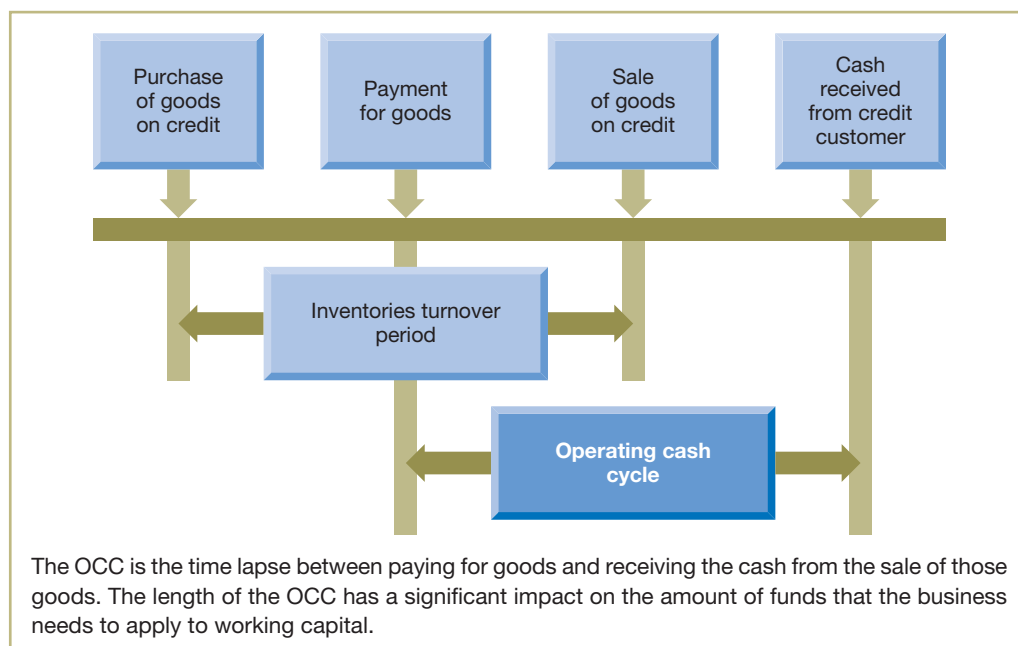
Figure 10.11 The operating cash cycle

Figure 10.11 shows that payment for inventories acquired on credit occurs some time after those inventories have been purchased. No immediate cash outflow arises, therefore, from the purchase. Similarly, cash receipts from credit customers will occur some time after the sale is made. There will be no immediate cash inflow, therefore, as a result of the sale. The OCC is the period between the payment made to the supplier, for the goods concerned, and the cash received from the credit customer. Although Figure 10.11 depicts the position for a wholesaling business, the precise definition of the OCC can easily be adapted for other types of business.

The OCC is important because it has a significant influence on the financing requirements of the business. Broadly, the longer the cycle, the greater will be the financing requirements and the greater the financial risks. The business may therefore wish to reduce the OCC to the minimum period possible. A business with a short OCC is said to have 'good (or strong) cash flow'.

For businesses that buy and sell goods on credit, the OCC can be deduced from their financial statements through the use of certain ratios. The calculations required are as shown in Figure 10.12.

For businesses that buy and sell on credit, three ratios are required to calculate the OCC.
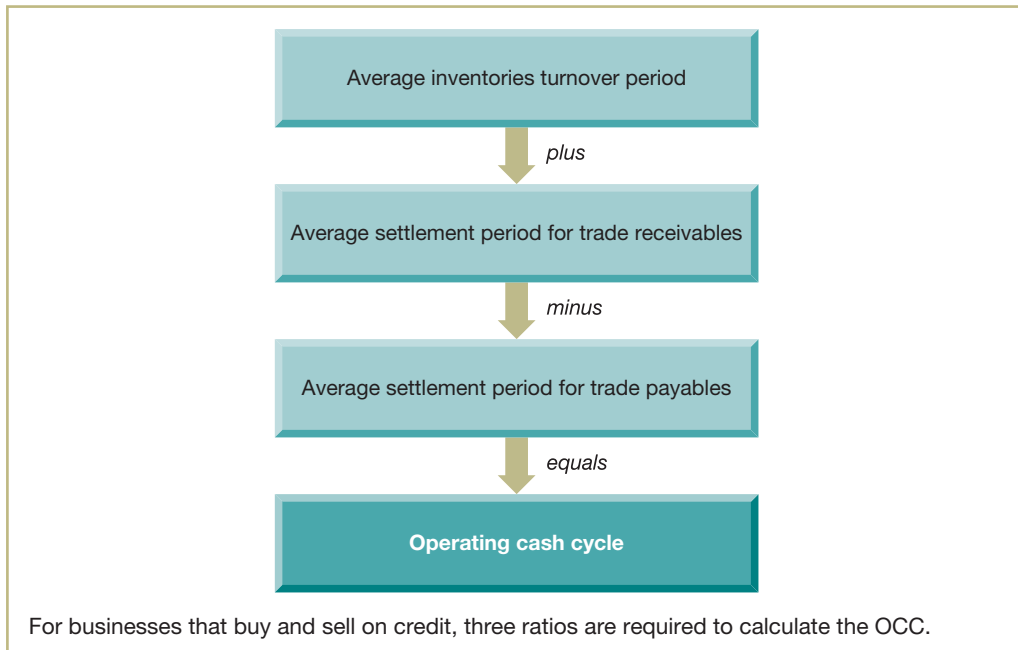
Figure 10.12 Calculating the operating cash cycle

Activity 10.17

The financial statements of Freezeqwik Ltd, a distributor of frozen foods, for the year ended 31 December last year are:

Income statement for the year ended 31 December last year

	£000	£000
Sales revenue		820
Cost of sales		
Opening inventories	142	
Purchases	568	
	710	
Closing inventories	(166)	(544)
Gross profit		276
Administration expenses		(120)
Distribution expenses		(95)
Operating profit		61
Financial expenses		(32)
Profit before taxation		29
Taxation		(7)
Profit for the year		22

Statement of financial position as at 31 December last year

	£000
ASSETS	
Non-current assets	
Property, plant and equipment	364

→

	£000
Current assets	
Inventories	166
Trade receivables	264
Cash	24
	454
Total assets	818
EQUITY AND LIABILITIES	
Equity	
Ordinary share capital	300
Retained earnings	352
	652
Current liabilities	
Trade payables	159
Taxation	7
	166
Total equity and liabilities	818

All purchases and sales are on credit. There has been no change in the level of trade receivables or payables over the period.

Calculate the length of the OCC for the business.

The OCC may be calculated as follows:

	Number of days

Average inventories turnover period:

$$\frac{\text{(Opening inventories + Closing inventories)/2}}{\text{Cost of sales}} \times 365 = \frac{(142 + 166)/2}{544} \times 365 \qquad 103$$

Average settlement period for trade receivables:

$$\frac{\text{Trade receivables}}{\text{Credit sales}} \times 365 = \frac{264}{820} \times 365 \qquad 118$$

Average settlement period for trade payables:

$$\frac{\text{Trade payables}}{\text{Credit purchases}} \times 365 = \frac{159}{568} \times 365 \qquad (102)$$

OCC   119

We can see from the formula above that if a business wishes to reduce the OCC, it should do one or more of the following:

- reduce the average inventories turnover period
- reduce the average settlement period for trade receivables
- increase the average settlement period for trade payables.

Activity 10.18

Assume that Freezeqwik Ltd (Activity 10.17) wishes to reduce its OCC by 30 days. Evaluate each of the options available to this business.

The average inventories turnover period for the business represents more than three months' sales requirements. Similarly, the average settlement period for trade receivables represents

nearly four months' sales. Both periods seem quite long. It is possible that both could be reduced through greater operating efficiency. Improving inventories control and credit control procedures may achieve the required reduction in OCC without any adverse effect on future sales. If so, this may offer the best way forward.

The average settlement period for trade payables represents more than three months' purchases. Any decision to extend this period, however, must be given very careful consideration. It is quite long and may already be breaching the payment terms required by suppliers.

There is no reason why the 30 days' reduction in the OCC could not come from a combination of altering all three of the periods involved (inventories, trade receivables and trade payables).

Before a final decision is made, full account must be taken of current trading conditions.

It may be that a business wishes to maintain the OCC at a particular target level. However, not all days in the OCC are of equal value. In Activity 10.17, for example, the operating cycle is 119 days. If the average settlement period for both trade receivables and trade payables were increased by seven days, the OCC would remain at 119 days. The amount tied up in working capital, however, would not remain the same. Trade receivables would increase by £15,726 (that is, $7 \times £820,000/365$) and trade payables would increase by £10,893 (that is, $7 \times £568,000/365$). This means that there would be a net increase of £4,833 in working capital.

Real World 10.10 shows the average operating cash cycle for businesses classified according to size.

Cycling along

The annual survey of working capital by PricewaterhouseCoopers (PwC) (see Real World 10.2 above) calculated the average operating cash cycle of businesses in its survey. The results, which were categorised according to business size, are set out in Figure 10.13.

Figure 10.13 The average OCC of businesses categorised according to size

Cash transmission

A business will normally wish to benefit from receipts from customers at the earliest opportunity. Where cash is received, the benefit is immediate. Where settlement is made by cheque, however, there may be a delay before it is cleared through the banking system. In recent years, the CHAPS (Clearing House Automated Payments) system has helped to reduce the time cheques spend in the banking system.

Payment by cheque, however, is in decline. Increasingly, customers prefer to instruct their bank to make a direct transfer of the amount owed to the business's bank account. The transfer may be completed within the same day and provides a more efficient form of cash transmission for both parties. Transfers between a customer's bank account and the business's bank account may also be carried out by setting up a standing order or a direct debit. In both cases, the transfer will then take place on an agreed date.

A final way in which a business may be paid promptly is through the use of a debit card. This allows the customer's bank account to be charged (debited) and the seller's bank account to be simultaneously increased (credited) with the sale price of the item. Many types of business, including retailers and restaurants, use this method. It is operated through computerised cash tills and is referred to as electronic funds transfer at point of sale (EFTPOS).

Bank overdrafts

Bank overdrafts are simply bank current accounts that have a negative balance. They are a type of bank loan and can be a useful tool in managing the business's cash flow requirements.

MANAGING TRADE PAYABLES

Most businesses buy their goods and services on credit. Trade payables are the other side of the coin from trade receivables. In a trade credit transaction, one business's trade payable is another one's trade receivable. Trade payables are an important source of finance for most businesses. They have been described as a 'spontaneous' source, as they tend to increase in line with the increase in the level of activity achieved by a business.

There are potential costs associated with taking trade credit. A business that buys supplies on credit may incur additional administration and accounting costs resulting from the scrutiny and payment of invoices, maintaining and updating payables accounts, and so on. Furthermore, customers who take credit may not be as well treated as those who pay immediately. When goods are in short supply, they may be given lower priority. They may also be less favoured in terms of delivery dates or in gaining access to technical support. Where credit is required, customers may even have to pay more. In most industries, however, trade credit is the norm. As a result, these disadvantages do not normally apply unless, perhaps, the credit facilities are being abused.

The benefits to be gained from taking credit usually outweigh any costs involved. In effect, it is an interest-free loan from suppliers. It can also provide a more convenient way of paying for goods and services than paying by cash. Furthermore, during a period of inflation, there is an economic gain from paying later rather than sooner for goods and services supplied.

Activity 10.19

Why might a supplier prefer a customer to take a period of credit rather than pay for the goods or services on delivery? (There are probably two reasons.)

1　Paying on delivery may not be administratively convenient for the seller. Most customers will take a period of credit, so the systems of the seller will be geared up to receive payment after a reasonable period of credit.
2　A credit period can allow any problems with the goods or service supplied to be resolved before payment is made. This might avoid the seller having to make refunds.

Delaying payment to suppliers may be a sign of financial problems. It may also, however, reflect an imbalance in bargaining power. It is not unusual for large businesses to delay payment to small suppliers, which are reliant on them for continuing trade. The UK government has encouraged large businesses to sign up to a 'Prompt Payment Code' to help small suppliers but, to date, this has achieved only limited success.

Taking advantage of cash discounts

Where a supplier offers a discount for prompt payment, the business should give careful consideration to the possibility of paying within the discount period. Example 10.6 illustrates the cost of forgoing possible discounts.

Example 10.6

Hassan Ltd takes 70 days to pay for goods from its supplier. To encourage prompt payment, the supplier has offered the business a 2 per cent discount if payment for goods is made within 30 days. Hassan Ltd is not sure, however, whether it is worth taking the discount offered.

If the discount is taken, payment could be made on the last day of the discount period (that is, the 30th day). However, if the discount is not taken, payment will be made after 70 days. This means that, by not taking the discount, the business will receive an extra 40 days' (that is, 70 – 30) credit. The cost of this extra credit to the business will be the 2 per cent discount forgone. If we annualise the cost of this discount forgone, we have:

$$365/40 \times 2\% = 18.3\%*$$

We can see that the annual cost of forgoing the discount is very high. It may, therefore, be profitable for the business to pay the supplier within the discount period, even if it means that it will have to borrow to enable it to do so.

*This is an approximate annual rate. For the more mathematically minded, the precise rate is:

$$\{[(1 + 2/98)^{9.125}] - 1\} \times 100\% = 20.2\%$$

The key difference is that, in this calculation, compound interest is used, whereas in the first calculation, simple interest is used, which is not strictly correct.

Controlling trade payables

To help monitor the level of trade credit taken, management can calculate the **average settlement period for trade payables ratio**. As we saw in Chapter 3, this ratio is:

$$\text{Average settlement period for trade payables} = \frac{\text{Average trade payables}}{\text{Credit purchases}} \times 365$$

Once again, this provides an average figure, which could be misleading. A more informative approach would be to produce an ageing schedule for payables. This would look much the same as the ageing schedule for receivables described earlier in Example 10.4.

As a footnote to our discussion on working capital, **Real World 10.11** contains an extract from an article by McKinsey and Co, the management consultants. Here, it is argued that employing techniques of working capital management will only improve matters so far. To exert firm control over working capital, a cultural shift within the business is needed.

Real World 10.11

Transforming the culture

Lots of routine decisions can adversely affect the amount of cash available to finance a large business – and, sometimes, to a significant degree. These decisions are often so run of the mill as to appear of no consequence. In an engineering business, for example, a production manager may decide to buy large buffer inventories of machinery spare parts to avoid the risk of running out and then having to halt production. This decision, however, ties up cash. Similarly, a business failing to send invoices to customers until some time after the goods have been sent, or the service rendered, can lead to payment being delayed – thereby depriving the business of cash. A business's procurement officer agreeing to pay a supplier earlier than the normal credit period of, say, 30 days, will again deprive the business of cash.

These types of routine, and apparently innocuous, decisions are being made in enormous numbers within large businesses every day. Their combined effect can have a serious impact on the value of the businesses, which is based on cash generation (as we saw in Chapter 4). Yet it appears that managers are often more concerned with profit than with cash. Hence, they are likely to take little notice of the operating cash cycle (the time taken between paying suppliers and receiving cash from sales to customers).

Controlling inventories, trade receivables and trade payables is not easy. This is partly because so many people within a large business are making decisions that affect these assets. To ensure minimum, but safe, levels of working capital, a business cannot rely on a mechanistic approach. Thus, using various working capital management techniques (of the kind discussed in this chapter) is not the complete answer. There also needs to be a change in attitude among managers. The importance of cash generation, and conserving cash, has to become ingrained within the culture of the business. Increasing the seniority and authority of those engaged in managing working capital may have a role to play in changing the culture.

Careful attention to controlling working capital can have enormous benefits. Reductions of 20 to 30 per cent in the level of working capital can be achieved. One business, specialising in natural resources, was recently able to reduce its working capital by over 40 per cent over one twelve-month period, which represented a massive reduction in its cash requirements.

Source: Based on information taken from: Birshan, M. Stone, M. and Park, M. (2018), *Transforming the culture of managing working capital*, McKinsey &Co, www.mckinsey.com January.

Town Mills Ltd is a wholesale business. Extracts from the business's most recent financial statements are as follows:

Income statement for the year ended 31 May

	£000
Sales	903
Cost of sales	(652)
Gross profit	251
Other operating expenses	(109)
Operating profit	142
Interest	(11)
Profit before taxation	131
Taxation	(38)
Profit for the year	93

Statement of financial position as at 31 May

	£000
ASSETS	
Non-current assets	
Property, plant and equipment at cost	714
Accumulated depreciation	(295)
	419
Current assets	
Inventories	192
Trade receivables	202
	394
Total assets	813
EQUITY AND LIABILITIES	
Equity	
Ordinary share capital	200
Retained earnings	246
	446
Current liabilities	
Trade payables	260
Borrowings (all bank overdraft)	107
	367
Total equity and liabilities	813

The levels of trade receivables and trade payables increased by 10 per cent, by value, during the year ended 31 May. Inventories levels remained the same. The chief financial officer believes that inventories levels are too high and should be reduced.

Required:
(a) Calculate the average operating cash cycle (in days) during the year ended 31 May and explain to what use this value can be put and what limitations it has.
(b) Discuss whether there is evidence that the business has a liquidity problem.
(c) Explain the types of risk and cost that might be reduced by following the chief financial officer's proposal to reduce inventories levels.

The solution to this question can be found at the back of the book on pp. 644–45.

SUMMARY

The main points of this chapter may be summarised as follows.

Working capital

- Is the difference between current assets and current liabilities
- That is, working capital = inventories + trade receivables + cash – trade payables – bank overdrafts
- An investment in working capital cannot be avoided in practice – typically large amounts are involved.

Inventories

- There are costs of holding inventories, which include:
  - lost interest
  - storage cost
  - insurance cost
  - obsolescence.
- There are also costs of not holding sufficient inventories, which include:
  - loss of sales and customer goodwill
  - production dislocation
  - loss of flexibility – cannot take advantage of opportunities
  - reorder costs – low inventories imply more frequent ordering.
- Practical points on inventories management include:
  - identify optimum order size – models can help with this
  - set inventories reorder levels
  - use forecasts
  - keep reliable inventories records
  - use accounting ratios (for example, inventories turnover period ratio)
  - establish systems for security of inventories and authorisation
  - employ ERP applications to automate and integrate the recording and management of inventories
  - implement just-in-time (JIT) inventories management
  - categorise inventories based on variations in demand (XYZ).

Trade receivables

- When assessing which customers should receive credit, the five Cs of credit can be used:
  - capital
  - capacity
  - collateral
  - condition
  - character.
- The costs of allowing credit include:
  - lost interest
  - lost purchasing power
  - costs of assessing customer creditworthiness

- administration cost
- bad debts
- cash discounts (for prompt payment).

■ The costs of denying credit include loss of customer goodwill.

■ Practical points on receivables management:

- establish a policy
- assess and monitor customer creditworthiness
- establish effective administration of receivables
- establish a policy on bad debts
- consider cash discounts
- use financial ratios (for example, average settlement period for trade receivables ratio)
- use ageing summaries.

Cash

■ The costs of holding cash include:

- lost interest
- lost purchasing power.

■ The costs of holding insufficient cash include:

- loss of supplier goodwill if unable to meet commitments on time
- loss of opportunities
- inability to claim cash discounts
- costs of borrowing (should an obligation need to be met at short notice).

■ Practical points on cash management:

- establish a policy
- plan cash flows
- make judicious use of bank overdraft finance – it can be cheap and flexible
- use short-term cash surpluses profitably
- bank frequently
- operating cash cycle (for a wholesaler) = average inventories turnover period + average settlement period for trade receivables – average settlement period for trade payables
- transmit cash promptly.

■ An objective of working capital management is to limit the length of the operating cash cycle (OCC), subject to any risks that this may cause.

Trade payables

■ The costs of taking credit include:

- higher price than purchases for immediate cash settlement
- administrative costs
- restrictions imposed by seller.

■ The costs of not taking credit include:

- lost interest-free borrowing
- lost purchasing power
- inconvenience – paying at the time of purchase can be inconvenient.

→

- Practical points on payables management:
  - establish a policy
  - exploit free credit as far as possible
  - use accounting ratios (for example, average settlement period for trade payables ratio).

KEY TERMS

Working capital p. 442
Average inventories turnover period ratio p. 448
Lead time p. 448
ABC system of inventories control p. 451
Economic order quantity (EOQ) p. 453
Enterprise resource planning (ERP) system p. 455
Just-in-time (JIT) inventories management p. 456
XYZ inventories management p. 458

Five Cs of credit p. 460
Cash discount p. 465
Average settlement period for trade receivables ratio p. 467
Trade receivables to sales ratio p. 467
Ageing schedule of trade receivables p. 467
Operating cash cycle (OCC) p. 474
Average settlement period for trade payables ratio p. 480

For definitions of these terms, see the Glossary, pp. 685–94.

FURTHER READING

If you would like to explore the topics covered in this chapter in more depth, try the following books:

Brigham, E. and Ehrhardt, M. (2019) *Financial Management: Theory and Practice*, 16th edn, Cengage Learning Custom Publishing, Chapters 16 and 28.

McLaney, E. (2017) *Business Finance: Theory and Practice*, 11th edn, Pearson, Chapters 8, 9, 11 and 12.

Pike, R., Neale, B. and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 13 and 14.

Sagner, J. (2014) *Working Capital Management: Applications and Case Studies*, Wiley Corporate F&A, Chapters 2–8.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on p. 656.

10.1 Tariq is the credit manager of Heltex plc. He is concerned that the pattern of monthly cash receipts from credit sales shows that credit collection is poor compared with budget. Heltex's sales director believes that Tariq is to blame for this situation, but Tariq insists that he is not. Why might Tariq not be to blame for the deterioration in the credit settlement period?

10.2 How might each of the following affect the level of inventories held by a business?

(a) An increase in the number of production bottlenecks experienced by the business.
(b) A rise in the business's cost of capital.
(c) A decision to offer customers a narrower range of products in the future.
(d) A switch of suppliers from an overseas business to a local business.
(e) A deterioration in the quality and reliability of bought-in components.

10.3 What are the reasons for holding inventories? Are these reasons different from the reasons for holding cash?

10.4 In the solution to Activity 10.15, one of the three reasons for holding cash was to exploit opportunities. The example was given of the acquisition of a competitor business. What other types of opportunity might holding cash enable a business to pursue? Try to think of three.

EXERCISES

Exercises 10.4 to 10.7 are more advanced than 10.1 to 10.3. Those with coloured numbers have solutions at the back of the book, starting on p. 659.
   If you wish to try more exercises, visit the students' side of the companion website.

10.1 The chief executive officer of Sparkrite Ltd, a trading business, has just received summary sets of financial statements for last year and this year:

Income statements for years ended 30 September

	Last year £000	Last year £000	This year £000	This year £000
Sales revenue		1,800		1,920
Cost of sales				
Opening inventories	160		200	
Purchases	1,120		1,175	
	1,280		1,375	
Closing inventories	(200)	(1,080)	(250)	(1,125)
Gross profit		720		795
Expenses		(680)		(750)
Profit for the year		40		45

Statements of financial position as at 30 September

	Last year £000	This year £000
ASSETS		
Non-current assets	950	930
Current assets		
Inventories	200	250
Trade receivables	375	480
Cash at bank	4	2
	579	732
Total assets	1,529	1,662

Statements of financial position as at 30 September (continued)

	Last year £000	This year £000
EQUITY AND LIABILITIES		
Equity		
Fully paid £1 ordinary shares	825	883
Retained earnings	509	554
	1,334	1,437
Current liabilities	195	225
Total equity and liabilities	1,529	1,662

The chief financial officer has expressed concern at the increase in inventories and trade receivables levels.

Required:
(a) Show, by using the data given, how you would calculate ratios that could be used to measure inventories and trade receivables levels during last year and this year.
(b) Discuss the ways in which the management of Sparkrite Ltd could exercise control over the levels of:
   (i)   inventories
   (ii) trade receivables.

10.2 Hercules Wholesalers Ltd has been particularly concerned with its liquidity position in recent months. The most recent income statement and statement of financial position of the business are as follows:

Income statement for the year ended 31 December last year

	£000	£000
Sales revenue		452
Cost of sales		
Opening inventories	125	
Purchases	341	
	466	
Closing inventories	(143)	(323)
Gross profit		129
Expenses		(132)
Loss for the year		(3)

Statement of financial position as at 31 December last year

	£000
ASSETS	
Non-current assets	
Property, plant and equipment	357
Current assets	
Inventories	143
Trade receivables	163
	306
Total assets	663

	£000
EQUITY AND LIABILITIES	
Equity	
Ordinary share capital	100
Retained earnings	158
	258
Non-current liabilities	
Borrowings – loans	120
Current liabilities	
Trade payables	145
Borrowings – bank overdraft	140
	285
Total equity and liabilities	663

The trade receivables and payables were maintained at a constant level throughout the year.

Required:

(a) Explain why Hercules Wholesalers Ltd is concerned about its liquidity position.

(b) Calculate the operating cash cycle for Hercules Wholesalers Ltd.

(c) State what steps may be taken to improve the operating cash cycle of the business.

10.3 International Electric plc at present offers its customers 30 days' credit. Half of the customers, by value, pay on time. The other half takes an average of 70 days to pay. The business is considering offering a cash discount of 2 per cent to its customers for payment within 30 days.

The credit controller anticipates that half of the customers who now take an average of 70 days to pay (that is, a quarter of all customers) will pay in 30 days. The other half (the final quarter) will still take an average of 70 days to pay. The scheme will also reduce bad debts by £300,000 a year.

Annual sales revenue of £365 million is made evenly throughout the year. At present the business has a large overdraft (£60 million) with its bank at an interest cost of 12 per cent a year.

Required:

(a) Calculate the approximate equivalent annual percentage cost of a discount of 2 per cent, which reduces the time taken by credit customers to pay from 70 days to 30 days. *(Hint: This part can be answered without reference to the narrative above.)*

(b) Calculate the value of trade receivables outstanding under both the old and new schemes.

(c) How much will the scheme cost the business in discounts?

(d) Should the business go ahead with the scheme? State what other factors, if any, should be taken into account.

10.4 Your superior, the general manager of Plastics Manufacturers Limited, has recently been talking to the chief buyer of Plastic Toys Limited, which manufactures a wide range of toys for young children. At present, Plastic Toys is considering changing its supplier of plastic granules and has offered to buy its entire requirement of 2,000 kg a month from you at the going market rate, provided that you will grant it three months' credit on its purchases. The following information is available:

1 Plastic granules sell for £10 a kg, variable costs are £7 a kg and fixed costs £2 a kg.

2 Your own business is financially strong and has sales revenue of £15 million a year. For the foreseeable future it will have surplus capacity and it is actively looking for new outlets.

3 Extracts from Plastic Toys' financial statements:

	Year 1	Year 2	Year 3
	£000	£000	£000
Sales revenue	800	980	640
Profit (loss) before interest and tax	100	110	(150)
Capital employed	600	650	575
Current assets			
Inventories	200	220	320
Trade receivables	140	160	160
	340	380	480
Current liabilities			
Trade payables	180	190	220
Overdraft	100	150	310
	280	340	530
Working capital	60	40	(50)

Required:
Advise your general manager on the acceptability of the proposal. You should give your reasons and do any calculations you consider necessary.

10.5 Mayo Computers Ltd has annual sales of £20 million. Bad debts amount to £100,000 a year. All sales made by the business are on credit and, at present, credit terms are negotiable by the customer. On average, the settlement period for trade receivables is 60 days. Trade receivables are financed by an overdraft bearing a 14 per cent rate of interest per year. The business is currently reviewing its credit policies to see whether more efficient and profitable methods could be employed. Only one proposal has so far been put forward concerning the management of trade credit.

The credit control department has proposed that customers should be given a 2.5 per cent discount if they pay within 30 days. For those who do not pay within this period, a maximum of 50 days' credit should be given. The credit department believes that 60 per cent of customers will take advantage of the discount by paying at the end of the discount period. The remainder will pay at the end of 50 days. The credit department believes that bad debts can be effectively eliminated by adopting the proposed policies and by employing stricter credit investigation procedures, which will cost an additional £20,000 a year. The credit department is confident that these new policies will not result in any reduction in sales revenue.

Required:
Calculate the net annual cost (savings) to the business of abandoning its existing credit policies and adopting the proposals of the credit control department. (*Hint:* To answer this question you must weigh the costs of administration and cash discounts against the savings in bad debts and interest charges.)

10.6 Boswell Enterprises Ltd is reviewing its trade credit policy. The business, which sells all of its goods on credit, has estimated that sales revenue for the forthcoming year will be £3 million under the existing policy. Credit customers representing 30 per cent of trade receivables are expected to pay one month after being invoiced and 70 per cent are expected to pay two months after being invoiced. These estimates are in line with previous years' figures.

At present, no cash discounts are offered to customers. However, to encourage prompt payment, the business is considering giving a 2.5 per cent cash discount to credit customers who pay in one month or less. Given this incentive, the business expects credit customers accounting for 60 per cent of trade receivables to pay one month after being invoiced

and those accounting for 40 per cent of trade receivables to pay two months after being invoiced. The business believes that the introduction of a cash discount policy will prove attractive to some customers and will lead to a 5 per cent increase in total sales revenue.

Irrespective of the trade credit policy adopted, the gross profit margin of the business will be 20 per cent for the forthcoming year and three months' inventories will be held. Fixed monthly expenses of £15,000 and variable expenses (excluding discounts), equivalent to 10 per cent of sales revenue, will be incurred and will be paid one month in arrears. Trade payables will be paid in arrears and will be equal to two months' cost of sales. The business will hold a fixed cash balance of £140,000 throughout the year, whichever trade credit policy is adopted. Ignore taxation.

Required:
(a) Calculate the investment in working capital at the end of the forthcoming year under:
   (i)   the existing policy
   (ii) the proposed policy.
(b) Calculate the expected profit for the forthcoming year under:
   (i)   the existing policy
   (ii) the proposed policy.
(c) Advise the business as to whether it should implement the proposed policy.

(*Hint*: The investment in working capital will be made up of inventories, trade receivables and cash, *less* trade payables and any unpaid expenses at the year-end.)

10.7 Goliath plc is a food wholesaler. The most recent financial statements of the business are as follows:

Income statement for the year to 31 May

	£000	£000
Sales revenue		2,400.0
Cost of sales		
Opening inventories	550.0	
Purchases	1,450.0	
	2,000.0	
Closing inventories	(560.0)	(1,440.0)
Gross profit		960.0
Administration expenses		(300.0)
Selling expenses		(436.0)
Operating profit		224.0
Interest payable		(40.0)
Profit before taxation		184.0
Taxation (25%)		(46.0)
Profit for the period		138.0

Statement of financial position as at 31 May

ASSETS	£000
Non-current assets	
Property, plant and equipment	456.4
Current assets	
Inventories	560.0
Trade receivables	565.0
Cash at bank	36.4
	1,161.4
Total assets	1,617.8

Statement of financial position as at 31 May (continued)

	£000
EQUITY AND LIABILITIES	
Equity	
£1 ordinary shares	200.0
Retained earnings	520.8
	720.8
Non-current liabilities	
Borrowings – loan notes	400.0
Current liabilities	
Trade payables	451.0
Taxation	46.0
	497.0
Total equity and liabilities	1,617.8

All sales and purchases are made on credit.

The business is considering whether to grant extended credit facilities to its customers. It has been estimated that increasing the settlement period for trade receivables by a further 20 days will increase the sales revenue of the business by 10 per cent. However, inventories will have to be increased by 15 per cent to cope with the increased demand. It is estimated that purchases will have to rise to £1,668,000 during the next year as a result of these changes. To finance the increase in inventories and trade receivables, the business will increase the settlement period taken from suppliers by 15 days and use a loan facility bearing a 10 per cent rate of interest for the remaining balance.

If the policy is implemented, bad debts are likely to increase by £120,000 a year and administration costs will rise by 15 per cent.

Required:
(a) Calculate the increase or decrease to each of the following that will occur in the forth-coming year if the proposed policy is implemented:
  (i)   operating cash cycle (based on year-end figures)
  (ii) net investment in inventories, trade receivables and trade payables
  (iii) profit for the period.
(b) Should the business implement the proposed policy? Give reasons for your conclusion.

MEASURING AND MANAGING FOR SHAREHOLDER VALUE

INTRODUCTION

For some years, shareholder value has been a 'hot' issue among managers. Many leading businesses claim that the quest for shareholder value is the driving force behind their strategic and operational decisions. In this chapter, we begin by considering what is meant by the term 'shareholder value' and then take a look at some of the main methods of measuring shareholder value. We first examine measures designed for internal management purposes and then go on to examine measures designed to help external investors.

We continue the chapter by considering how managers may be incentivised to create wealth for their shareholders. Once, share options were widely used to encourage long-term wealth creation. Among large listed businesses, however, they have been largely replaced by performance share plans. In this chapter, we examine the advantages and disadvantages of both forms of long-term incentives.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Describe the shareholder value approach and explain its implications for the management of a business.

■ Explain shareholder value analysis (SVA) and economic value added (EVA®) and evaluate their usefulness for managers.

■ Explain market value added (MVA) and total shareholder return (TSR) and evaluate their usefulness for investors.

■ Discuss the use of share options and performance share plans for managers in promoting shareholder value.

THE QUEST FOR SHAREHOLDER VALUE

Let us start by considering what the term **shareholder value** means. In simple terms, it is about putting the needs of shareholders at the heart of management decisions. It is argued that shareholders invest in a business with a view to maximising their financial returns in relation to the risks that they are prepared to take. As managers are appointed by the shareholders to act on their behalf, management decisions and actions should reflect a concern for maximising shareholder returns. Although the business may have other 'stakeholder' groups, such as employees, customers and suppliers, it is the shareholders that should be seen as the most important group.

This, of course, is not a new idea. Take a look at most books on finance or economics, including this one, and you will see that maximising shareholder returns is assumed to be the key objective of a business. Not everyone, however, accepts this idea. Some believe that a balance must be struck between the competing claims of the various stakeholders. The relative merits of each viewpoint were debated in Chapter 1 and we shall not retread this path. What we can say, however, is that changes in the economic environment over recent years have often forced managers to focus their attention on the needs of shareholders.

In the past, shareholders have been accused of being too passive and of accepting too readily the profits and dividends that managers have delivered. However, this has changed. Nowadays, shareholders are much more assertive and, as owners of the business, are in a position to insist that their needs are given priority. Since the 1980s, we have witnessed the deregulation and globalisation of business as well as enormous changes in technology. The effect has been to create a much more competitive world. This has meant not only competition for products and services but also competition for funds. Businesses must now compete more strongly for shareholder funds and so must offer competitive rates of return.

Thus, self-interest may be the most powerful reason for managers to commit themselves to maximising shareholder returns. If they do not do this, there is a real risk either that shareholders will replace them with managers who will, or that shareholders will allow the business to be taken over by another business, with managers who are dedicated to maximising shareholder returns.

CREATING SHAREHOLDER VALUE

Creating shareholder value can be viewed as a four-stage process. The first stage is to set objectives that recognise the central importance of maximising shareholder returns. This should provide a clear direction for the business. The second stage is to establish an appropriate means of measuring the returns, or value, generated for shareholders. For reasons to be discussed later, the traditional methods of measuring returns to shareholders are inadequate for this purpose. The third stage is to manage the business so that shareholder returns are maximised. This means setting demanding targets and then achieving them through the best possible use of resources, the use of incentive systems and the embedding of a shareholder value culture throughout the business. The final stage is to measure shareholder returns over a period of time to see whether the objectives set have been achieved. These stages are set out in Figure 11.1.

The figure sets out the four-stage process required to create shareholder value.
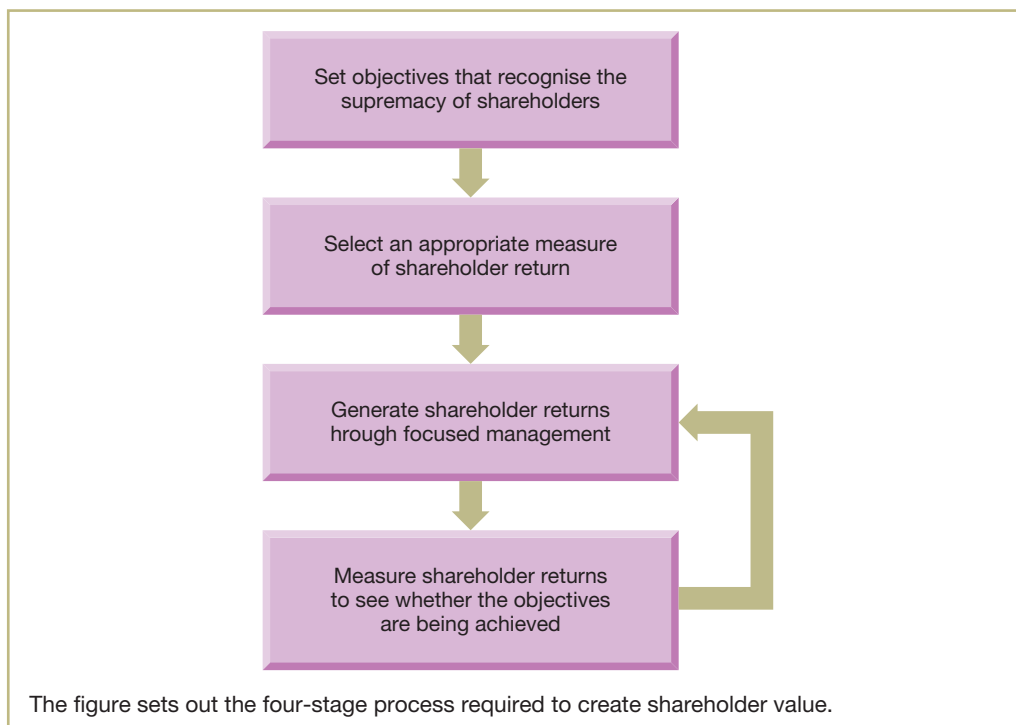
Figure 11.1 Creating shareholder value

THE NEED FOR NEW FORMS OF MEASUREMENT

Once a commitment is made to maximising shareholder returns, an appropriate measure is then needed to help assess the returns to shareholders over time. Many argue that conventional methods for measuring shareholder returns are seriously flawed and so should not be used.

Activity 11.1

What are the conventional methods of measuring shareholder returns?

Managers normally use accounting profit or some ratio that is based on accounting profit, such as return on shareholders' funds or earnings per share.

One problem with using accounting profit, or a ratio based on profit, is that profit is measured over a relatively short period of time (usually one year). When we talk about maximising share-holder returns, however, we are concerned with the long term. Using profit as a key measure runs the risk that actions taken by managers to improve short-term performance will have an adverse effect on long-term performance. For example, short-term profits may be improved by cutting back on staff training and research, even though these areas may be vital to long-term prosperity.

A second problem that arises with conventional methods of measuring shareholder returns is that risk is ignored. We saw in previous chapters that there is a linear relationship between the required returns and the level of risk that must be taken to achieve those returns. The higher the required returns, the higher the level of risk that must be undertaken to achieve those

returns. A strategy that increases profits can also reduce shareholder returns if the increase in profits is not commensurate with the increased level of risk. Thus, profit alone is not enough.

A third problem with the use of profit, or a ratio based on profit, is that it does not take full account of the costs of capital invested. When measuring profit, the cost of loan capital (that is, interest charges) is deducted but there is no similar deduction for the cost of shareholder funds. (Dividends are not deducted in arriving at the profit figure and, anyway, represent only part of total shareholder returns.) Critics point out that a business will not make a profit, in an economic sense, unless it covers the cost of all capital invested, including shareholder funds. Unless this is done, the business will make a loss and shareholder value will be reduced.

A final problem is that reported profit can be influenced by the particular policies adopted. Some businesses, for example, may adopt conservative accounting policies such as the immediate writing off of intangible assets (for example, research and development), the use of the reducing balance method of depreciation (which favours high depreciation charges in the early years) and so on. Businesses that adopt less conservative accounting policies would report profits more quickly. Thus, the writing off of intangible assets over a long period (or perhaps not writing off intangible assets at all), the use of the straight-line method of depreciation, and so forth, will mean that profits are reported more quickly.

Activity 11.2

There is a further reason why certain accounting policies may be adopted rather than others. This reason was discussed in Chapter 3. Can you recall what it is?

Managers may engage in 'creative accounting'. They may select particular accounting policies, or structure transactions in a particular way, to portray a picture of financial health that accords with what they would like investors to see rather than what is a fair representation of financial performance and position.

The above points are summarised in Figure 11.2.

The figure sets out the key problems encountered when using accounting profit to assess returns to shareholders over time.
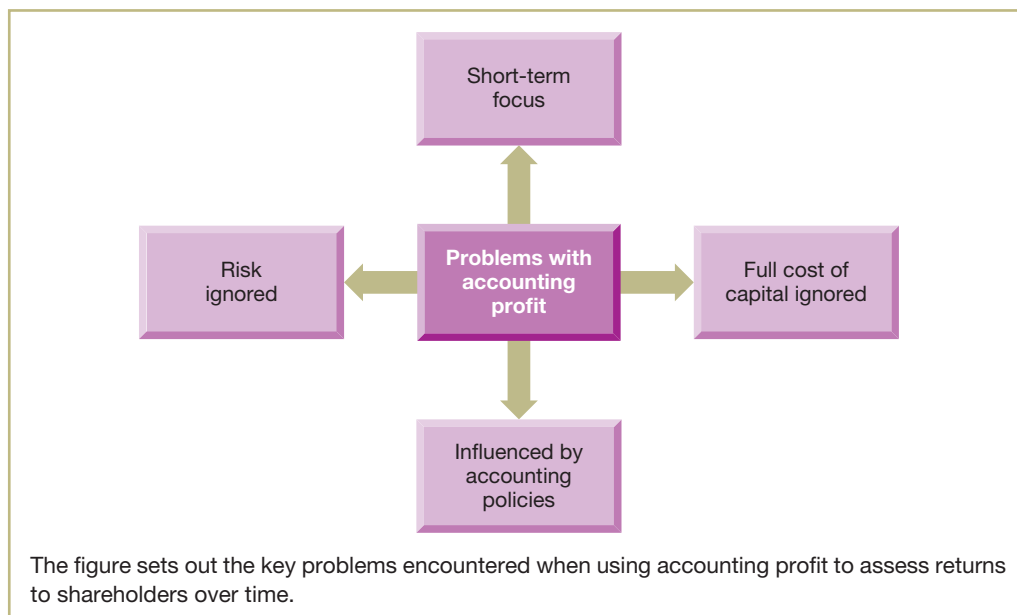
Figure 11.2 Problems with using accounting profit

NET PRESENT VALUE (NPV) ANALYSIS

To summarise the points made above, we can say that to measure changes in shareholder value, what we really need is a measure that will consider the long term, will take account of risk and of the cost of shareholders' funds, and will not be affected by accounting policy choices. Fortunately, we have a measure that can, in theory, do just this.

Net present value analysis was discussed in Chapter 4. We saw that if we want to know the NPV of an asset (whether this is a physical asset such as a machine or a financial asset such as a share), we should discount future cash flows generated by the asset over its life. Thus:

$$\text{NPV} = C_1 \frac{1}{(1 + r)^1} + C_2 \frac{1}{(1 + r)^2} + C_3 \frac{1}{(1 + r)^2} + \cdots.$$

where C = cash flows at time t (1, 2, 3, . . .)

   r = the required rate of return.

Shareholders have a required rate of return and managers should strive to generate long-term cash flows for shares (in the form of dividends or proceeds that investors receive from the sale of the shares) that meet this rate of return. A negative present value will indicate that the cash flows generated do not meet the minimum required rate of return. If a business is to create value for its shareholders, it must generate cash flows that exceed the required returns of shareholders. In other words, the cash flows generated must produce a positive present value.

The NPV method fulfils the criteria that we mentioned earlier for the following reasons:

- It considers the long term. The returns from an investment, such as shares, are considered over the whole of the investment's life.
- It takes account of the cost of capital and risk. Future cash flows are discounted using the required rates of returns from investors (that is, both long-term lenders and shareholders). Moreover, this required rate of return will reflect the level of risk associated with the investment. The higher the level of risk, the higher the required level of return.
- It is not sensitive to the choice of accounting policies. Cash, rather than profit, is used in the calculations and is a more objective measure of return.

Extending NPV analysis: shareholder value analysis

We know from our earlier study of NPV that when evaluating an investment project, shareholder wealth will be maximised when the net present value of cash flows generated by the project is maximised.

Activity 11.3

Can you think why NPV analysis should also be relevant when considering the business as a whole?

It can be argued that the business is simply a portfolio of investment projects and so the same principles should apply.

Shareholder value analysis (SVA) is founded on this basic idea.

The SVA approach involves evaluating strategic decisions according to their ability to maximise value, or wealth, for shareholders. To undertake this evaluation, conventional measures are discarded and replaced by discounted cash flows. We have seen that the net present value of a project represents the value of that particular project. Given that the business can be viewed as a portfolio of projects, the value of the business as a whole can therefore be viewed as the net present value of the cash flows that it generates. SVA seeks to measure the discounted cash flows of the business as a whole and then seeks to identify that part which is available to the shareholders.

Activity 11.4

If the net present value of future cash flows generated by the business represents the value of the business as a whole, how can we derive that part of the value of the business that is available to shareholders?

A business will normally be financed by a combination of loan capital and ordinary shareholders' funds. Thus, holders of loan capital will also have a claim on the total value of the business. That part of the total business value that is available to ordinary shareholders can therefore be derived by deducting the market value of any loans outstanding from the total value of the business (total NPV). Hence:

Shareholder value = Total business value − Market value of outstanding loans

Measuring free cash flows

The cash flows used to measure total business value are the **free cash flows**. These are the cash flows generated that are available to ordinary shareholders and long-term lenders. In other words, they are equivalent to the net cash flows from operations after deducting tax paid and cash for additional investment. These free cash flows can be deduced from information within the income statement and statement of financial position of a business. It is probably worth going through a simple example to illustrate how the free cash flows can be calculated in practice.

Example 11.1

Sagittarius plc generated sales of £220 million during the year and has an operating profit margin of 25 per cent of sales. Depreciation charges for the year were £8.0 million and the cash tax rate for the year was 20 per cent of operating profit. During the year, £11.3 million was invested in additional working capital and £15.2 million was invested in additional non-current assets. A further £8.0 million was invested in the replacement of existing non-current assets.

The free cash flows are calculated as follows:

	£m	£m
Sales revenue		220.0
Operating profit (25% × £220m)		55.0
Add Depreciation charge		8.0
Operating cash flows		63.0
Less Cash tax (20% × £55m)		(11.0)
Operating cash flows after tax		52.0
Less Additional working capital	(11.3)	
Additional non-current assets	(15.2)	
Replacement non-current assets	(8.0)	(34.5)
Free cash flows		17.5

We can see from Example 11.1 that to derive the operating cash flows, we add the depreciation charge to the operating profit figure. We can also see that the cost of replacement of existing non-current assets is deducted from the operating cash flows in order to deduce the free cash flows. When we are trying to predict future free cash flows, one way of arriving at an approximate figure for the cost of replacing existing assets is to assume that the depreciation charge for the year is equivalent to the replacement charge for non-current assets. This would mean that the two adjustments mentioned cancel each other out and the calculation above could be shortened to:

	£m	£m
Sales revenue		220.0
Operating profit (25% × £220m)		55.0
Less Cash tax (20% × £55m)		(11.0)
		44.0
Less Additional working capital	(11.3)	
Additional non-current assets	(15.2)	(26.5)
Free cash flows		17.5

This shortened approach enables us to identify the key variables in determining free cash flows as being:

- sales
- operating profit margin
- **cash tax rate**
- additional investment in working capital
- additional investment in non-current assets (NCA).

Figure 11.3 sets out the process in the form of a flow chart.

The figure shows the process of measuring the free cash flows for a business. The information required can be gleaned from the income statement and statement of financial position of a business.
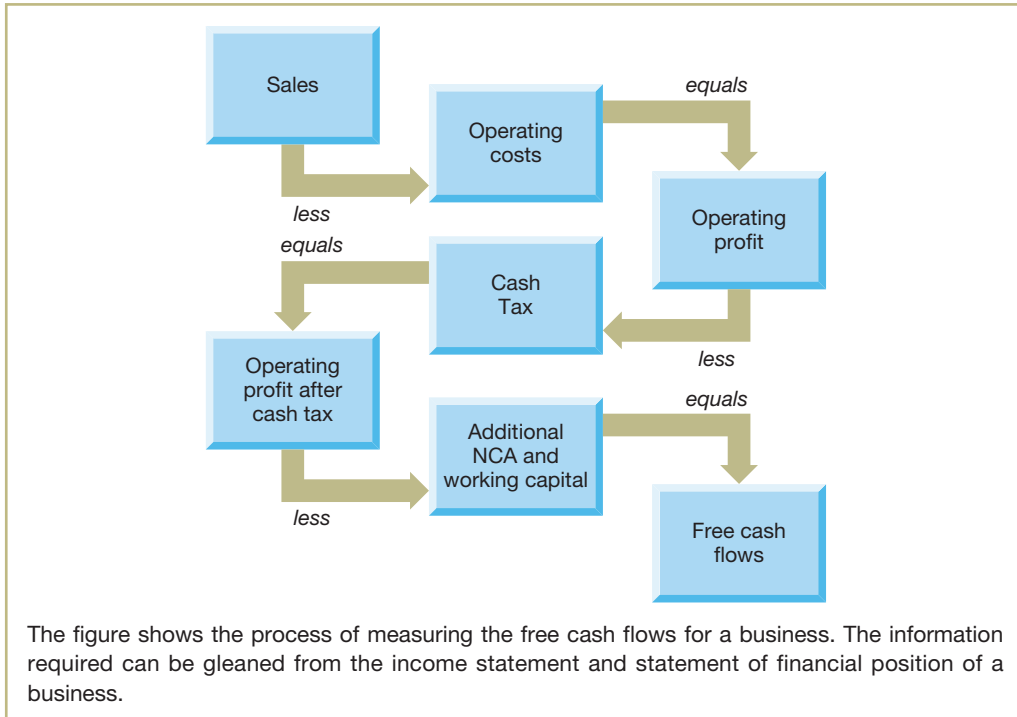
Figure 11.3 Measuring free cash flows

The five variables identified are **value drivers** of the business that reflect key business decisions. These decisions convert into free cash flows and finally into total business value. To determine total business value, we measure the free cash flows over time and discount them by the cost of capital.

The free cash flows should be measured over the life of the business. As you can imagine, this is usually a difficult task. To overcome the problem, it is helpful to divide the future cash flows into two elements:

■ cash flows over the planning horizon and which may be forecast with a reasonable level of reliability
■ cash flows occurring beyond the planning horizon, which will be represented by a terminal value.

It is a good idea to make the planning horizon as long as possible. This is because the discounting process ensures that values beyond the planning horizon are given little weight. Cash flows in the distant future can be extremely difficult to forecast and so the less weight given to them, the better. Activity 11.5 develops this point.

Activity 11.5

Libra plc has an estimated terminal value (representing cash flows beyond the planning horizon) of £100 million. What is the present value of this figure assuming a discount rate of 12 per cent and a planning horizon of:

(a) 5 years
(b) 10 years
(c) 15 years?

To calculate the terminal value of a business, it is usually necessary to make simplifying assumptions. It is beyond the scope of this book to discuss this topic in detail. However, one common assumption is that returns beyond the planning horizon will remain constant (perhaps at the level achieved in the last year of the planning period). Using the formula for a perpetuity, the calculation for determining the terminal value (TV) will be:

$$TV = C_1/r$$

where C_1 = the free cash flows in the following year
r = the required rate of return from investors (that is, the weighted average cost of capital).

This formula provides a capitalised value for future cash flows. Thus, if an investor receives a constant cash flow of £100 per year and has a required rate of return of 10 per cent, the capitalised value of these cash flows will be £100/0.1 = £1,000. In other words, the future cash flows are worth £1,000, when invested at the required rate of return, to the investor. This formula is similar to the dividend formula, where dividends are assumed to be constant, discussed in Chapter 8.

Activity 11.6

Can you think of another simplifying assumption that may be used to help calculate the terminal value? (*Hint*: Think back to the dividend valuation models in Chapter 8.)

A constant growth rate beyond the planning horizon may be assumed. In this case, the formula will be $TV = C_1/(r - g)$, where g is the expected annual growth rate. Deriving an appropriate growth rate can be a difficult problem, however.

Let us go through an example to illustrate the way in which shareholder value can be calculated.

Example 11.2

The directors of United Pharmaceuticals plc are considering the purchase of all the shares in Bortex plc, which produces vitamins and health foods. Bortex plc has a strong presence in the UK and it is expected that the directors of the business will reject any bids that value the shares of the business at less than £11.00 per share.

→

Bortex plc generated sales for the most recent year of £3,000 million. Extracts from the statement of financial position of the business at the end of the most recent year are as follows:

		£m
Equity		
Share capital (£1 ordinary shares)		400.0
Retained earnings		380.0
		780.0
Non-current liabilities		
Loan notes		120.0

Forecasts that have been prepared by the business planning department of Bortex plc are as follows:

- Sales revenue will grow at 10 per cent a year for the next five years.
- The operating profit margin is currently 15 per cent and is likely to be maintained at this rate in the future.
- The cash tax rate is 25 per cent.
- Replacement non-current asset investment (RNCAI) will be in line with the annual depreciation charge each year.
- Additional non-current asset investment (ANCAI) over the next five years will be 10 per cent of sales growth.
- Additional working capital investment (AWCI) over the next five years will be 5 per cent of sales growth.

After five years, the sales of the business will stabilise at their Year 5 level.

The business has a cost of capital of 10 per cent and the loan notes figure in the statement of financial position reflects their current market value.

The free cash flow calculation will be as follows:

	Year 1	Year 2	Year 3	Year 4	Year 5	After Year 5
	£m	£m	£m	£m	£m	£m
Sales	3,300.0	3,630.0	3,993.0	4,392.3	4,831.5	4,831.5
Operating profit (15%)	495.0	544.5	599.0	658.8	724.7	724.7
Less Cash tax (25%)	(123.8)	(136.1)	(149.8)	(164.7)	(181.2)	(181.2)
Operating profit after cash tax	371.2	408.4	449.2	494.1	543.5	543.5
Less						
ANCAI (Note 1)	(30.0)	(33.0)	(36.3)	(39.9)	(43.9)	–
AWCI (Note 2)	(15.0)	(16.5)	(18.2)	(20.0)	(22.0)	–
Free cash flows	326.2	358.9	394.7	434.2	477.6	543.5

Notes:
1 The additional non-current asset investment is 10 per cent of sales growth. In the first year, sales growth is £300m (that is, £3,300m − £3,000m). Thus, the investment will be 10% × £300m = £30m. Similar calculations are carried out for the following years.
2 The additional working capital investment is 5 per cent of sales growth. In the first year the investment will be 5% × £300m = £15m. Similar calculations are carried out in following years.

Having derived the free cash flows (FCF), we can calculate the total business value as follows:

Year	FCF	Discount rate	Present value
	£m	10.0%	£m
1	326.2	0.91	296.8
2	358.9	0.83	297.9
3	394.7	0.75	296.0
4	434.2	0.68	295.3
5	477.6	0.62	296.1
Terminal value (543.5/0.10)	5,435.0	0.62	3,369.7
Total business value			4,851.8

Activity 11.7

What is the shareholder value figure for the business in Example 11.2? Would the sale of the shares at £11 per share really add value for the shareholders of Bortex plc?

Shareholder value will be the total business value *less* the market value of the loan notes. Hence, shareholder value is £4,851.8m − £120m = £4,731.8m.

The proceeds from the sale of the shares to United Pharmaceuticals would yield 400m × £11 = £4,400.0m.

Thus, from the point of view of the shareholders of Bortex plc, the sale of the business at the share price mentioned would not increase shareholder value.

Activity 11.8

Take a look again at the calculations. Why should we be cautious when drawing conclusions?

We can see that the terminal value figure represents a large part of the total business value. The validity of the conclusions will therefore be heavily reliant on the accuracy of this calculation.

Figure 11.4 sets out the key steps in calculating SVA.

The figure shows how shareholder value is derived. The five value drivers mentioned earlier – sales, operating profit, cash tax, additional non-current assets and additional working capital – will determine the free cash flows. These cash flows will be discounted using the required rate of return from investors to determine the total value of the business. If we deduct the market value of any loan capital from this figure, we are left with a measure of shareholder value.

Figure 11.4 Deriving shareholder value

Non-operating income

In some cases, a business will also have non-operating income from marketable investments. As, by definition, this will not form part of the operating profits, its value must be separately determined. To do this, there is no need to forecast, and then discount, future non-operating cash inflows. Instead, we simply take the market value of the investments that give rise to these cash inflows. In theory, this should reflect the discounted value of the future cash inflows. Total business value, as shown in Figure 11.4, will then equal the sum of the discounted free cash flows *plus* the value of marketable investments.

MANAGING THE BUSINESS WITH SHAREHOLDER VALUE ANALYSIS

We saw earlier that the adoption of SVA indicates a commitment to managing the business in a way that maximises shareholder returns. Those who support this approach argue that SVA can be a powerful tool for strategic planning. For example, SVA can be useful when considering major shifts of direction such as:

- acquiring new businesses
- selling existing businesses
- developing new products or markets
- reorganising or restructuring the business.

This is because SVA takes account of all the elements that determine shareholder value.

To illustrate this point let us suppose that a business develops a new product that is quite different from those within its existing range of products and appeals to a quite different market. Profit forecasts may indicate that the product is likely to be profitable and so a decision to launch the product may be made. This decision, however, may increase the level of risk for the business and, if so, investors will demand higher levels of return. In addition, there may have to be a significant investment in additional non-current assets and working capital in order to undertake the venture. When these factors are taken into account, using the type of analysis shown above, the present value of the venture may prove to be negative. In other words, shareholder value will be destroyed.

Activity 11.9

What about the problem of uncertainty and risk associated with the forecast SVA outcome? How might this be dealt with? (*Hint*: Think back to Chapter 5.)

The risk measures discussed in Chapter 5, such as scenario analysis and sensitivity analysis, can be used.

SVA is useful in focusing attention on the value drivers that create shareholder wealth. We saw earlier that the key variables in determining free cash flows were:

- sales
- operating profit margin
- cash tax rate
- additional investment in working capital
- additional investment in non-current assets.

To improve free cash flows and, in turn, shareholder value, targets can be set for improving performance relating to each value driver, with managers given responsibility for achieving particular targets.

Activity 11.10

Can you think of any practical problems of adopting an SVA approach? Try to think of at least one.

Two practical problems spring to mind:

- Forecasting future cash flows lies at the heart of this approach. In practice, forecasting can be difficult and simplifying assumptions will usually have to be made.
- SVA requires more comprehensive information (for example, information concerning the value drivers) than the traditional measures discussed earlier.

You may have thought of other problems.

IMPLICATIONS OF SVA

Supporters of SVA believe that this measure should replace the traditional accounting measures of value creation such as profit, earnings per share and return on ordinary shareholders'

funds. To check whether shareholder value has increased or decreased, a comparison of shareholder value at the beginning and the end of a period can be made.

SVA is a radical departure from the conventional approach to managing a business. It requires different performance indicators, different financial reporting systems and different management incentives. It may also require a cultural change within a business to embed the shareholder value philosophy. This last point also applies to the economic value added approach, to which we shall now turn.

ECONOMIC VALUE ADDED (EVA®)

Economic value added (EVA®) has been developed and trademarked by a US management consultancy firm, Stern Stewart. However, it is based on the idea of economic profit, which has been around for many years. The measure reflects the point made earlier that for a business to be profitable in an economic sense, it must generate returns that exceed the required returns from investors. It is not enough simply to make an accounting profit as this measure does not take full account of the returns required from investors.

EVA® indicates whether the returns generated exceed the required returns from investors and is measured as follows:

$$EVA^® = NOPAT - (R \times C)$$

where

NOPAT = net operating profit after tax
  R = required returns from investors (that is, the weighted average cost of capital)
  C = capital invested (that is, the net assets of the business).

Only when EVA® is positive can we say that the business is increasing shareholder wealth. To maximise shareholder wealth, managers must increase EVA® by as much as possible.

Activity 11.11

What can managers do in order to increase EVA®? (*Hint*: Use the formula shown above as your starting point.)

The formula suggests that to increase EVA® managers should try to:

■ increase NOPAT – this may be done by either reducing expenses or increasing sales
■ use capital invested more efficiently – this means selling off assets that are not generating returns which exceed their cost and investing in assets that do
■ reduce the required rates of return for investors – this may be achieved by changing the capital structure in favour of borrowing (which is cheaper to service than share capital). Such a strategy raises various issues, however, which were discussed in Chapter 8.

Calculating EVA®

EVA® relies on conventional financial statements to measure the wealth created for shareholders. However, the NOPAT and capital invested figures shown on these statements are only taken as a starting point. They are adjusted because of the problems and limitations of conventional measures. According to Stern Stewart, the major problem is that profit and capital

invested are understated because of the conservative bias in accounting measurement. Profit is understated as a result of arbitrary write-offs such as research and development expenditure and also as a result of excessive provisions being created (such as allowances for trade receivables). Capital invested is also understated because assets are often reported at their original cost (less amounts written off), which can produce figures considerably below current market values. In addition, certain assets, such as internally-generated goodwill and brand names, are omitted from the financial statements because no external transactions have occurred.

Stern Stewart has identified more than 100 adjustments that could be made to the conventional financial statements to eliminate the conservative bias. However, it believes that, in practice, only a handful of adjustments to the accounting figures of any particular business is probably needed. Unless an adjustment has a significant effect on the calculation of EVA®, it is really not worth making. The adjustments made should reflect the nature of the particular business. Each business is unique and so must customise the calculation of EVA® to its particular circumstances. (Depending on your viewpoint, this aspect of EVA® can be seen either as indicating flexibility, or as being open to manipulation.)

Common adjustments that have to be made include:

- *Research and development (R&D) costs and marketing costs.* These costs should be written off over the period that they benefit. In practice, however, they are often written off in the period in which they are incurred. This means that any amounts written off immediately should be added back to the assets on the statement of financial position, thereby increasing capital invested, and then written off over time.
- *Restructuring costs.* This item can be viewed as an investment in the future rather than an expense to be written off. Supporters of EVA® argue that by restructuring, the business is better placed to meet future challenges and so any amounts incurred should be added back to capital invested.
- *Marketable investments.* Investment in shares and loan notes are not included as part of the capital invested in the business. This is because the income from marketable investments is not included in the calculation of operating profit. (As mentioned earlier, income from this source will be added to the income statement *after* operating profit has been calculated.)

In addition to these accounting adjustments, the tax charge must be adjusted so that it is based on the operating profits for the year. This means that it should not take account of the tax charge on non-operating income, such as income from investments, or the tax allowance on interest payable.

Let us now consider a simple example to show how EVA® may be calculated.

Example 11.3

Scorpio plc was established two years ago and has produced the following statement of financial position and income statement at the end of the second year of trading.

Statement of financial position as at the end of the second year

	£m
ASSETS	
Non-current assets	
Plant and equipment	80.0
Motor vehicles	12.4
Marketable investments	6.6
	99.0

	£m
Current assets	
Inventories	34.5
Trade receivables	29.3
Cash	2.1
	65.9
Total assets	164.9
EQUITY AND LIABILITIES	
Equity	
Share capital	60.0
Retained earnings	23.7
	83.7
Non-current liabilities	
Loan notes	50.0
Current liabilities	
Trade payables	30.3
Taxation	0.9
	31.2
Total equity and liabilities	164.9

Income statement for the second year

	£m
Sales revenue	148.6
Cost of sales	(76.2)
Gross profit	72.4
Wages	(24.6)
Depreciation of plant and equipment	(12.8)
Marketing costs	(22.5)
Allowances for trade receivables	(4.5)
Operating profit	8.0
Income from investments	0.4
	8.4
Interest payable	(0.5)
Ordinary profit before taxation	7.9
Restructuring costs	(1.9)
Profit before taxation	6.0
Tax	(1.5)
Profit for the year	4.5

Discussions with the chief financial officer reveal the following:

1 Marketing costs relate to the launch of a new product. The benefits of the marketing campaign are expected to last for three years (including this most recent year).
2 The allowance for trade receivables was created this year and the amount is considered to be very high. A more realistic figure for the allowance would be £2.0 million.
3 Restructuring costs were incurred as a result of a collapse in a particular product market. As a result of the restructuring, benefits are expected to flow for an infinite period.
4 The business has a 10 per cent required rate of return for investors.
5 The rate of tax on profits is 25 per cent.
6 The capital invested at the end of the year fairly reflects the average capital invested during the year.

The first step in calculating EVA® is to adjust the net operating profit after tax to take account of the various points revealed from the discussion with the chief financial officer. The revised figure is calculated as follows:

NOPAT adjustment

	£m	£m
Operating profit		8.0
Tax (Note 1)		(2.0)
		6.0
EVA® adjustments (added back to profit)		
Marketing costs $(2/3 \times 22.5)$	15.0	
Excess allowance	2.5	17.5
Adjusted NOPAT		23.5

The next step is to adjust the net assets (as represented by equity and loan notes) to take account of the points revealed.

Adjusted net assets (or capital invested)

	£m	£m
Net assets (from statement of financial position)		133.7
Marketing costs (Note 2)	15.0	
Allowance for trade receivables	2.5	
Restructuring costs (Note 3)	1.9	19.4
		153.1
Marketable investments (Note 4)		(6.6)
Adjusted net assets		146.5

Notes:
1 Tax is based on 25 per cent of the operating profits and is therefore £2 million (25% × £8.0m). (Tax complications, such as the difference between the tax allowance for non-current assets and the accounting charge for depreciation, have been ignored.)
2 The marketing costs represent two years' benefits added back (2/3 × £22.5m).
3 The restructuring costs are added back to the net assets as they provide benefits over an infinite period. (Note that they were not added back to the operating profit as these costs were deducted after arriving at operating profit in the income statement.)
4 The marketable investments do not form part of the operating assets of the business and the income from these investments is not part of the operating profit.

Activity 11.12

Can you work out the EVA® for the second year of Scorpio plc in Example 11.3?

EVA® can be calculated as follows:

$$\text{EVA}^® = \text{NOPAT} - (R \times C)$$
$$= £23.5\text{m} - (10\% \times £146.5\text{m})$$
$$= \underline{£8.9\text{m}} \text{ (to one decimal place)}$$

We can see that EVA® is positive and so the business increased shareholder wealth during the year.

We are told in Note 6 from the discussion with the chief financial officer that the capital invested at the end of the year reflects the average capital invested for the year. Where an average figure is not provided, an average may be calculated by taking the opening and closing figures and dividing by two. (This, of course, is the same approach used in Chapter 3 to derive average capital employed when calculating the return on capital employed ratio.)

Real World 11.1 reveals the economic value added over time for one well-known US soft drinks business.

Managing resources with EVA®

A key advantage of this measure is the discipline to which managers are subjected. Before any increase in shareholder wealth can be recognised, an appropriate charge is made for the use of business resources. EVA® should therefore encourage managers to use these resources efficiently. Where managers are focused simply on increasing profit, there is a risk that resources used to achieve any increase will not be taken into account.

EVA®-BASED RATIOS

It is possible to produce financial ratios based on EVA®. One such ratio is the **EVA® margin**, which is calculated as follows:

$$\text{EVA}^{®} \text{ margin} = \frac{\text{EVA}^{®} \text{ for the period}}{\text{Sales revenue for the period}} \times 100\%$$

This is a profitability ratio, which is similar to the operating profit margin discussed in Chapter 3. The EVA® margin is claimed to be superior, however, because EVA® reflects the ability of a

business to manage its resources efficiently. Other things being equal, businesses that are 'capital lean' will be rewarded with a higher margin.

Activity 11.13

Calculate the EVA® margin for the second year of Scorpio plc in Example 11.3.

The ratio is:

$$\text{EVA® margin} = \frac{£8.9m}{£148.6m} \times 100\%$$
$$= \underline{6.0\%}$$

Like all ratios, a suitable benchmark, such as the performance in past periods, or of other businesses, should be employed to evaluate this figure.

A further EVA®-based ratio is **EVA® momentum**. This ratio is considered by Stern Stewart to be of primary importance. It is calculated as follows:

$$\text{EVA® momentum} = \frac{\text{Change in EVA® from the previous period}}{\text{Sales revenue for the previous period}} \times 100\%$$

If we assume that a business reported an increase of EVA® of £3 million, when compared to the previous period, and the sales revenue in the previous period was £100 million, the EVA® momentum would be 3 per cent. The ratio measures the growth rate of EVA® and can be used to identify trends, or turning points, in the fortunes of a business.

By highlighting the 'direction of travel', the ratio offers deeper insights to financial performance. Where, for example, a distressed business is being successfully turned around, it will show positive EVA® momentum even though it may report a negative EVA® for a period. Where a business is in decline, it will show negative EVA® momentum even though it may still report positive EVA®.

According to Stern Stewart, the bigger this ratio is, the better, because it is directly linked to shareholder wealth creation. It should, therefore, be adopted as the key financial target for a business.

Note that both ratios discussed incorporate the sales revenue of the business. This helps to eliminate the problems of scale. Comparisons between operating divisions, or businesses, of different size can then be made more easily.

EVA® IN PRACTICE

In this short section, we provide some impressions concerning how EVA® is reported and used and how widely it is implemented in practice. EVA® is really designed for management purposes only. Few businesses report this measure to shareholders.

Real World 11.2 provides an impression of the extent to which EVA® is used by UK businesses.

EVA® in practice

The Chartered Institute of Management Accountants (CIMA) carried out a survey of current accounting and finance practice in 2009 and received 439 responses. Part of the survey was concerned with the extent to which EVA® is used within different business sectors. The survey results are set out in Figure 11.5.

The figure indicates that EVA® is not in widespread use. It appears to be most popular in financial services businesses.
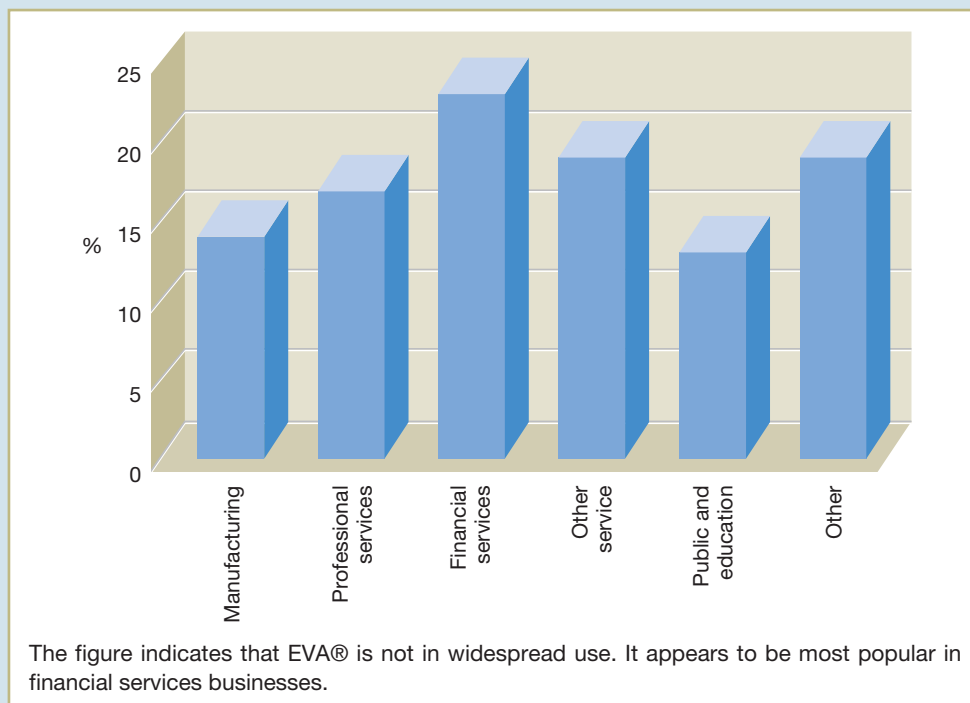
Figure 11.5 Use of economic value added

Source: Adapted from figure in 'Management accounting tools for today and tomorrow', CIMA, 2009, p. 20.

Real World 11.3 contains some advice on how to implement EVA®.

The thoughts of Robert Goizueto

Robert Goizueto was the chief executive of Coca-Cola Co. for many years and was an ardent supporter of EVA®. He offered two pieces of advice for those wishing to implement this technique:

■ *Keep it simple.* By this he meant that EVA® should be the only method of value measurement used by managers. To do otherwise would lessen the impact of EVA® and would also make the management of the business unnecessarily complicated.

■ *Make it accountable.* By this he meant that managers should be rewarded for increasing EVA®. In this way, the managers' own interests become indistinguishable from those of the owners of the business.

Source: Adapted from Ehrbar, A. (1998) *EVA: The Real Key to Creating Wealth*, John Wiley & Sons.

EVA® AND SVA COMPARED

Although at first glance it may appear that EVA® and SVA are worlds apart, this is not the case. In fact, the opposite is true. EVA® and SVA are closely related and, in theory at least, should produce the same figure for shareholder value. The way in which shareholder value is calculated using SVA has already been described. The EVA® approach to calculating shareholder value adds the capital invested to the present value of future EVA® flows and then deducts the market value of any loan capital. Figure 11.6 illustrates the two approaches to determining shareholder value.

The figure shows how EVA® and SVA can both provide a measure of shareholder value. Total business value can be derived either by discounting the free cash flows over time or by discounting the EVA® flows over time and adding the capital invested. Whichever approach is used, the market value of loan capital must then be deducted to derive shareholder value.
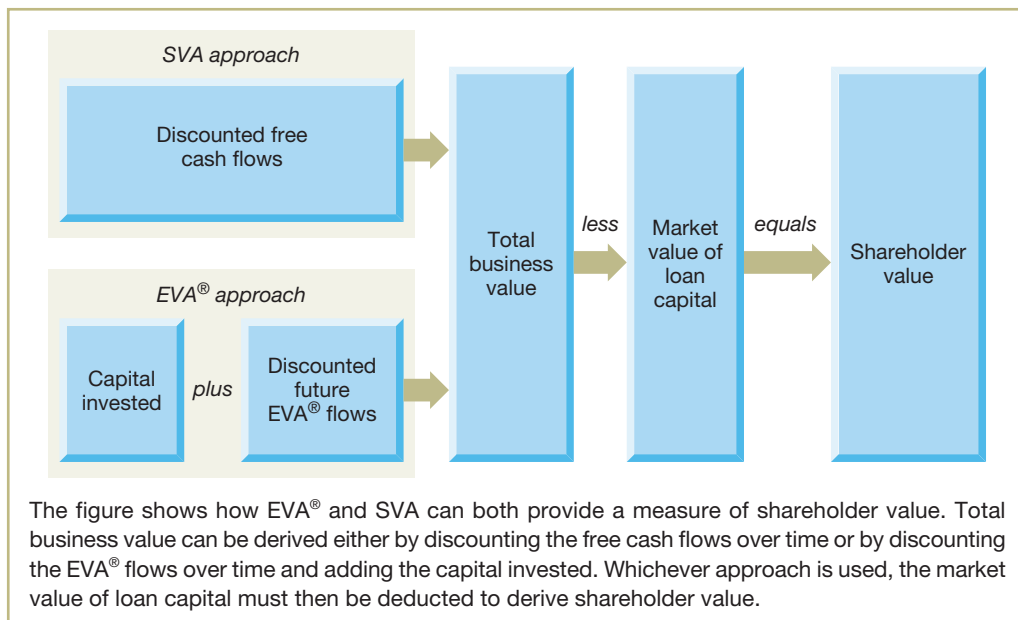
Figure 11.6 Two approaches to determining shareholder value

Let us go through a simple example to illustrate this point.

Example 11.4

Leo Ltd has just been formed and has been financed by a £20 million issue of share capital and a £10 million issue of loan notes. The proceeds of the issue have been invested in non-current assets with a life of three years and during this period these assets will depreciate by £10 million per year. The operating profit after tax is expected to be £15 million each

year. There will be no replacement of non-current assets during the three-year period and no investment in working capital. At the end of the three years, the business will be wound up and the non-current assets will have no residual value.

The required rate of return by investors is 10 per cent.

The SVA approach to determining shareholder value will be as follows:

Year	FCF	Discount rate	Present value
	£m	10%	£m
1	25.0*	0.91	22.8
2	25.0	0.83	20.7
3	25.0	0.75	18.7
		Total business value	62.2
		Less Loan notes	(10.0)
		Shareholder value	52.2

*The free cash flows (FCF) will be the operating profit after tax plus the depreciation charge (that is, £15m + £10m). In this case, there are no replacement non-current assets against which the depreciation charge can be netted off. It must therefore be added back.

The EVA® approach to determining shareholder value will be as follows:

Year	Opening capital invested (C)	Capital charge (10% × C)	Operating profit after tax	EVA®	Discount rate 10%	Present value of EVA®
	£m	£m	£m	£m		£m
1	30.0*	3.0	15.0	12.0	0.91	10.9
2	20.0	2.0	15.0	13.0	0.83	10.8
3	10.0	1.0	15.0	14.0	0.75	10.5
						32.2
			Opening capital			30.0
						62.2
			Less Loan notes			(10.0)
			Shareholder value			52.2

*The capital invested decreases each year by the depreciation charge (that is, £10 million).

EVA® OR SVA?

Both EVA® and SVA are consistent with the objective of maximising shareholder wealth and, in theory, should produce the same decisions and results. Nevertheless, EVA® has a number of practical advantages over SVA. One advantage is that EVA® sits more comfortably with the conventional financial reporting systems and financial reports. There is no need to develop entirely new systems to implement EVA® as it can be calculated by making a few adjustments to the conventional income statement and statement of financial position. (We should not, however, underestimate the problems of deciding on an appropriate period over which to write off research and development costs, restructuring costs and so on when making these adjustments.)

Another advantage is that EVA® is more useful as a basis for rewarding managers. Supporters of both EVA® and SVA believe that management rewards should be linked to increases in shareholder value. This should help align the interests of managers to the interests of shareholders. Under the SVA approach, management rewards will be determined on the basis of

the contribution made to the generation of long-term cash flows. There are, however, practical problems in using SVA for this purpose.

Activity 11.14

Try to identify at least one practical problem that may arise when using SVA calculations to reward managers. (*Hint*: Think about how SVA is calculated.)

The SVA approach measures changes in shareholder value by reference to predicted changes in future cash flows. It is unwise, however, to pay managers on the basis of predicted rather than actual achievements. If the predictions are optimistic, the effect will be that the business rewards optimism rather than real achievement. There is also a risk that unscrupulous managers will manipulate predicted future cash flows in order to increase their rewards.

Under EVA®, managers may receive bonuses based on actual achievement during a particular period. Nevertheless, it is important to strike a note of caution. If bonuses are linked to a single period, there is a danger that managers will place undue attention on increasing EVA® during this period. The objective should be to maximise EVA® over the longer term. An appropriate balance must therefore be struck between the short-term and long-term rewards offered to managers.

Real World 11.4 reveals how one large business uses EVA® to reward its managers.

Real World 11.4

It's a bonus

Halma plc, which specialises in health, safety and environmental technology products, offers its senior managers an annual performance-related bonus tied to increases in economic value added. The bonus is based exclusively on growth in EVA® compared with a target based on a weighted average of the previous three financial years. As the EVA® for each year is utilised for a further three years in the comparator calculations, managers are incentivised to focus on the medium-term interests of the business. There are no individual objectives. For executive directors, the bonus opportunity varies from 125 to 150 per cent of the annual salary.

The 2018 annual report provided the following details of how bonuses were awarded to the executive directors (that is, those involved in the day-to-day management of the business).

Executive Director	EVA threshold 000	EVA actual 000	Overall bonus outcome (% of salary)	EVA maximum 000
Andrew Williams	£197,124	£215,755	134%	£217,949
Kevin Thompson	£197,124	£215,755	134%	£217,949
Adam Meyers	$99,417	$105,831	44%	$113,409
Jennifer Ward	£197,124	£215,755	114%	£221,991

The EVA maximum column represents the EVA performance at which the maximum bonus is payable for each individual.

Source: Halma plc, Annual Report and Accounts 2018, p. 99.

An EVA®-based bonus system should encompass as many managers as possible to encourage widespread commitment. It is worth noting that Stern Stewart believes that bonuses, calculated as a percentage of EVA®, should form a large part of the total remuneration for managers. Thus, the higher the EVA® figure, the higher the rewards to managers – with no upper limits. The philosophy is that EVA® should make managers wealthy provided it makes shareholders extremely wealthy.

Activity 11.15

It was mentioned earlier that the EVA® generated during a period is rarely reported to shareholders. Why might this be a drawback for implementing an EVA®-based bonus scheme?

It means that shareholders will be unable to check whether the rewards given to managers are appropriate.

MARKET VALUE ADDED (MVA)

EVA® is designed to motivate managers to achieve shareholder value. As already mentioned, it is really for internal reporting purposes. A further measure, however, has been developed by Stern Stewart to complement EVA® and to provide shareholders with a way of tracking changes in shareholder value over time. **Market value added (MVA)** attempts to measure the gains or losses in shareholder value by measuring the difference between the market value of the business and the total investment that has been made in it over the years. The market value of the business is usually taken to be the market value of shares and loan capital. The total investment is the long-term capital invested, which is made up of equity (share capital plus retained earnings) and loan capital. Figure 11.7 illustrates the derivation of MVA.

The figure shows how market value added represents the difference between the total market value (loan capital plus share capital) and the total amount invested in the business.
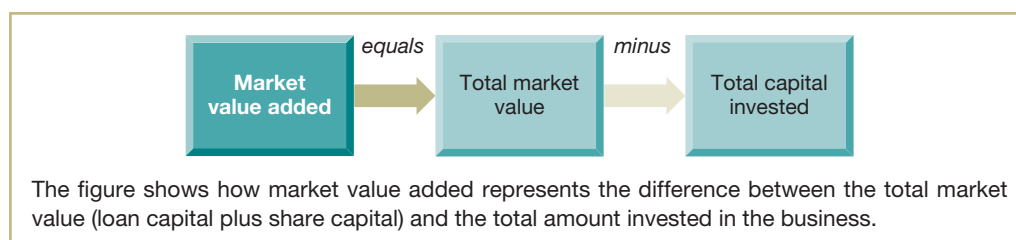
Figure 11.7 Market value added (MVA)

It is worth going through a simple example to show how market value can be calculated.

Example 11.5

Cosmo plc began trading ten years ago. It has 2 million £1 ordinary shares in issue that have a current market value of £5 per share. These shares were issued at their nominal value when the business was founded. The business also has £6 million 10 per cent loan

notes. The book value of the loan notes is the same as their current market value. In addition, the business has retained earnings of £3 million.

The market value added can be calculated as follows:

	£m	£m
Market value of investments		
Ordinary shares (2m × £5)		10
Loan notes		6
		16
Total amount invested		
Ordinary shares (2m × £1)	2	
Retained earnings	3	
Loan notes	6	(11)
Market value added		5

We can see that market valued added is, in essence, a very simple idea. The cash value of the investment is compared with the cash invested. If the cash value of the investment is more than the cash invested, there has been an increase in shareholder value. If the cash value of the investment is less than the cash invested, there has been a decrease in shareholder value. There are, however, complications in measuring the figure for cash invested, which arise because of the conservative bias in accounting measurement. Thus, the adjustments to the statement of financial position that are necessary for the proper calculation of EVA® are also required when measuring MVA.

The measurement of the cash value of capital invested is straightforward. The market value of each share is simply multiplied by the number of shares in issue in order to derive the total market value of the shares. If shares are not listed on the Stock Exchange it is not really possible to measure MVA, unless perhaps a bid for the business has been received from a possible buyer.

In Example 11.5, it was assumed that the market value and book value of loan notes are the same. This is a common assumption used in practice and, when made, the calculation of MVA reduces to the difference between the market value of shares and the sum of the nominal value of those shares and retained earnings. Thus, in the example, MVA is simply the difference between £10m and £5m (£2m + £3m), that is, £5 million.

Although calculating MVA can be fairly straightforward, two points are worth mentioning concerning its interpretation. The first is that the market value of shares can be affected by factors outside the control of the business, such as investor confidence in the economy as a whole. MVA may, therefore, offer a poor guide to the performance of the particular business. The second point is that, when calculating MVA over the whole life of a business (as we did in Example 11.5 above) the period when value was created will not be identified.

Activity 11.16

Why is it important to identify when the value was created and how could this be done?

The pattern of value creation over time may help in the assessment of past and likely future performance. It is perfectly feasible, however, to measure the change in MVA over any period by comparing the opening and closing positions for that period.

MVA-based ratios

A number of MVA ratios have been developed to help assess financial performance over time. One such ratio is the **MVA spread**, which is calculated as follows:

$$\text{MVA spread} = \frac{\text{MVA}}{\text{Invested capital}} \times 100\%$$

This ratio measures how successfully capital invested in the business has been employed. The higher the ratio, the greater its success in generating shareholder wealth.

Activity 11.17

Calculate the MVA spread for Cosmo plc in Example 11.5 above.

$$\text{The MVA spread} = \frac{£5m}{£11m} \times 100\%$$
$$= 45\%$$

The ratio indicates that the value of invested capital has increased by 45 per cent for the period. The increase in MVA represents a safety buffer for the original invested capital. The higher the ratio, the greater the wealth created and the lower the risk the original capital will be eroded by any future losses.

A further ratio is the **MVA margin**, which is calculated as follows:

$$\text{MVA margin} = \frac{\text{MVA}}{\text{Sales revenue}} \times 100\%$$

The MVA margin is meant to measure how effective sales revenue has been in generating wealth for shareholders. The link between sales revenue and MVA is not, however, as straightforward as implied by this ratio. A host of other factors, such as a proposed takeover, changes in the level of borrowing and changes to the cost structure of the business, can exert an influence on market value added for a period.

Real World 11.5 shows the calculation of MVA spread and MVA margin for one well-known business.

Real World 11.5

The Mighty Mouse

The following tables (in US$ millions) show the MVA spread and MVA margin for Walt Disney Corporation, the media and entertainment business.

	Sep 29, 2018	Sep 30, 2017	Oct 1, 2016	Oct 3, 2015	Sep 27, 2014	Sep 28, 2013
Selected financial data (US $m)						
Market value added (MVA)	117,292	108,556	109,035	152,321	105,643	74,052
Invested capital	79,473	79,398	74,460	67,942	67,257	66,741
Ratio						
MVA spread	147.59%	136.72%	146.43%	224.19%	157.07%	110.95%

Following a rise in the MVA spread in preceding years, there was a significant deterioration in 2016 and then a further deterioration in 2017. However, the spread showed some improvement in 2018.

	Sep 29, 2018	Sep 30, 2017	Oct 1, 2016	Oct 3, 2015	Sep 27, 2014	Sep 28, 2013
Selected Financial Data (US $m)						
Market value added (MVA)	117,292	108,556	109,035	152,321	105,643	74,052
Revenues	59,434	55,137	55,632	52,465	48,813	45,041
Ratio						
MVA margin	**197.35%**	**196.88%**	**195.99%**	**290.33%**	**216.42%**	**164.41%**

Following a rise in the margin in preceding years, there was a significant deterioration in 2016. Since then, the MVA margin has stabilised at the 2016 level.

Source: www.stock-analysis-on.net/NYSE/Company/Walt-Disney-Co/Performance-Measure/Market-Value-Added, accessed 29 January 2019.

THE LINK BETWEEN MVA AND EVA®

Stern Stewart argues that there is a strong relationship between MVA and EVA®. The theoretical underpinning of this relationship is clear. We saw earlier that the value of a business is equal to the present value of future expected EVA® plus the capital invested. Thus:

Business value = Capital invested + PV of future EVA®

This equation could be rearranged so that:

PV of future EVA® = Business value − Capital invested

We have also seen that market value added is the difference between the value of the business and the capital invested. Thus:

MVA = Business value = Capital invested

By comparing the above equations, we can see that:

PV of future EVA® = MVA

Stern Stewart claims that the relationship described holds in practice as well as in theory. The firm has produced evidence to show that the correlation between MVA and EVA® is much stronger than the correlation between MVA and other measures of performance such as earnings per share, return on shareholders' funds, or cash flows.

Given that MVA reflects the expected future EVA® of a business, it follows that an investor using this measure will be able to see whether a business generates returns above the cost of capital invested. Where a business only manages to provide returns in line with the cost of capital, the EVA® will be zero and so there will be no MVA. Thus, MVA can be used to impose a capital discipline on managers in the same way that EVA® does.

LIMITATIONS OF MVA

MVA has a number of limitations as a tool for investors. To begin with, it has a fairly narrow scope. As mentioned earlier, MVA relies on market share prices and so it can be calculated only for businesses listed on a stock exchange. Furthermore, MVA can only be used to assess the business as a whole as there are no separate market share prices available for strategic business units.

The interpretation of MVA can also be a problem. It is a measure of the absolute change occurring over time and so its significance is difficult to assess when deciding among competing investment opportunities involving businesses of different size or trading over different periods. Consider the following financial information relating to three separate businesses:

Business	Total market value (a) £m	Total capital invested (b) £m	Market value added (a) − (b) £m	No. of years trading
Alpha	250	120	130	18
Beta	480	350	130	16
Gamma	800	670	130	15

The table shows that each business has an identical MVA, but does this mean that each business has performed equally well? We can see that they operate with different amounts of capital invested and have operated over different periods.

The problems identified are not insurmountable, but they reveal the difficulties of relying on an absolute measure when making investment decisions.

Activity 11.18

How could the problems of time periods and scale mentioned above be overcome?

The problem of the different time periods is probably best dealt with by comparing the businesses over the same time period. The problem of scale is probably best dealt with by comparing the MVA for each business with the capital invested in the business. (MVA/Capital provides a relative measure of wealth creation for investors.)

The businesses that are most successful at generating MVA are also the largest. Because MVA is an absolute measure of performance, large businesses have a greater potential to generate MVA. However, they also have a greater potential to destroy MVA.

TOTAL SHAREHOLDER RETURN (TSR)

Total shareholder return (TSR) has been used for many years by investors as a means of assessing value created and is often used as a basis for management reward systems. The total return from a share is made up as follows:

1 The increase (or decrease) in share value over a period plus (minus)
2 Any dividends paid during the period.

To illustrate how total shareholder return is calculated, let us assume that a business commenced trading by issuing shares of £0.50 each at their nominal value (P_0) and by the end of the first year of trading the shares had increased in value to £0.55 (P_1). Furthermore, the business paid a dividend of £0.06 (D_1) per share during the period. We can calculate the total shareholder return as follows:

$$\text{Total shareholder return} = \frac{D_1 + (P_1 - P_0)}{P_0} \times 100\%$$

Therefore, for the business described above, the total shareholder return will be:

$$\frac{0.06 + (0.55 - 0.50)}{0.50} \times 100\% = 22\%$$

The figure calculated has little information value when taken alone. It can only really be used to assess performance when compared with some benchmark.

Activity 11.19

What benchmark would be most suitable?

Perhaps the best benchmark to use would be the returns made by similar businesses operating in the same industry over the same period of time.

Where such a benchmark is used, returns generated will be compared with those generated from other investment opportunities with the same level of risk. We have seen in earlier chapters that the level of return from an investment should always be related to the level of risk that has to be taken.

TSR in practice

Many large businesses publish total shareholder returns on their websites or in their annual reports. **Real World 11.6** gives an example.

Real World 11.6

Halma's TSR

Halma plc, which specialises in safety, health and environmental technology products, publishes its TSR for a five-year period, along with movements in the FTSE 100 index, FTSE 250 index and the FTSE 350 Electronic and Electronic Equipment indices for the same period. The TSR for the business is displayed graphically in Figure 11.8.

→

Shareholder returns vary over time and so a measure of total shareholder return is likely to be sensitive to the particular time period chosen.
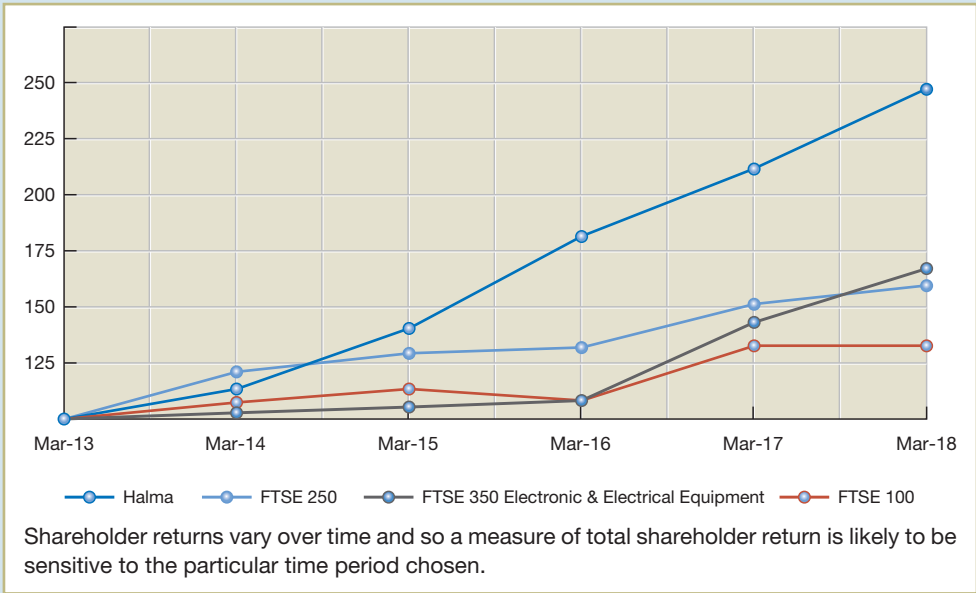
Figure 11.8 Halma plc: total shareholder returns, March 2013 to March 2018

Source: Halma plc, www.halma.com/invesetors/investment-proposition, accessed 26 January 2018.

Real World 11.7 shows international TSR rankings for large businesses based on their performance over a five-year period.

Real World 11.7

Pulling rank

The Boston Consulting Group publishes global rankings of large businesses based on TSR. All businesses included in the rankings have a market capitalisation of at least $50 billion. The top ten rankings for the five-year period to 31 December 2017 are set out below.

Five-year average TSR 2013–17
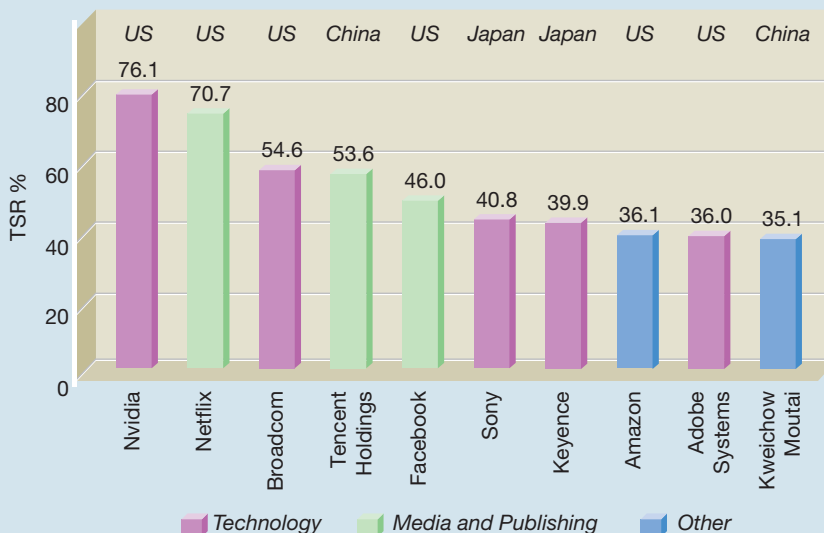
Applying TSR

TSR is a fairly robust measure that can accommodate different operating and financing arrangements. However, there are various drawbacks to adopting this measure. They include:

- *Restricted application.* To calculate TSR, share price information must be available. This means it can be applied only to businesses listed on a stock exchange. Listed businesses represent a very small percentage of the total number of businesses in existence and so its potential application is severely restricted.
- *Share values.* Prices quoted for the shares of a listed business may not provide a reliable guide to their intrinsic value. There are times, for example, when investors' perceptions about the value of shares become detached from underlying reality. This can lead to share price 'bubbles' as described in Chapter 7.
- *Performance comparison.* It may be difficult to find similar businesses against which to assess relative performance. There is also the risk that unsuitable businesses will be deliberately selected by managers to make their performance appear better than it is.

TSR and management incentives

TSR is widely used by large listed businesses as a basis for management incentives (see reference 1 at the end of the chapter). The use of TSR for this purpose has sparked much criticism, however. It raises a number of problems, including the following:

- Share prices reflect investors' views concerning future returns. As a result, managers may receive rewards based on expected future performance rather than on actual performance. (It can be argued, however, that the dividends and increase in share price have actually occurred.)
- Managers may achieve higher share returns by simply taking on higher-risk projects. However, this policy shift may not align with the risk appetite of investors.
- Share price movements may be beyond the control of managers. (For this reason, TSR-based incentives have been described as a lottery for managers.)
- The contribution of individual managers to overall business performance cannot normally be determined.
- TSR can be manipulated over the short term (by, for example, the timing of important announcements).

Thus, TSR-based incentives awarded to managers may neither reflect their actual effort nor encourage long-term shareholder value creation.

Despite the above criticisms, it seems that TSR remains at the heart of many long-term incentive plans for the directors of large businesses (see Real World 11.10).

Figure 11.9 sets out the main value measures that we have discussed in this chapter.

The figure shows the main value measures discussed in this chapter. SVA and EVA® are primarily for internal management use, and TSR and MVA are primarily for use by investors.
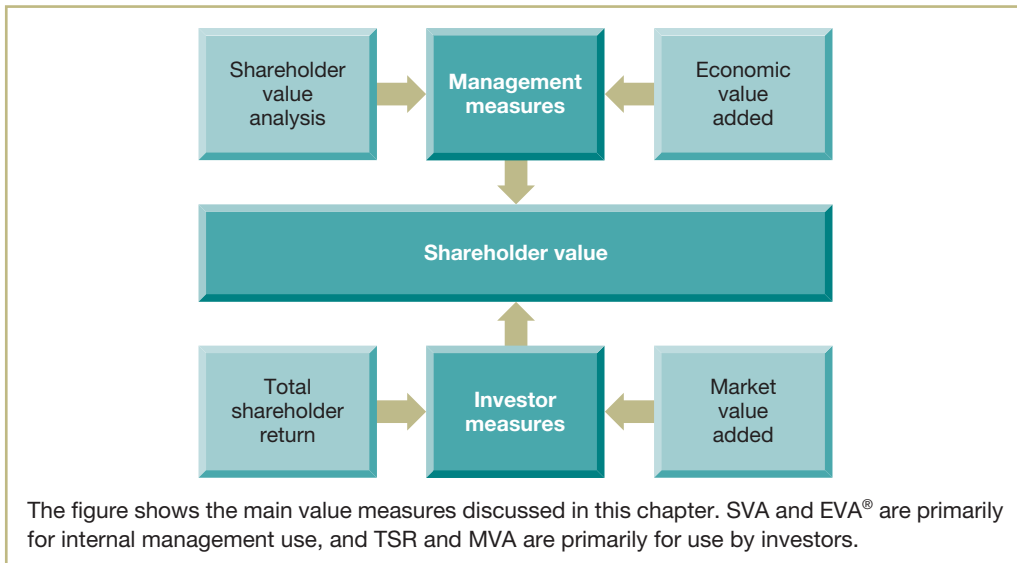
Figure 11.9 The main value measures

CRITICISMS OF THE SHAREHOLDER VALUE APPROACH

In recent years, there has been growing criticism of the shareholder value approach. It is claimed that the pursuit of shareholder value has resulted in conflicts between shareholders and other stakeholders and has created a crisis for the world of business. There is no reason in theory, however, why such problems should occur. We have seen that shareholder value reflects a concern for long-term value creation, and to achieve this, the interests of other stakeholders cannot be trampled over.

Real World 11.8 sets out the view of McKinsey and Co, the management consultants, concerning this issue.

Real World 11.8

The long and the short of it

Creating shareholder value is not the same as maximising short-term profits – and companies that confuse the two often put both shareholder value and stakeholder interests at risk. Indeed, a system focused on creating shareholder value from business isn't the problem; short-termism is. Great managers don't skimp on safety, don't make value-destroying investments just because their peers are doing it, and don't use accounting or financial gimmicks to boost short-term profits, because ultimately such moves undermine intrinsic value.

What's needed at this time of reflection on the virtues and vices of capitalism is a clearer definition of shareholder value creation that can guide managers and board directors, rather than blurring their focus with a vague stakeholder agenda. We do believe that companies

are better able to deliver long-term value to shareholders when they consider stakeholder concerns; the key is for managers to examine those concerns systematically for opportunities to do both.

Source: Extract from Goedhart, M., Koller, T. and Wessels, D. (2015) 'The real business of business', *McKinsey Quarterly*, March.

Nevertheless, it is easy to see how, in practice, the notion of shareholder value may be corrupted. The quest for shareholder value implies a concern for improving current performance and for exploiting future growth opportunities. The latter is by far the more difficult task. The future is unpredictable and risks abound. Managers must therefore tread carefully. They must be painstaking in their analysis of future opportunities and in developing appropriate strategies. There is a risk, therefore, that managers will shy away from such a daunting task.

Instead they may prefer to focus on improving current performance. This is usually achieved by 'efficiency' measures such as bearing down on costs through working assets harder, shedding staff and putting pressure on suppliers to lower prices. If, however, these measures are taken too far, the result will be an emaciated business that is unable to take advantage of future growth opportunities and that has its major stakeholder groups locked in conflict.

To be successful, the shareholder value approach must strike the right balance between a concern for improving current performance and a concern for future growth. To help achieve this balance, the way in which managers are assessed and rewarded must reflect the importance of both.

MEASURING THE VALUE OF FUTURE GROWTH

If managers are to be assessed and rewarded, at least in part, on the basis of developing growth potential, a suitable measure of this potential is required. According to Stern Stewart, the EVA® approach can provide such a measure.

We saw earlier that the value of a business can be described as:

$$\text{Business value} = \text{Capital invested} + \text{PV of future EVA}^{\circledR}$$

If a business has no growth potential and EVA® remains constant, we can use the formula for a perpetuity, so that the present value of future EVA® is:

$$\text{PV of future EVA}^{\circledR} = \frac{\text{EVA}^{\circledR}}{r}$$

where r = required returns from investors (that is, the weighted average cost of capital). Thus, the value of a business with no growth potential is:

$$\text{Business value} + \text{Capital invested} = \frac{\text{EVA}^{\circledR}}{r}$$

Where the business has growth potential (as measured by growth in EVA®), business value (as measured by the market value of share and loan capital) will be greater than this. The value placed on future growth potential by investors is, therefore:

$$\text{Value of future growth potential} = \text{Business value} - \left(\text{Capital invested} + \frac{\text{EVA}^{\circledR}}{r}\right)$$

Stern Stewart refers to the above value as **future growth value (FGV®)** and by using this measure periodically we can see whether managers are creating or destroying future value.

The percentage contribution to the value of the business arising from investor expectations concerning future growth in EVA® is:

$$\text{Percentage contribution to business value} = \left(\frac{\text{FGV}^{\circledR}}{\text{Business value}}\right) \times 100\%$$

This measure can be used to see whether managers are striking the right balance between efficiency and future growth.

Activity 11.20

Centaur plc has 5 million shares in issue with a market value of £8.40 per share. The business has £14.2 million capital invested and EVA® for the most recent year was £1.8 million. The required return from investors is 10 per cent a year.

What is the percentage contribution to the market value of the business arising from future growth?

Assuming no growth, PV of future $\text{EVA}^{\circledR} = \dfrac{\text{EVA}^{\circledR}}{r} = \dfrac{£1.8m}{0.10} = £18.0m$

Value of future growth potential $(\text{FGV}^{\circledR}) = \text{Business value} - \left(\text{Capital invested} + \dfrac{\text{EVA}^{\circledR}}{r}\right)$

$\qquad\qquad = (5m \times £8.40) - (£14.2m + £18.0m)$

$\qquad\qquad = £9.8m$

Percentage contribution to business value $= \left(\dfrac{\text{EVA}^{\circledR}}{\text{Business value}}\right) \times 100\%$

$\qquad\qquad = \dfrac{£9.8m}{(5m \times £8.40)} \times 100\%$

$\qquad\qquad = 23.3\%$

SHAREHOLDER VALUE AND DIRECTORS' REWARDS

In this final part of the chapter we switch our attention to how directors of a business may be incentivised to promote shareholder value. Some aspects of this topic have been discussed already when examining methods of measuring shareholder value such as EVA and TSR. In

the sections below we focus on the structure and make up of directors' rewards and the role performance measures may play.

Elements of directors' remuneration

The remuneration package of an executive director of a large listed business is usually made up of two elements:

- a fixed element, which is largely in the form of a base salary but will also include benefits such as pension contributions, medical insurance, company car and so on; and
- a variable element, which rewards directors on the basis of both short-term and long-term results. This element is designed to motivate directors to improve performance.

The elements just described are summarised in Figure 11.10.

Remuneration is made up of a fixed element and a variable element, with the latter being performance related.
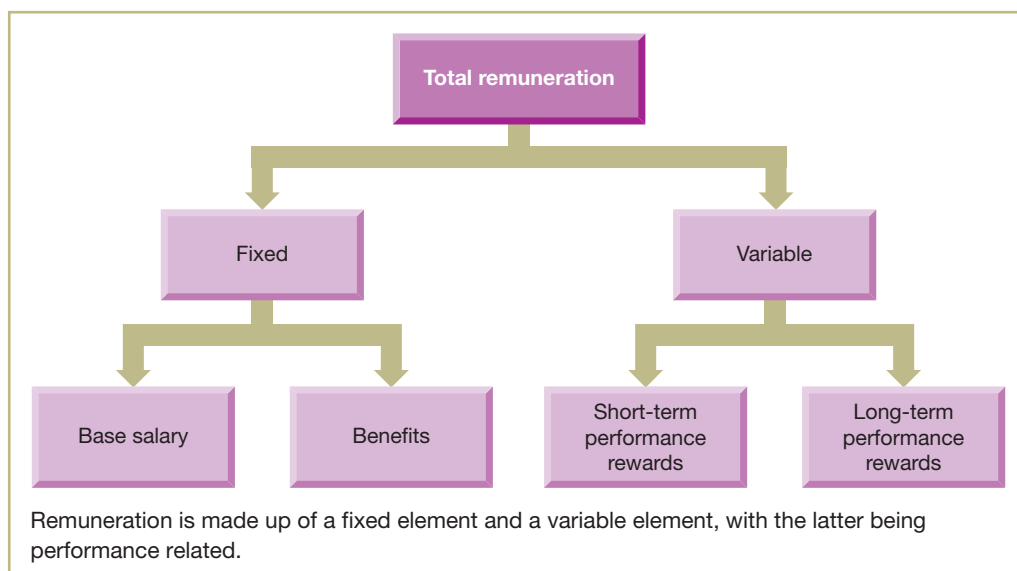
Figure 11.10 The elements of remuneration for an executive director of a listed business

With large listed businesses, the variable (performance-related) element, typically accounts for a large proportion of the total remuneration for executive directors. **Real World 11.9** provides some impression of the relationship between the fixed and variable elements of remuneration for CEOs of large listed businesses.

Real World 11.9

A question of balance

Figure 11.11 shows the relationship between the fixed and variable elements of remuneration for CEOs of the 100 largest and 250 next largest listed UK businesses. It is based on median total earnings received for financial years ending up to and including 30 June 2017.
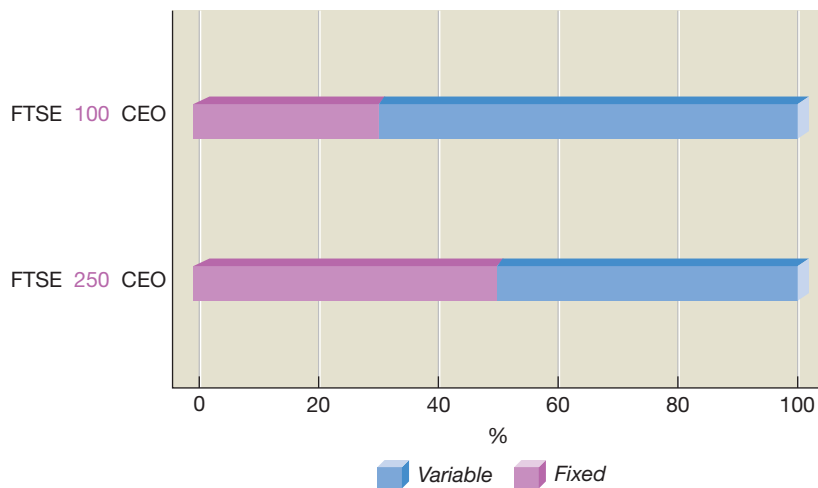
The figure shows that the variable element of remuneration for CEOs of the FTSE 100 businesses is significantly higher than for CEOs of FTSE 250 businesses.

Figure 11.11 Relationship between the fixed and variable elements of CEO remuneration

We can see that CEOs of the largest 100 businesses have a higher variable element to their remuneration package.

Source: KPMG (2017) *Guide to Directors' Remuneration 2017*, www.kpmg.com, p. 24. By permission of KMPG LLP.

It should be mentioned that the variable element of CEO remuneration shown above may be overstated. It may contain a hidden fixed element. A director of a large business is unlikely to receive no variable element at all.

The short-term, variable element usually takes the form of an annual bonus, typically expressed as a multiple of base salary. Not all of the bonus may be paid at the year-end; some of it may be deferred. Deferral may be undertaken on a voluntary or compulsory basis.

Activity 11.21

Why might part of the annual bonus be deferred on a compulsory basis? Try to think of at least one reason.

It can reduce the risk of paying directors a large sum on the basis of only one year's performance. Instead, a part of the bonus is paid at a later date, subject to satisfactory performance during the deferral period.

A further reason for compulsory deferral is that it can provide a financial incentive for directors to stay with the business. They may become ineligible for the deferred part of a bonus if they leave before the end of the deferral period.

The deferred part of the bonus will normally be invested in the business's shares during the deferral period, which is often three years. Where part of the bonus can be voluntarily deferred, a matching award of free shares may be offered to directors as an incentive to defer.

Annual bonuses are normally paid to directors for achieving prescribed levels of performance. In practice, it seems that conventional profit-based measures (such as operating profit and earnings per share) are more widely used than EVA® discussed earlier. These financial measures may be used in conjunction with non-financial measures (such as customer service or employee engagement) as well as those relating to personal objectives.

Activity 11.22

Can you think of any problems with using multiple measures to determine the annual bonus? Try to think of at least one.

They may include:

- determining appropriate weightings between the various measures
- deciding whether a minimum level of financial performance must be achieved before any bonus is triggered
- demonstrating a clear link between annual bonus awarded and the financial results.

You may have thought of others.

Where the annual bonus involves an element of compulsory deferral, performance targets may not be imposed.

The long-term variable element normally takes the form of a **performance share plan (PSP)**. Under this type of plan, the directors are awarded a specified number of free shares in the business. The award of these shares is, once again, dependent on achieving prescribed levels of performance. In practice, TSR and EPS growth are widely used as performance measures. It seems that MVA, mentioned above, is rarely used. **Real World 11.10** sheds some light on current practice.

Real World 11.10

Providing an incentive

A survey of FTSE 250 businesses reveals that performance share plans continue to be the most common form of long-term incentive plan. It also reveals that TSR is used either on its own, or in conjunction with other measures as the basis for such plans. Figure 11.12 below provides more detail.

➔
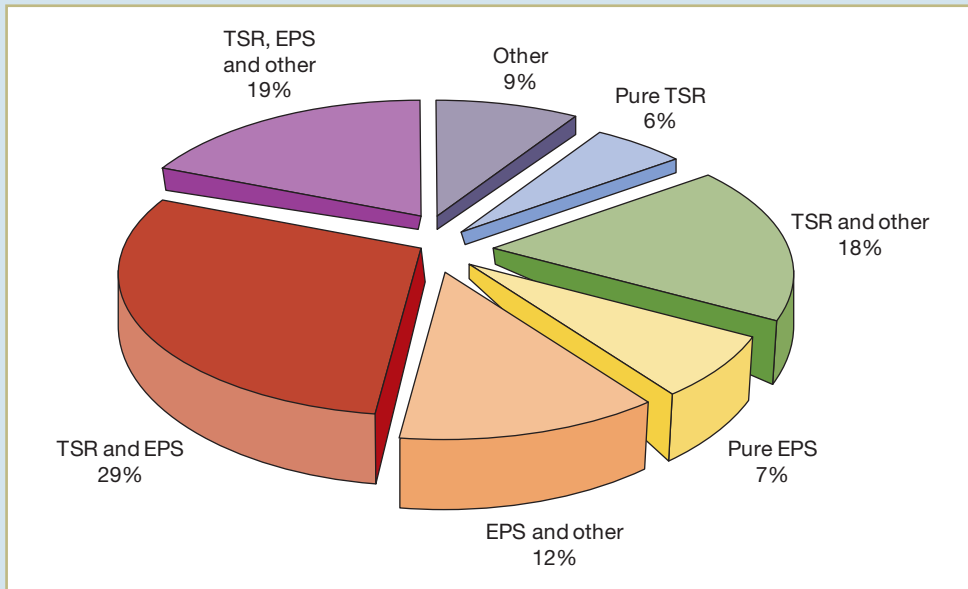
Figure 11.12 The use of TSR in performance share plans of FTSE 250 businesses

We can see that EPS is often used in conjunction with TSR. Other measures used include profits, cash flow, share price targets and return on capital.

Source: Figure compiled from information in KPMG (2017) *Guide to Directors' Remuneration 2017*, https://assets. kpmg/content/dam/kpmg/uk/pdf/2018/01/2017-kpmg-guide-to-directors-remuneration.pdf, p. 59.

Shares may be awarded on an 'all or nothing basis', that is, all of the shares will be awarded if the performance level is reached and none will be awarded if it is not. Normally, however, shares are awarded on a sliding scale according to the actual level of performance achieved. Exceptional performance may be rewarded by awarding additional shares to the number specified. Shares will be awarded to directors at the end of the performance period, which is typically three to five years. Dividends that accrue during the performance period will usually be received by directors only after the award of the shares.

Under a performance share plan, directors may be awarded **restricted shares**. These type of shares are issued to the directors immediately but are not owned outright. They may be forfeited under certain circumstances, such as where the directors fail to reach the prescribed level of performance, or where they leave the business before the end of the performance period. This type of share is rarely found in practice in the UK.

Share awards transfer to directors some of the risks and rewards of being a shareholder. This may encourage directors to think more like shareholders and to strive to enhance shareholder wealth. The process for awarding shares, however, can be a tricky business. Finding an appropriate performance measure, setting the appropriate performance level for triggering a share award and determining the number of shares to be awarded to directors are all areas fraught with difficulties.

Real World 11.11 provides an impression of how the total remuneration for chief executive officers (CEOs) of some of the UK's largest businesses is made up.

All part of the package

KPMG, the accounting and consulting firm, revealed in its 2017 *Guide to Directors' Remuneration* the median remuneration mix for CEOs of the 250 largest listed UK companies shown in Figure 11.13.

Pie chart segments:
- Basic salary 47%
- Total bonus 35%
- Realised LTIP gains 11%
- Pension 7%
- Other fixed pay 0%
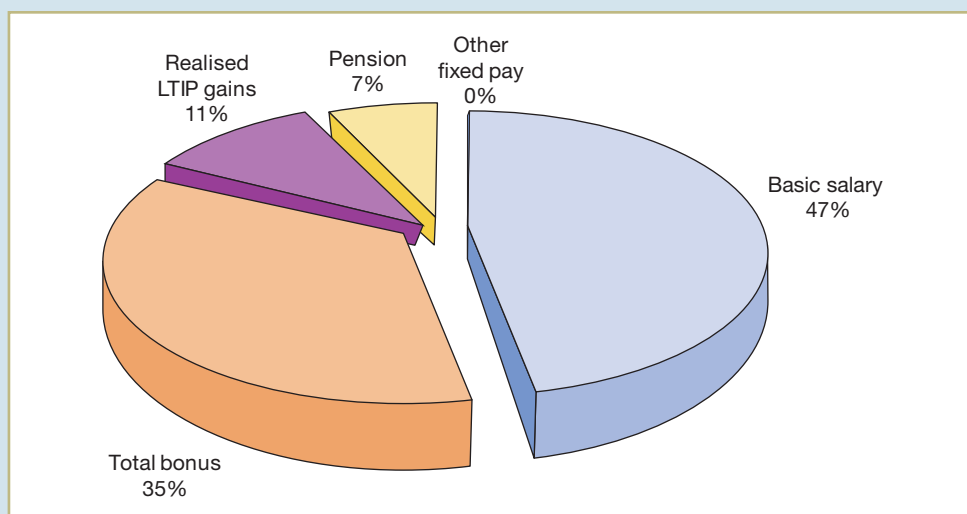
Figure 11.13 Remuneration mix for CEOs of FTSE 250 businesses

We can see that incentive-based rewards form a significant proportion of total remuneration.

Source: KPMG (2017) *Guide to Directors' Remuneration 2017*, Summary, KPMG, www.kpmg.com, p. 25.

Directors' share options

Directors' share options give directors the right, but not the obligation, to buy equity shares in their business at an agreed price. The conditions of the scheme usually stipulate that the option to buy must be exercised either on, or after, a specified future date. A final date for exercising the option will also usually be specified.

Directors' share options will be exercised only if the market value of the shares exceeds the option price. Where the option is exercised, the business issues the agreed number of shares to the director. The gain received by the director will be the difference between the option price and the share price at the time the option is exercised. This type of option differs from most financial options in that a director will not normally be required to pay for the option rights: they are granted at no cost to the directors concerned. Directors' share options, however, cannot be traded and will usually be forfeited if the person leaves the business before the option can be exercised. Dividends will only accrue to directors after the share options are exercised and they become shareholders.

Directors' share options are normally issued at the current market price of the underlying shares. The terms of a share option scheme often allow the directors to exercise their option no earlier than three years, but no later than ten years, after the option has been granted. The exercise of the option may, once again, be subject to certain performance targets, such as TSR, growth in EPS and so on.

Share options involve no financial outlay for the business at the time they are granted. If the share price does not perform well over the option period, the option will be allowed to lapse and the business will incur no cost. If the shares perform well and the options are exercised, they represent a form of deferred payment to the directors. This deferral of rewards may be particularly attractive to a growing business that is short of cash. Where directors exercise their options and the business issues shares at below their current market value, it becomes a very real cost to the business. If the business were to issue those same shares to an ordinary investor, it would receive the current market price for them.

Problems with options

A problem with share options occurs where the share price falls significantly below the exercise price. The prospects of directors receiving benefits may become remote and any incentive effect is lost. It may also affect the risk-taking behaviour of directors.

Activity 11.23

How do you think this might happen?

As options are granted to directors at no cost to them, they have an incentive to take risks when options are 'out of the money' (that is, when they cannot be exercised at a profit). Taking risks may increase the prospect of a share price rise and resulting benefits. If things do not turn out as expected, however, the directors incur no financial loss.

The pricing of options has often been a target for manipulation by unscrupulous individuals and, in the USA, several scandals have occurred. Some high-profile US businesses have re-issued share options at a lower price to directors when the share price fell below the option price. This effectively eliminates any risks for directors and can also eliminate any incentive effect that share options possess (see reference 2 at the end of the chapter). Nevertheless, there may, sometimes, be a case for re-issuing options.

Activity 11.24

Can you think of any circumstances under which re-issuing share options at a lower price to directors might be justified?

By 're-pricing' options in this way, it may re-incentivise directors, particularly when share prices are falling.

An even more controversial practice is when directors benefit from the backdating of options. One study found that 1,400 directors of 460 US businesses benefited from the back-dating of share options to the lowest price in a monthly period (see reference 3 at the end of the chapter).

In the UK, directors' share options have declined in popularity, partly due to the changes in the corporate governance landscape. An influential report on directors' remuneration discouraged the use of share option schemes and a number of large institutional investors have voiced their concerns over their cost and effectiveness. Furthermore, international accounting

standards now require the 'fair value' of share option schemes to be included in the financial statements. Shareholders can now see more clearly the cost incurred by granting share options as it is shown as a charge against profits.

Share options or PSPs?

Share options have largely been supplanted by performance share plans (PSPs) among larger listed businesses. They can still be found, however, among smaller businesses, particularly AIM listed businesses.

A distinctive feature of PSPs, when compared with options, is that, when share prices fall, the award of free shares still has some value. This means that they can retain an incentive effect – unlike share options that are 'out of the money'.

Activity 11.25

From the business viewpoint, is there a potential disadvantage to this feature of PSPs?

Directors can still be rewarded despite a fall in share price. Share options, on the other hand, only reward directors if share prices rise.

Setting appropriate performance targets for directors may, however, alleviate this problem.

As shares are awarded free under a PSP, fewer shares have to be issued to provide the same potential benefits to directors as under a share option scheme. This means that a PSP has a less dilutive effect for equity shareholders. A PSP may not, however, have the same motivating effect as share options. This is because the latter contain a gearing element, thereby offering potentially greater gains than a PSP. (This gearing element is similar to that described for share warrants (see Chapter 6, p. 272).) Gearing, however, makes any gains more sensitive to changes in share price and operates in both directions. This means that directors' rewards can become volatile and unpredictable.

Both stock options and PSPs share a common problem. Rises and falls in share price may be beyond the control of the directors and may simply reflect changes in economy-wide or industry-wide factors. Any incentive scheme that is subject to the vagaries of the stock market can, therefore, provide uncertain outcomes. There is always a risk that directors will either be undercompensated, or overcompensated, for their achievements.

Self-assessment question 11.1

Romeo plc produced the following statement of financial position at the end of the third year of trading:

Statement of financial position as at the end of the third year

	£m
ASSETS	
Non-current assets	
Property	60.0
Computing equipment	90.0
Motor vehicles	22.0
	172.0

→

	£m
Current assets	
Inventories	39.0
Trade receivables	53.0
Cash	12.0
	104.0
Total assets	276.0
EQUITY AND LIABILITIES	
Equity	
£1 ordinary shares	60.0
Retained earnings	81.0
	141.0
Non-current liabilities	
Loan notes	90.0
Current liabilities	
Trade payables	45.0
Total equity and liabilities	276.0

An analysis of the underlying records reveals the following:

1 R&D costs relating to the development of a new product in the current year had been written off at a cost of £10 million. However, this is a prudent approach and the benefits are expected to last for ten years.
2 Property has a current value of £200 million.
3 The current market value of an ordinary share is £8.50.
4 The book value of the loan notes reflects their current market value.

Required:
Calculate the MVA for the business over its period of trading.

The solution to this question can be found at the back of the book on p. 645.

SUMMARY

The main points of this chapter may be summarised as follows:

Shareholder value

- Means putting shareholders' interests at the heart of management decisions.
- To create shareholder value, the objectives of the business must reflect a concern for shareholder value, there must be appropriate methods of measurement, the business must be managed to create shareholder value and there must be periodic assessment of whether shareholder value has been achieved.

Measuring shareholder value – internal (management) measures

- Conventional forms of accounting measurement are inadequate – they focus on the short term, ignore risk, fail to take proper account of the cost of capital invested and are influenced by accounting methods employed.
- Two main approaches are used to measure shareholder value: shareholder value analysis (SVA) and economic value added (EVA®).

- SVA is based on the concept of net present value analysis.

- It identifies key value drivers for generating shareholder value.

- EVA® provides a means of measuring whether the returns generated by the business exceed the required returns from investors.

- EVA® = NOPAT − $(R \times C)$.

- EVA® relies on conventional financial statements, which are adjusted because of their limitations.

- Two financial ratios based on EVA® (EVA margin and EVA momentum) can be calculated.

- In theory, EVA® and SVA should produce the same decisions and results.

Measuring shareholder value – external (investor) measures

- There are two main approaches: market value added (MVA) and total shareholder return (TSR).

- MVA measures the difference between the market value of the business and the investment made in the business.

- MVA = present value of EVA®.

- Two financial ratios based on MVA (MVA spread and MVA margin) can be calculated.

- MVA is suitable only for listed businesses.

- Interpreting MVA can be a problem.

- TSR measures the total return to shareholders over a period.

- TSR is made up of the increase (decrease) in share value and the dividends paid.

- TSR can be sensitive to the time period chosen and it can be difficult to find similar businesses for comparison purposes.

- It is suitable only for listed business and where market prices reflect the intrinsic value of the shares.

- It has a number of drawbacks when used as a basis for management incentives.

Criticisms of the shareholder value approach

- There are two elements to shareholder value: efficiency of current operations and future growth.

- Undue emphasis on efficiency of current performance can undermine the prospects for long-term future growth.

Measuring the value of future growth

- One approach is to use the EVA® methodology.

- Value of future growth potential = Market value of the business – (Capital invested + EVA®/r)

- To check whether managers strike the right balance between efficiency and future growth, the future growth potential can be compared with the market value of the business.

KEY TERMS

Shareholder value p. 492
Shareholder value analysis (SVA) p. 496
Free cash flows p. 496
Cash tax rate p. 497
Value drivers p. 498
Economic value added (EVA®) p. 504
EVA® margin p. 508
EVA® momentum p. 509

Market value added (MVA) p. 514
MVA spread p. 516
MVA margin p. 516
Total shareholder return (TSR) p. 518
Future growth value (FGV®) p. 524
Performance share plan (PSP) p. 527
Restricted shares p. 528
Directors' share options p. 529

For definitions of these terms see the Glossary, pp. 685–94.

REFERENCES

1 Kay, J. (2012) *The Kay Review of UK Equity Markets and Long-term Decision Making*, Interim Report – February, Department for Business, Innovation and Skills, p. 25.

2 Monks, R. and Minow, N. (2001) *Corporate Governance*, 2nd edn, Blackwell, p. 226.

3 Quoted in Guerrera, F. (2006) 'Study links directors to options scandal', *Financial Times*, 18 December.

FURTHER READING

If you wish to explore the topic of shareholder value in more depth, try the following books:

Arnold, G. and Lewis, D. (2019) *Corporate Financial Management*, 6th edn, Pearson, Chapters 14 and 15.

Koller, T., Goedhart, M. and Wessels, D. (2015) *Valuation: Measuring and Managing the Value of Companies*, 6th edn, Wiley, Chapters 8 and 12.

Malekian, R. (2009) *Free Cash Flow: The Key to Shareholder Value Creation*, Shareholder Value Consultants Inc., sections 1–4.

Stewart, B. (2013) *Best-practice EVA: The Definitive Guide to Measuring and Maximising Shareholder Value*, Wiley Finance.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on pp. 656–57.

11.1 How might the directors' attitude towards risk be affected by the business offering them share options?

11.2 Why is MVA not really suitable as a tool for internal management purposes?

11.3 Should managers take changes in the total market value of the shares (that is, share price × number of shares issued) over time as an indicator of shareholder value created (or lost)? Why?

11.4 It has been argued that many businesses are overcapitalised. If this is true, what may be the reasons for businesses having too much capital and how can EVA® help avoid this problem?

EXERCISES

Questions 11.4 to 11.6 are more advanced than 11.1 to 11.3. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

11.1 Advocates of the shareholder value approach argue that, by delivering consistent and sustainable improvements in shareholder value, a business will benefit several stakeholder groups. The performance of a business such as the Stagecoach Group plc, which is committed to maximising shareholder value, may be used to support their arguments. Key elements of the income statement for the Stagecoach Group for the year to 30 April 2018 are set out below.

Required:
Fill out the right-hand column below to show how advocates of the shareholder value approach might seek to identify the stakeholder groups that benefit from the business's operations.

	£m	Stakeholders that benefit
Revenue	3,226.8	
Operating costs	3,121.8	
Finance costs	36.6	
Taxation	31.5	
Profit for the year	63.8	

Source: Stagecoach Group plc, Group Income Statement, Annual Report 2018, www.stagecoach.com, p.76.

11.2 Aquarius plc has estimated the following free cash flows for its five-year planning period:

Year	Free cash flows
	£m
1	35.0
2	38.0
3	45.0
4	49.0
5	53.0

Required:

How might it be possible to check the accuracy of these figures? What internal and external sources of information might be used to see whether the figures are realistic?

11.3 Aries plc was recently formed and issued 80 million £0.50 shares at nominal value and loan capital of £24 million. The business used the proceeds from the capital issues to purchase the remaining lease on some commercial properties that are rented out to small businesses. The lease will expire in four years' time and during that period the annual operating profits are expected to be £12 million each year. At the end of the three years, the business will be wound up and the lease will have no residual value.

The required rate of return by investors is 12 per cent.

Required:

Calculate the expected shareholder value generated by the business over the four years, using:

(a) the SVA approach
(b) the EVA® approach.

11.4 Virgo plc is considering introducing a system of EVA® and wants its managers to focus on the longer term rather than simply focus on the year-to-year EVA® results. The business is seeking your advice on how a management bonus system could be arranged so as to ensure that the longer term is taken into account. The business is also unclear as to how much of the managers' pay should be paid in the form of a bonus and when such bonuses should be paid. Finally, the business is unclear as to where the balance between individual performance and corporate performance should be struck within any bonus system.

The chief financial officer has recently produced figures that show that if Virgo plc had used EVA® over the past three years, the results would have been as follows:

	£m
2017	25
2018	(20)
2019	10

Required:

Set out your recommendations for a suitable bonus system for the divisional managers of the business.

11.5 Leo plc is considering entering a new market. A new product has been developed at a cost of £5 million and is now ready for production. The market is growing and estimates from the finance department concerning future sales of the new product are as follows:

Year	Sales
	£m
1	30.0
2	36.0
3	40.0
4	48.0
5	60.0

After Year 5, sales are expected to stabilise at the Year 5 level.

You are informed that:

■ the operating profit margin from sales in the new market is likely to be a constant 20 per cent of sales revenue

- the cash tax rate is 25 per cent of operating profit
- replacement non-current asset investment (RNCAI) will be in line with the annual depreciation charge each year
- additional non-current asset investment (ANCAI) over the next five years will be 15 per cent of sales growth
- additional working capital investment (AWCI) over the next five years will be 10 per cent of sales growth.

The business has a cost of capital of 12 per cent. The new market is considered to be no more risky than the markets in which the business already has a presence.

Required:
Using an SVA approach, indicate the effect of entering the new market on shareholder value.

11.6 Pisces plc produced the following statement of financial position and income statement at the end of the third year of trading:

Statement of financial position as at the end of the third year

	£m
ASSETS	
Non-current assets	
Property	40.0
Machinery and equipment	80.0
Motor vans	18.6
Marketable investments	9.0
	147.6
Current assets	
Inventories	45.8
Receivables	64.6
Cash	1.0
	111.4
Total assets	259.0
EQUITY AND LIABILITIES	
Equity	
Share capital	80.0
Retained earnings	36.5
	116.5
Non-current liabilities	
Loan notes	80.0
Current liabilities	
Trade payables	62.5
Total equity and liabilities	259.0

Income statement for the third year

	£m
Sales revenue	231.5
Cost of sales	(143.2)
Gross profit	88.3
Wages	(43.5)
Depreciation of machinery and equipment	(14.8)

	£m
R&D costs	(40.0)
Allowance for trade receivables	(10.5)
Operating loss	(20.5)
Income from investments	0.6
	(19.9)
Interest payable	(0.8)
Ordinary loss before taxation	(20.7)
Restructuring costs	(6.0)
Loss before taxation	(26.7)
Tax	–
Loss for the year	(26.7)

An analysis of the underlying records reveals the following:

1 R&D costs relate to the development of a new product in the previous year. These costs are written off over a two-year period (starting last year). However, this is a prudent approach and the benefits are expected to last for 16 years.
2 The allowance for trade receivables was created this year and the amount is very high. A more realistic figure for the allowance would be £4 million.
3 Restructuring costs were incurred at the beginning of the year and are expected to provide benefits for an infinite period.
4 The business has a 7 per cent required rate of return for investors.
5 The capital employed at the end of the year fairly reflects the average capital employed during the year.

Required:
Calculate the EVA® for the business for the third year of trading.

Chapter 12

BUSINESS MERGERS AND SHARE VALUATION

INTRODUCTION

This chapter begins by examining various aspects of mergers and takeovers. We consider possible reasons for mergers and takeovers and how they may be financed. We then go on to identify the likely winners and losers in a takeover as well as the defences available to a business seeking to fend off a hostile bid.

In the second part of this chapter, we consider how the shares of a business may be valued. We examine various valuation methods proposed and discuss the measurement and forecasting problems that are raised. Share valuation is an important topic and one which is relevant to a range of financial decisions, including mergers and takeovers.

Learning outcomes

When you have completed this chapter, you should be able to:

- Identify and discuss the main reasons for mergers and takeovers.

- Discuss the advantages and disadvantages of each of the main forms of purchase consideration used in a takeover.

- Identify the likely winners and losers from takeover activity.

- Outline the tactics that may be used to defend against a hostile takeover bid.

- Identify and discuss the main methods of valuing the shares of a business.

MERGERS AND TAKEOVERS

When two (or possibly more) businesses combine, this can take the form of either a **merger** or a **takeover**. The term 'merger' is normally used to describe a situation where the two businesses are of roughly equal size and there is agreement among the managers and owners of each business on the desirability of combining them. A merger is usually effected by creating an entirely new business from the assets of the two existing businesses, with both shareholder groups receiving a substantial ownership stake in the new business.

The term 'takeover' is normally used to describe a situation where a larger business acquires control of a smaller business, which is then absorbed by the larger business. When a takeover occurs, shareholders of the target business may cease to have any financial interest in the business and the resources of the business may come under entirely new ownership. (The particular form of consideration used to acquire the shares in the target business will determine whether the shareholders continue to have a financial interest in the business.) Although the vast majority of takeovers are not contested, there are occasions when the management of the target business will fight to retain its separate identity.

In practice, however, many business combinations do not fit into these neat categories and it may be difficult to decide whether a merger or a takeover has occurred. The distinction between the two forms of combination used to be important in the context of financial reporting, as different accounting rules existed for each type of combination. However, changes to these rules have meant that this distinction is really no longer an issue. In this chapter, we shall not distinguish between 'merger' and 'takeover' and the terms will be used interchangeably.

Mergers and takeovers can be classified according to the relationship between the businesses being merged:

- A **horizontal merger** occurs when two businesses in the same industry, and at the same point in the production/distribution process, decide to combine.
- A **vertical merger** occurs when two businesses in the same industry, but at different points in the same production/distribution process, decide to combine.
- A **conglomerate merger** occurs when two businesses in unrelated industries decide to combine.

Activity 12.1

Can you think of an example of each type of merger for a tyre retailer?

An example of a horizontal merger would be where a tyre retailer merges with another tyre retailer to form a larger retail business. An example of a vertical merger would be where a tyre retailer merges with a manufacturer of tyres. This would mean that the combined business operates at different points in the production/distribution chain. An example of a conglomerate merger would be where a tyre retailer merges with an ice cream manufacturer.

MERGER AND TAKEOVER ACTIVITY

Although mergers and takeovers are a normal part of the business landscape, there are surges in merger and takeover activity from time to time. Each surge will have its own particular combination of economic, political and technological factors to create the required environment.

Important economic factors usually include rising share prices, the availability of credit and low interest rates, which make financing mergers and takeovers much easier.

Real World 12.1 provides some impression of the pattern of merger and takeover activity over recent times.
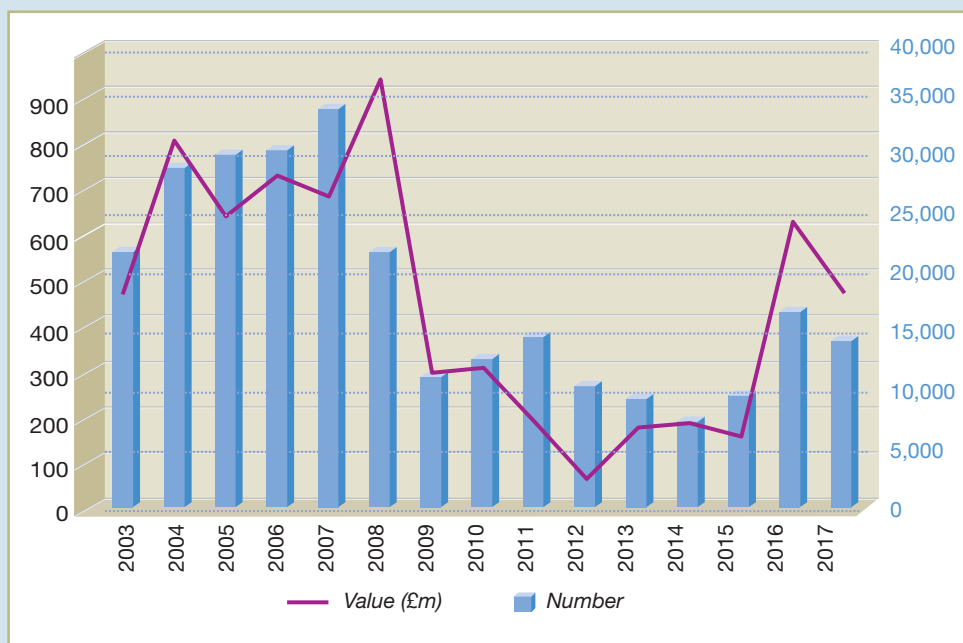
THE RATIONALE FOR MERGERS

In economic terms, a merger will be worthwhile for shareholders only if combining the two businesses will lead to gains that would not arise if the two businesses had stayed apart. We saw in the previous chapter that the value of a business can be defined in terms of the *present value of its future cash flows.* Thus, if a merger is to make economic sense, the present value of the combined business should be equal to the present value of future cash flows of the bidding and target businesses *plus* a gain from the merger. Figure 12.2 illustrates this point.

The figure shows that, to make economic sense, the present value of the merged business should be equal to the present value of the bidding and target businesses, when taken separately, plus an economic gain from the merger.
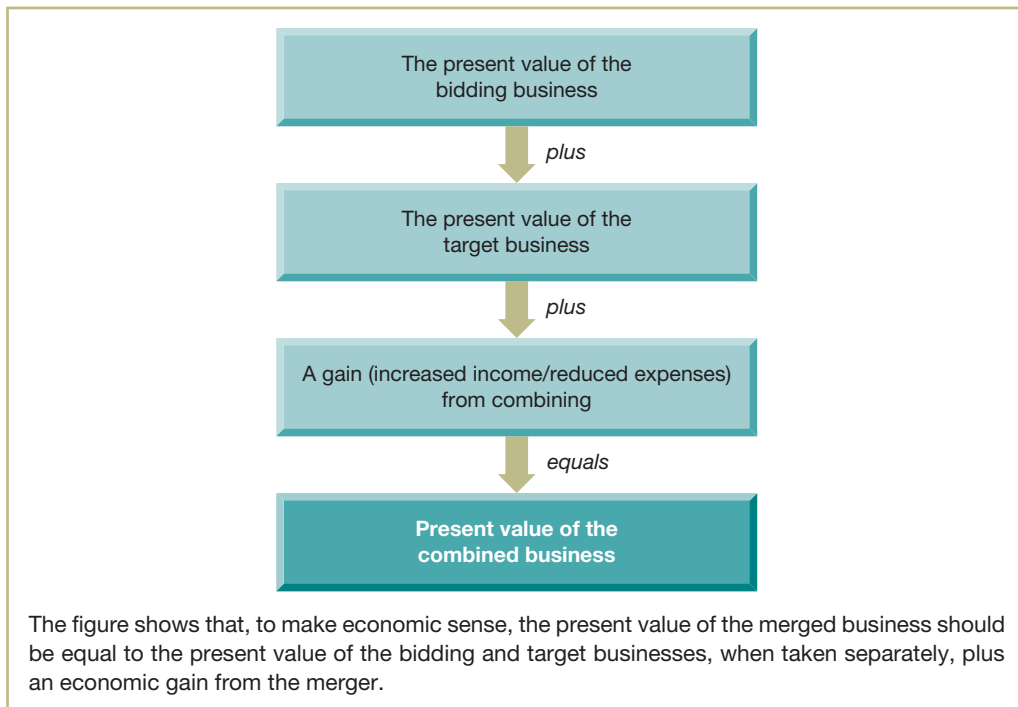
Figure 12.2 The rationale for mergers

WEALTH-ENHANCING MOTIVES FOR MERGERS

There are various ways in which an economic gain for shareholders may be achieved through a merger or takeover. The more important of these are described below.

Benefits of scale

A merger or takeover will result in a larger business being created that may enable certain benefits of scale to be achieved. For example, a larger business may be able to negotiate lower prices with suppliers in exchange for larger orders. It may also be able to lower the cost of finance when larger sums are being raised. A merger or takeover may also provide the potential for savings, as some operating costs may be duplicated (for example, administrative costs, IT costs, marketing costs, research and development costs). These benefits are more likely to be gained from horizontal and vertical mergers than from conglomerate mergers; it is more difficult to achieve economies where the businesses are unrelated. However, the benefits outlined must be weighed against the increased costs of organising and controlling a larger business.

Activity 12.2

Is it necessary for a business to merge with, or take over, another business in order to reap the benefits of scale? Can these benefits be obtained by other means?

A business may be able to obtain lower prices from suppliers, reduced research and development costs, and so forth by joining a consortium of businesses or by entering into joint ventures with other businesses. This form of co-operation can result in benefits of scale and yet avoid the costs of a merger. (However, there will be costs in negotiating a detailed joint venture agreement.)

Real World 12.2 describes the anticipated benefits from a merger between two large food producers. The benefits described largely relate to those of scale.

Real World 12.2

Food for thought

Following an offer to buy the shares of Northern Foods plc, Greencore plc set out the expected synergies (that is benefits or savings) from combining the two businesses. The cost synergies were forecast as being at least £40 million. A breakdown of the forecast synergies, some of which were not quantified, was provided by the business as follows.

Overhead cost savings

Annual synergies of approximately £15 million are expected to be achieved through creating a single group management structure and head office function, specifically:

- creation of a single board and single executive management team
- combination of group functions and removal of duplication in areas including group finance, treasury, tax, corporate development and legal
- creation of a single operating entity in UK, eliminating overlapping roles across the business, within category businesses and within manufacturing units
- rationalisation of head office locations
- reduction in advisory and regulatory fees.

Purchasing and supply chain synergies

Annual synergies of approximately £20 million are expected to be achieved through realising the benefits of a total combined purchasing base in excess of £1 billion, specifically:

- generating efficiencies through scale with common suppliers across both organisations
- establishing common terms with suppliers
- creating a single purchasing organisation
- leveraging the larger distribution and supply chain
- lowering storage costs and sharing trucks.

Financing and tax synergies

Annual tax synergies of approximately £3 million are expected to be achieved through moving Northern Foods to Greencore's tax structure and Essenta Foods being domiciled in Ireland. The financing synergies of approximately £2 million per annum are expected to be achieved through lower interest rates on a business with a stronger balance sheet and with an expected investment grade rating from the DBRS rating agency.

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Eliminating competition

A business may combine with, or take over, another business in order to eliminate competition and to increase its market share. The resulting increase in market power may enable the business to raise prices and thereby increase profits.

Activity 12.3

Which of the three types of mergers discussed above would achieve this objective? What are the potential problems of this kind of merger from the consumer's point of view?

A horizontal merger will normally be required to increase market share. The potential problems of such mergers are that consumers will have less choice following the merger and that the market power of the merged business will lead to an increase in consumer prices. For these reasons, governments often try to ensure that the interests of the consumer are protected when mergers resulting in a significant market share are proposed. (This point is considered in more detail later in the chapter.)

Eliminating weak and inefficient management

A weak management team may prevent the full potential of a business being achieved. In this case, a takeover may offer the chance to install a stronger management team that could do better. This argument is linked to what is referred to as the '*market for corporate control*'. The term is used to describe the idea that mergers and takeovers are motivated by teams of managers that compete for the right to control business resources. The market for corporate

control ensures that weak management teams will not survive and that, sooner or later, they will be succeeded by stronger management teams.

A merger or takeover can also be the solution to the agency problem. Where managers are not acting in the interests of shareholders but are busy pursuing their own interests, the effect is likely to be a decline in business performance and share price. The market for corporate control may lead to a takeover by another business whose managers are committed to serving the interests of shareholders.

The threat of takeover may be enough to motivate managers to improve their performance. This would suggest that mergers and takeovers are good for the economy. They help to ensure that resources are fully utilised and that shareholder wealth maximisation remains the top priority.

Activity 12.4

Can you think of a counterargument to this point? In other words, how might the threat of takeover be bad for the economy?

It may encourage managers to adopt a short-term focus. In a misguided attempt to please shareholders, they may pursue projects aimed at producing quick returns. There is no real evidence, however, to support this view.

Complementary resources

Two businesses may have complementary resources which, when combined, will allow higher profits to be made than if the businesses remain separate. By combining the two businesses, the relative strengths of each business will be brought together, which may lead to additional profits being generated. It may be possible, of course, for each business to overcome its particular deficiency and continue as a separate entity. Even so, it may still make sense to combine.

Activity 12.5

Why might there still be an argument in favour of a merger, even though a business could overcome any deficiency on its own?

Overcoming a particular deficiency may take time. Combining the resources of two businesses may lead to a quicker exploitation of the strengths of each business.

Real World 12.3 sets out the reasons given for a merger between two large businesses operating in the global industrial gas sector. As we shall see, expected benefits from combining complementary resources were at the heart of the merger decision.

Protecting sources of supply or revenue

A business may buy an important product or service from a particular supplier. There may be a risk, however, that the supplier will switch its output to a competitor business. In this kind of situation, the business may decide to acquire the supplier's business in order to protect its continuing operations. For similar reasons, a business may decide to acquire the business of an important customer where there is a risk that the customer will switch allegiance to a competitor. Although future cash flows may not be increased by such acquisitions, the risk of losing those cash flows may be greatly reduced.

The main shareholder wealth-enhancing motives for mergers and takeovers are shown in Figure 12.3.
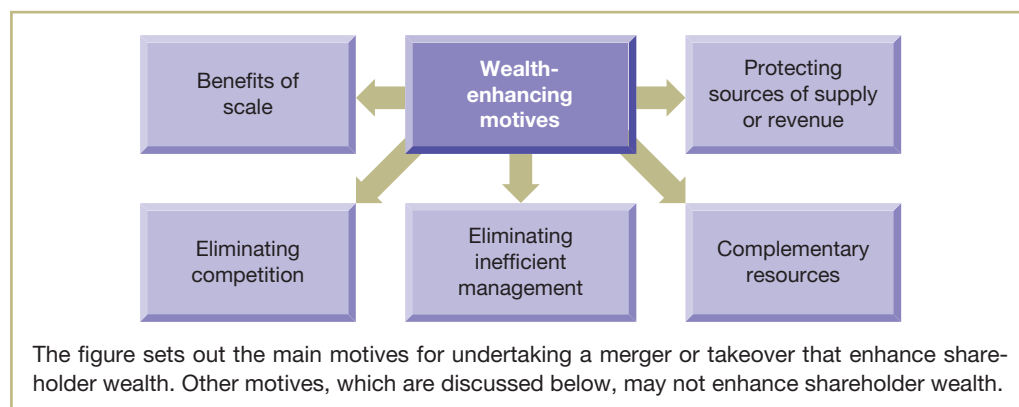
The figure sets out the main motives for undertaking a merger or takeover that enhance shareholder wealth. Other motives, which are discussed below, may not enhance shareholder wealth.

Figure 12.3 Motives for mergers that enhance shareholder wealth

OTHER MOTIVES FOR MERGERS

The motives for mergers and takeovers discussed so far are consistent with the objective of enhancing shareholder wealth. Other motives, which may not be, can also provide the driving force for business combinations. The following are examples.

Diversification

A business may invest in another business, operating in a different industry, in order to reduce risk. By having income streams from different industries, a more stable pattern of overall profit may be created. At first sight, such a policy may seem appealing. However, we must ask ourselves whether diversification by *management* will provide any benefits to shareholders that the *shareholders themselves* cannot provide more cheaply. It may be easier and cheaper for a shareholder to deal with the problem of risk by holding a diversified portfolio of shares than for the business to acquire another. The latter approach may prove expensive as a premium may have to be paid to acquire the shares and external investment advisers may have to be hired at substantial cost.

Activity 12.6

Which particular group might benefit most from diversification?

The managers of the bidding business may benefit most. Managers cannot diversify their investment of time and effort in the business easily. Managing a more diversified business reduces the risks of unemployment and increases the prospects of increased income.

Diversification may also benefit lenders by making their investment more secure. As a result, they may be prepared to lend at a lower cost. (Where this occurs, shareholders will benefit indirectly from diversification.)

Undervalued shares

Another possible motive for a takeover is where managers of a bidding business believe that the market undervalues the shares of a target business. As a result, there is a profitable opportunity to be exploited. If we accept that the market is efficient, at least in the semi-strong form, this motive is difficult to justify. Close monitoring of the market by investors should ensure that share prices reflect all publicly available information. It is possible, however, that managers of the bidding business have access to information that the market does not have. It is also possible that the market, perhaps for a short period, fails to price the shares in an efficient manner. Such situations, however, are not common.

Management interests and goals

A merger or takeover may be undertaken to fulfil the personal interests and goals of managers. Managers may acquire another business to reduce the risks they face (for example, from a takeover by another business) or to increase the amount of resources under their control. The ultimate prize will be increased job security and/or increased remuneration. In some cases, managers are directly rewarded on the basis of growth in sales or profits, thereby providing them with a greater incentive for making acquisitions. Takeovers driven by the interests of managers, however, may not be in the interests of shareholders.

Real World 12.4 also points out that managers may enjoy the excitement of mergers and takeovers.

The personal interests and goals of managers may also help to explain why some proposed takeovers are fiercely contested by them.

FORMS OF PURCHASE CONSIDERATION

When a business takes over another business, payment for the shares acquired may be made in different forms.

Activity 12.7

What different forms of payment do you think may be used?

The main methods of payment are:

■ cash
■ shares in the bidding business
■ loan capital in the bidding business.

Below we consider the advantages and disadvantages of each form of payment from the point of view of both the bidding business's shareholders and the target business's shareholders.

Cash

Payment by cash means the amount of the purchase consideration will be both certain and clearly understood by the target business's shareholders. This may improve the chances of a successful bid. It will also mean that shareholder control of the bidding business will not be diluted as no additional shares will be issued.

Raising the necessary cash, however, can create problems for the bidding business, particularly when the target business is large. It may only be possible to raise the amount required by a loan or share issue or by selling off assets, which the bidding business's shareholders may not like. On occasions, it may be possible to spread the cash payments over a period. However, deferred payments are likely to weaken the attraction of the bid to the target business's shareholders.

The receipt of cash will allow the target business's shareholders to adjust their share portfolios without incurring transaction costs on disposal. Transaction costs will be incurred, however, when new shares or loan capital are acquired to replace the shares sold. Moreover, the receipt of cash may result in a liability to capital gains tax (which arises on gains from the disposal of certain assets, including shares).

Shares

The issue of ordinary shares in the bidding business as purchase consideration avoids any strain on its cash position. However, some dilution of existing shareholder control will occur and there may also be a risk of dilution in earnings per share. (Dilution will occur if the additional earnings from the merger divided by the number of new shares issued is lower than the existing earnings per share.) The cost of this form of financing must also be taken into account. We saw in Chapter 8 that the cost of servicing ordinary shares is relatively high.

The directors must ensure that the authorised share capital of the business is sufficient to make a new issue and, more importantly, that the market value of the business's shares does not fall during the course of the takeover.

Activity 12.8

What problem would arise if there was a fall in the market value of the shares?

It would reduce the value of the bid and could undermine the chances of acceptance.

To avoid this problem, the bidding business may make a more generous offer where the bid is in the form of shares.

The target business's shareholders may find a share-for-share exchange attractive. As they currently hold shares, they may wish to continue with this form of investment rather than receive cash or other forms of security. A share-for-share exchange does not result in a liability for capital gains tax. (For capital gains tax purposes, no disposal is deemed to have occurred when this type of transaction takes place.) The target shareholders will also have a continuing ownership link with the original business, although it will now be part of a larger business. However, the precise value of the offer may be difficult to calculate owing to movements in the share prices of the two businesses. There is also the risk that share prices will not reflect their intrinsic value.

Real World 12.5 contains a warning from Warren Buffett about share-for-share bids where share prices do not reflect their intrinsic value.

Real World 12.5

Mergers can be costly

In evaluating a share-for-share offer, shareholders of the target company quite understandably focus on the market price of the acquirer's shares that are to be given them. But they also expect the transaction to deliver them the *intrinsic* value of their own shares – the ones they are giving up. If shares of a prospective acquirer are selling below their intrinsic value,

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it's impossible for that buyer to make a sensible deal in an all-share deal. You simply can't exchange an undervalued share for a fully-valued one without hurting your shareholders.

Imagine, if you will, Company A and Company B, of equal size and both with businesses intrinsically worth £100 per share. Both of their shares, however, sell for $80 per share. The CEO of A, long on confidence and short on smarts, offers 1¼ shares of A for each share of B, correctly telling his directors that B is worth $100 per share. He will neglect to explain, though, that what he is giving will cost his shareholders $125 in intrinsic value. If the directors are mathematically challenged as well, and a deal is therefore completed, the shareholders of B will end up owning 55.6% of A and B's combined assets and A's shareholders will own 44.4%.

Not everyone at A, it should be noted, is a loser from this nonsensical transaction. Its CEO now runs a company twice as large as his original domain, in a world where size tends to correlate with both prestige and compensation.

Source: Adapted from Buffett, W. (2010) Shareholders Letter, Berkshire Hathaway Inc., www.berkshirehathaway.com, 26 February, p. 16.

Loan capital

Like the issue of shares, the issue of loan capital is simply an exchange of paper and so it avoids any strain on the cash resources of the bidding business. However, it has certain advantages over shares in that the issue of loan capital involves no dilution of shareholder control and the service costs will be lower. A disadvantage of a loan-capital-for-share exchange is that it will increase the gearing of the bidding business and therefore the level of financial risk. The directors of the bidding business must ensure that the issue of loan capital is within its borrowing limits.

Loan capital may be acceptable to shareholders in the target business if they have doubts over the future performance of the combined business. It provides investors with both a fixed level of return and security for their investment. When a takeover bid is being made, convertible loan notes may be offered as purchase consideration.

Activity 12.9

What might be the attraction of this form of loan capital from the point of view of the target business's shareholders?

The issue of convertible loan notes would give target business shareholders a useful hedge against uncertainty. This type of loan capital will provide relative security in the early years, with an option to convert to ordinary shares at a later date. Investors will, of course, exercise this option only if things go well for the combined business.

Various factors may influence the form of payment used by bidding businesses. Market conditions may be critical. It seems that ordinary shares are more likely to be used following a period of strong stock market performance. Recent high returns from shares make them more attractive to investors. Businesses with good growth opportunities often favour ordinary shares when financing acquisitions. It is seen as less constraining than issuing loan capital or paying cash. Businesses with poor growth opportunities, however, may not be able to offer ordinary shares as payment.

To make a bid more attractive, a choice of payment method may be offered to shareholders in the target business. Often, the choice is between shares in the bidding business and cash. This allows shareholders an opportunity to adjust their portfolios in a way that suits them.

Real World 12.6 reveals the ways in which mergers have been financed in recent years.

Real World 12.6

How mergers are financed

The popularity of each form of bid consideration varies over time. Figure 12.4 shows that in recent years, cash has proved to be, by far, the most popular.

The figure shows that cash has been the most important form of bid consideration. Fixed-interest securities, such as preference shares and loan notes, have been not been significant forms of bid consideration.
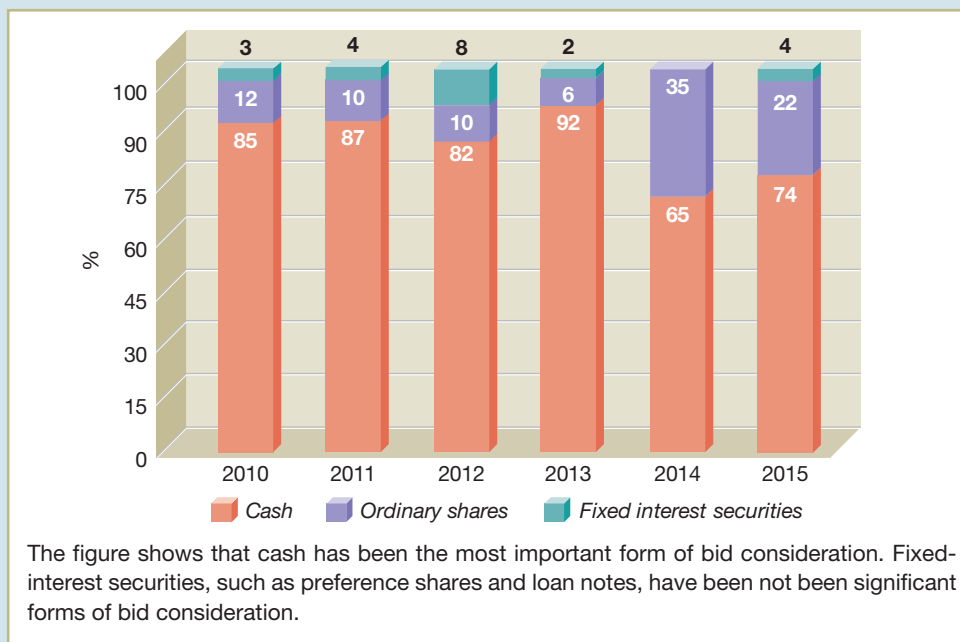
Figure 12.4 Bid consideration in mergers and acquisitions in the UK by other UK businesses, 2010–15

Source: Based on information from *Mergers and Acquisitions Involving UK Companies, Quarter 4 2015* and *Q4 2014*, Table 9, Office for National Statistics, www.ons.gov.uk.

It is interesting to note that research in the UK and the USA suggests that businesses using ordinary shares as a means of acquisition achieve significantly poorer returns following the acquisition than those using cash (see reference 1 at the end of the chapter). The reasons for this are not entirely clear. Perhaps the relatively poor performance of share-for-share deals indicates that the bidding businesses' shares were too highly valued to begin with.

MERGER SYNERGIES – A CASE STUDY

In this section we delve a little deeper into the subject of merger synergies, which we touched upon in a previous section. **Real World 12.7** describes how a hefty premium was paid for expected synergies arising from a merger between two airlines. It also describes how the benefits from these synergies were valued and how these benefits were divided between shareholders in each airline.

Sky high synergies

In 2016, Alaska Air Group acquired one of its competitors, Virgin America, to become the 5th largest airline in the US. A key objective of the acquisition was for the group to improve its existing footprint in California. The purchase price was $2.6 billion in cash. This represented an acquisition premium of 50 per cent and provided a windfall gain of around $900 million for Virgin America shareholders. To justify such a high premium to its own shareholders, Alaska Air Group needed to generate significant synergies from the merger. The Boston Consulting Group have argued that, assuming a WACC of around 9 percent, this represents a valuation multiple of 11 times operating income (that is, 110/9). By applying a multiple of 10 times operating income (that is, minus one multiple for one-off integration costs) the increase in annual operating income needed to cover the premium is $90 million (that is, $900m/10).

At the time of the merger, Alaska Air Group estimated that synergies would lead to annual benefits of $225 million (with one-off integration costs of $300 million - $350 million). Revenue synergies, largely from the expansion of its route network, account for most of these benefits. However, cost synergies from lower overheads, better asset utilisation and improved purchasing power were also significant. Applying a multiple of 10 times annual operating income, the total value of these synergy benefits is valued at $2,250 million. As $900 million of these benefits went to Virgin America shareholders, the remaining $1,350 million accrue to Alaska Air Group shareholders. This represents a division 40 per cent to Virgin America shareholders and 60 per cent to Alaska Air Group shareholders.

Source: based on information in Kengelbach J., Keienburg G., Schmid T., Degen D., and Sievers S. *2018 Mergers & Acquisitions (M&A) Report - Elevating Synergies on the Board Agenda* Boston Consulting Group www.bcg.com 12 September 2018; A Levine-Weinberg, *Alaska Air–Virgin America Update: More synergies, but later than expected*, The Motley Fool, 3 April 2017; *Alaska Air Group to Acquire Virgin America, Creating West Coast's Premier Carrier* PR newswire, 4 April 2016

Underlying assumptions regarding the expected benefits from synergies require close examination. There is always a risk that they will turn out to be too optimistic. In the case of the Alaska Air/Virgin America merger discussed above, it was assumed that the high profit margins enjoyed by Alaska Air prior to the merger would continue. However, for the financial year prior to the merger deal, the profit margin of Alaska Air was 24 per cent compared to 13 per cent for Virgin America. (See reference 2 at the end of the chapter.) On the face of it, raising Virgin America's profitability to match that of Alaska Air poses a huge challenge. The merger between the two businesses was completed on 14 December 2016. For the year to 31 December 2017, the profit margin for the combined business was 15 per cent. Although full integration of Virgin America had not been fully completed by then, doubts must arise as to whether all the benefits proclaimed for the merger will materialise.

MERGERS AND FINANCIAL OUTCOMES

A proposed merger can be evaluated in terms of the financial effect on both groups of shareholders. This is considered in Example 12.1.

Example 12.1

Ixus plc is a large sugar-refining business that is currently considering the takeover of Decet plc, an engineering business. Financial information concerning each business is as follows:

Income statements for the year ended 30 June 2019

	Ixus plc £m	Decet plc £m
Sales revenue	432.5	242.6
Operating profit	64.8	35.0
Interest payable	(20.6)	(13.2)
Profit before taxation	44.2	21.8
Taxation	(10.6)	(7.4)
Profit for the period	33.6	14.4
Other financial information		
Ordinary shares (£1.00 nominal)	£120.0m	£48.0m
Dividend payout ratio	50%	25%
Price/earnings ratio	20 times	16 times

The board of directors of Ixus plc has offered shareholders of Decet plc 5 shares in Ixus plc for every 4 shares held. If the takeover is successful, the price/earnings ratio of the enlarged business is expected to be 19 times. The dividend payout ratio will remain unchanged.

As a result of the takeover, after-tax savings in head office costs of £9.6 million per year are expected.

Required:

(a) Calculate:
  (i) the total value of the proposed bid
  (ii) the expected earnings per share and share price of Ixus plc following the takeover.
(b) Evaluate the proposed takeover from the viewpoint of an investor holding 20,000 shares in:
  (i) Ixus plc
  (ii) Decet plc.

Solution

Before we consider this problem in detail we should recall from Chapter 3 that the P/E ratio is calculated as follows:

$$\text{P/E ratio} = \frac{\text{Market value per share}}{\text{Earnings per share}}$$

The P/E ratio reflects the market's view of the likely future growth in earnings. The higher the P/E ratio, the more highly regarded are the future growth prospects. The equation above can be rearranged so that:

$$\text{Market value per share } (P_0) = \text{P/E ratio} \times \text{Earnings per share}$$

We shall use this rearranged formula to value the shares of both businesses.

(a) (i) Five shares in Ixus plc are offered for every four shares in Decet plc. The total number of shares offered is, therefore:

$$5/4 \times 48.0\text{m} = 60.0\text{m}$$

$$\text{EPS of Ixus plc} = \text{Earnings available to shareholders/No. of shares in issue}$$
$$= \text{£33.6m/120.0m}$$
$$= \underline{\text{£0.28}}$$
$$\text{Value of share in Ixus plc} = \text{P/E ratio} \times \text{EPS}$$
$$= \text{£0.28} \times 20$$
$$= \underline{\text{£5.60}}$$
$$\text{Total bid value} = \text{£5.60} \times \text{60.0m}$$
$$= \underline{\text{£336.0m}}$$

(ii) Following the takeover, the EPS of Ixus plc would be:

	£m
Earnings of Ixus plc	33.6
Earnings of Decet plc	14.4
After-tax savings	9.6
Total earnings	57.6

$$\text{No. of shares following the takeover} = \text{180m (that is, 120m} + \text{60m)}$$
$$\text{EPS after the takeover} = \text{£57.6m/180m}$$
$$= \underline{\text{£0.32}}$$
$$\text{Value of a share following the takeover} = \text{P/E ratio} \times \text{EPS}$$
$$= 19 \times \text{£0.32}$$
$$= \underline{\text{£6.08}}$$

(b) (i) *Ixus plc investor*

$$\text{Value of shares before the takeover} = \text{20,000} \times \text{£5.60}$$
$$= \text{£112,000}$$
$$\text{Value of 20,000 shares after the takeover} = \text{£121,600 (that is, 20,000} \times \text{£6.08)}$$
$$\text{Increase in value of shares} = \underline{\text{£9,600}}$$

(ii) *Decet plc investor*

$$\text{EPS of Decet plc before the takeover} = \text{£14.4m/48.0m}$$
$$= \text{£0.30}$$
$$\text{Value of a share in Decet plc} = 16 \times \text{£0.30}$$
$$= \underline{\text{£4.80}}$$
$$\text{Shares held in Ixus plc} = \text{5/4} \times \text{20,000}$$
$$= \underline{\text{25,000}}$$
$$\text{Value of 20,000 shares before the takeover} = \text{20,000} \times \text{£4.80}$$
$$= \text{£96,000}$$
$$\text{Value of 25,000 shares after the takeover} = \text{25,000} \times \text{£6.08}$$
$$= \text{£152,000}$$
$$\text{Increase in value of shares held} = \underline{\text{£56,000}}$$

We can see that the gain arising from the takeover is not shared equally between the two shareholder groups. The investor in Decet plc will receive a 58 per cent increase in the value of shares held whereas the investor in Ixus plc will receive only a 9 per cent increase.

The annual dividends received by each investor will be:

	Ixus plc investor	Decet plc investor
	£	£
Dividend received before the takeover		
((£33.6m × 50%)/120m) × 20,000	2,800	
((£14.4m × 25%)/48.0m) × 20,000		1,500

WHO BENEFITS?

In this section, we shall try to identify the likely winners and losers in a merger. We begin by considering the shareholders, as the pursuit of shareholder value is usually claimed to be the driving force behind merger activity. It is worth asking, however, whether the reality matches the rhetoric. The answer, it seems, will depend on whether the bidding shareholders or the target shareholders are being discussed. Where mergers create value, it is often unevenly allocated (see reference 3 at the end of the chapter).

Shareholders in the target business

Studies in both the UK and the USA show that shareholders in the target business are the main beneficiaries. They are normally rewarded through a substantial premium on the share price.

Activity 12.10

Why might a bidding business be prepared to pay a premium above the market price for the shares of a business? Try to think of at least two reasons.

Various reasons have been put forward to explain this phenomenon. They include the following:

- The managers of the bidding business have access to information that is not available to the market and which is not, therefore, reflected in the share price. (This assumes that the market is not efficient in the strong form.)
- The managers of the bidding business may simply misjudge the value of the target business.
- The managers may feel that there will be significant gains arising from combining the two businesses that are worth paying for. We saw earlier that, in theory, the maximum price a buyer will be prepared to pay will be equivalent to the present value of the business plus any gains from the merger.
- Management hubris. Where there is more than one bidder or where the takeover is being resisted, the managers of a bidding business may fail to act rationally and may raise the bid price above an economically justifiable level. This may be done in order to salvage management pride as they may feel humiliated by defeat.

The size of bid premia tends to be inversely related to the size of the target business. One study of 3,691 US businesses acquired over the period 1990–2007 found that bid premia for the top third, in terms of size, averaged 38 per cent compared with 54 per cent for the bottom third (see reference 4 at the end of the chapter). There could be various reasons for this. The bigger the target business, the bigger the investment required. This may prompt the bidding business to act with more care and to employ specialists with expertise in negotiation and valuation. Furthermore, the bigger the target business, the smaller will be the pool of potential buyers. The resulting lack of competition may also help to keep bid premia lower.

Bid premia also tend to be significantly higher when a hostile bid is launched.

Activity 12.11

Why should we expect this to be the case?

A higher premium will often be needed to overcome resistance to the bid.

There are also other, less obvious, reasons why a higher premium may be paid under these circumstances. A hostile bid may attract greater competition among buyers, which is likely to push up the bid premium. Where a friendly merger is under way, other suitors may see little point in launching a bid. A hostile bid may indicate that managers of the bidding business believe the target business is badly run. They may, therefore, be prepared to offer a high bid premium in the expectation that large gains can be made through better management.

Share prices in the target business will usually reflect the bid premium for as long as the bid is in progress. Where a takeover bid is unsuccessful and the bid is withdrawn, the share price of the target business will usually return to its pre-offer level. However, shares may fall below their pre-bid prices if investors believe that the managers have failed to exploit a profitable opportunity. The same fate may be experienced by shares in the bidding business.

Shareholders in the bidding business

Shareholders of the bidding business usually have little to celebrate. Although early studies offered some evidence that a merger provided them with either a small increase or no increase in the value of their investment, more recent studies suggest that, over the long run, takeovers produce a significant decrease in shareholder value (see, for example, reference 5 at the end of the chapter). Some studies also suggest that cross-border mergers are particularly poor performers (see, for example, reference 6 at the end of the chapter).

Activity 12.12

Why might shares in the bidding business lose value as a result of a takeover of a target business? Try to think of two reasons why this may be so.

Various reasons have been suggested. These include:

■ *Overpayment.* The bidding business may pay too much to acquire the target business. We saw earlier that large premia are often paid to acquire another business, which may result in a transfer of wealth from the bidding business shareholders to the target business shareholders. Hostile bids usually lead to bigger premia being paid and so may be particularly bad news for shareholders of the bidding business.

- *Integration problems.* Following a successful bid, it may be difficult to integrate the target business's operations. Problems relating to organisational structure, management style, management rivalries and so on can work against successful integration. These problems are most likely to arise in horizontal mergers where an attempt is made to fuse the systems and operations of the two separate businesses into a seamless whole. There are likely to be fewer problems with a conglomerate merger where there is no real attempt to adopt common systems or operations. The lack of success of many cross-border mergers, mentioned above, may be due to integration problems resulting from cultural differences.
- *Management neglect.* There is a risk that, following the takeover, managers may feel that the hard work has been done and expect the combined business to operate smoothly. Where the takeover has been bitterly contested, the temptation for management to ease back after the struggle may be very strong.
- *Hidden problems.* Problems relating to the target business may be unearthed following the takeover. This is most likely to arise where a thorough investigation was not carried out prior to the takeover.

Managers

Any discussion concerning winners and losers in a merger should include the senior managers of the bidding business and the target business. They are important stakeholders in their respective businesses and play an important role in takeover negotiations.

Activity 12.13

Following a successful bid, what is the likelihood of the senior managers in

(a) the bidding business, and
(b) the target business

benefiting from the merger?

(a) The managers of the bidding business are usually beneficiaries as they will manage an enlarged business, which will, in turn, result in greater status, income and security.
(b) The position of senior managers in the acquired business is less certain. In some cases, they may be retained and may even become directors of the enlarged business. In other cases, however, the managers may lose their jobs.

A study by Franks and Mayer found that nearly 80 per cent of executive directors in a target business either resign or lose their job within two years of a successful takeover. As might be expected, a higher proportion lost their jobs following a hostile bid than following a friendly bid (see reference 7 at the end of the chapter).

Where senior managers in the target business lose their jobs, generous severance packages may be on offer. Furthermore, highly paid management jobs in other businesses may beckon. This can often help to soften the blow.

Advisers

Mergers and takeovers can be very rewarding for investment advisers and lawyers employed by each business during the bid period. Whatever the outcome of the bid, it seems that they are winners. **Real World 12.8** describes how a merger between two media and entertainment giants proved highly rewarding for advisers.

Nice work (if you can get it)

Goldman Sachs stands to make about $105m for advising 21st Century Fox in its $71bn asset sale to Walt Disney and for helping Rupert Murdoch finance his new broadcasting group, in one of the most lucrative deals ever for the investment bank.

A regulatory filing by the two media companies shows that Goldman received $58m for advising 21st Century Fox since August last year, when Mr Murdoch and Bob Iger, Disney's chief executive, first met in Los Angeles to consider a transaction.

The fee collected by Goldman is lower than the $120m brought in by Morgan Stanley for advising Monsanto in its $66bn sale to Germany's Bayer, which was the highest advisory fee paid to an investment bank, according to Thomson Reuters.

Goldman will receive about $47m for providing a bridge loan and permanent financing to the new entity that will house the remainder of the Murdoch family broadcasting empire, including the Fox broadcast network and Fox News.

FT *Source*: Extract from Fontanella-Khan, J. (2018) Goldman Sachs tops $100m fees in fees from Fox-Disney deal, ft.com, 27 June.
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In recent years, concern has been expressed over the influence of advisers in stimulating merger activity. There can be a conflict between the short-term financial incentives available to advisers for promoting merger activity and the long-term economic consequences of mergers.

THE MERGER PUZZLE

A substantial body of evidence now exists, covering different time periods and across several different countries, indicating the dubious value of takeovers for bidding business shareholders. This raises the question of why businesses persist in acquiring other businesses. The answer is still unclear. Perhaps it is because takeovers satisfy the interests of managers, or perhaps it reflects Samuel Johnson's view of remarriage – the triumph of hope over experience.

Real World 12.9 sets out the thoughts of Warren Buffett on why mergers occur.

A modern fairy tale

Many managements apparently were overexposed in impressionable childhood years to the story in which the imprisoned handsome prince is released from a toad's body by a kiss from a beautiful princess. Consequently, they are certain their managerial kiss will do wonders for the profitability of Company T[arget] . . . Investors can always buy toads at the going price for toads. If investors instead bankroll princesses who wish to pay double for the right to kiss the toad, those kisses had better pack some real dynamite. We've observed many kisses

INGREDIENTS FOR SUCCESSFUL MERGERS

Although many mergers and takeovers do not add value for the bidding business's shareholders, not all are unsuccessful. Why do some succeed? What are the magic ingredients for success? Business consultancy firms often try to answer these questions, mainly through surveys of business executives that have gone through the merger process. One extensive review of the consultancy literature (see reference 8 at the end of the chapter) found that, to be successful, a merger should normally have strategic fit. In other words, it should align with the overall aims and objectives of the business. Even where this is the case, however, it seems that a merger involving businesses of equal size, or with different cultures, can be extremely difficult to implement. The review also found that mergers between businesses in the same, or related, industries that exploit existing business strengths tend to be more successful. No real surprises here then.

Perhaps more interestingly, the literature review found that the following may help to tip the balance in favour of successfully implementing a merger:

- early planning to ensure proper integration of the physical and human resources of the combined entity
- rapid integration, along with early action to secure cost savings
- identifying and incentivising managers to lead the integration process
- being aware of cultural issues and keeping the various stakeholders, such as employees and customers, fully informed
- retaining customers by ensuring that the sales force remain fully engaged
- retaining talented employees, particularly where the business is technology or human resource based.

While the importance of most of these factors will vary from merger to merger, the importance of early planning is paramount. It is seen as vital in achieving rapid gains and in building commitment to the merger.

REJECTING A TAKEOVER BID

A takeover bid may be rejected, of course. This need not imply that the bid is unwelcome and that shareholders are committed to maintaining the business as an independent entity.

What other reason might there be for rejecting a takeover bid?

It may simply be a tactic to increase the bid premium and thereby increase shareholder wealth.

If, however, it is not a negotiating tactic but a genuine attempt to remain independent, there is no certainty that rejection will be the end of the story. The spurned business may decide to press ahead with a hostile bid. Some of the defensive tactics that can be used against such a bid are considered below.

Defensive tactics

Various tactics may be used to fend off a hostile bid. Some of these must be put in place before a hostile bid is received, whereas others can be deployed when the bid has been made.
Defensive tactics to be used before a bid has been received include:

- *Conversion to private company status.* By converting to private limited company status, the business makes its shares more difficult to acquire.
- *Employee share option schemes.* Encouraging employees to acquire shares in the business is likely to increase the proportion of shareholders willing to resist a bid.
- *Maintaining good investor relations.* All shareholders should be kept fully informed of the strengths, opportunities and potential of the business, and good relations with major shareholders should be cultivated.
- *Share repurchase.* By reducing the numbers of shares in issue, it may be possible to make it more difficult for a bidder to acquire a controlling interest in the business.
- *Increasing gearing.* By the judicious use of gearing, returns to shareholders may be enhanced, which may, in turn, make a takeover more expensive. It may also make it more difficult for a predator business that is already highly geared to launch a takeover.
- *Increasing operating efficiency.* Every effort should be made to ensure that the business is operating at a high level of efficiency and profitability. This may help to ward off interest from predator businesses seeking to exploit underutilised resources.

Activity 12.15

How might the managers of a business seek to increase efficiency and profitability?

Managers may impose tight discipline through cost savings, asset disposals, productivity improvements and sales campaigns.

Once a bid has been made, defensive tactics may include:

- *Presenting the case to shareholders.* When an offer has been received, the directors of the target business will normally notify the shareholders in a circular letter. In this letter the case for rejection may be set out. It might be argued, for example, that it is not in the long-term interests of the shareholders to accept the offer, or that the price offered is too low. In support of such arguments, the managers may disclose hitherto confidential information such

as profit forecasts, asset valuations, details of new contracts and so on. The circular may also try to attack the record of the bidding business in creating value for its shareholders. At the very least, this may boost share price, thereby making the takeover more expensive (and therefore less attractive).

■ *Increasing dividend payouts.* The aim of this tactic is to signal to shareholders the directors' confidence in the future prospects of the business.

Activity 12.16

We came across this tactic when discussing dividends in Chapter 9. Can you recall the reason why it might fail?

There is a risk that it will simply be seen by shareholders as a desperate attempt by the directors to gain their support and so may be discounted.

■ *Finding a white knight.* A target business may avoid the attentions of an unwelcome bidder by seeking out another business (a **white knight**) with which to combine. This tactic will normally be used only as a last resort, however, as it will result in the loss of independence. There is also a risk that the white knight will be less gallant after the merger than was hoped.

■ *Finding a white squire.* This is a variation of the white knight tactic. In this case, a supportive business will purchase a block of shares in the target business. This will be big enough to prevent any real prospect of a takeover but will not provide a controlling interest. The **white squire** will usually be given some incentive to 'ride to the rescue', which may take the form of a seat on the board or a discount on the purchase price of the shares.

Real World 12.10 describes how a takeover bid by Kraft Heinz, the food business, to acquire Unilever, the nutrition, hygiene and personal care business, was successfully fought off.

Real World 12.10

An offer it can refuse

In 2016, Kraft Heinz, which is controlled by Warren Buffett's Berkshire Hathaway and the private equity business 3G Capital, made an unexpected bid to acquire Unilever. The bid was rejected by the Unilever board as it wished to retain the ethos and culture of the business. It opposed the business model of 3G Capital, with its sharp focus on shareholder value and a fondness for ferocious cost cutting. In the words of the chief executive of Unilever, Paul Polman, the bid was 'clearly a clash between a long-term, sustainable business model for multiple stakeholders and a model that is entirely focused on shareholder primacy.' When rejecting the deal, the Unilever board stated that the bid price was too low and the proposed deal made no strategic sense.

Once the bid had been received, Paul Polman and finance director, Graeme Pitkethly, set up a sub-group to move quickly and reply to Kraft Heinz. Mr Polman said 'We made very clear that we were not interested. They didn't hear us for some reason. We sent letters. They didn't read them for some reason.' Advisers were hired. 'You get 20 lawyers around you and 50 bankers, and basically the lawyers all tell you what you cannot do. They never tell you what you can do. And the last thing you want to hear is what you cannot do.'

Mr Polman knew that, without decisive action, activist investors could pile into Unilever on the Monday, giving succour to Kraft Heinz – 'these people have a history of not giving up'.

It then became apparent to Mr Polman that Warren Buffett did not seem aware that the offer would have to go hostile to succeed – the Sage of Omaha has always publicly opposed hostile takeovers. 'Unknown to us at that time, Warren wasn't actively involved. With the confidence he has, probably, in those people, he had delegated [the bid] to these people – that would be my best interpretation,' says Mr Polman. Mr Buffett was duly bombarded. 'Warren was approached by probably more people than he expected,' says Mr Polman, declining to say who did so. 'As soon as Warren discovered that this was a hostile takeover, the tone of the conversation became different.'

In its statement 'amicably' agreeing to desist, Kraft Heinz said it had 'the utmost respect for the culture, strategy and leadership of Unilever'.

Footnote: Bono, the rock singer and campaigner, opposed the takeover bid and even offered to write a song for Unilever. Thankfully, this novel defensive tactic was not required.

FT *Source*: Adapted from Daneshkho, S. and Barber, L. (2017) Paul Polman: how I fended off a hostile takeover bid, ft.com, 3 December.

There are other defensive tactics, which are acceptable in some countries, but which are not normally acceptable to regulatory authorities in the UK. These include:

■ *Making the business unattractive.* Managers may take steps to make the business unattractive to a bidder. In the colourful language of mergers, this may involve taking a **poison pill** through the sale of prized assets of the business (the **crown jewels**). Other tactics include agreements to pay large sums to directors for loss of office resulting from a takeover (**golden parachutes**) and the purchase of certain assets that the bidding business does not want.
■ *Making a counterbid.* The target business may launch a counterbid for the bidding business. However, this tactic is difficult to carry out where the target business is much smaller than the bidding business. (This is often referred to as the **pac-man defence** and derives its name from a well-known computer game.)

Real World 12.11 shows that modern tactics used to resist takeover attempts are pretty tame when compared with those used in the US during the 19th century.

Real World 12.11

Defensive tactics – Western style

The following is a brief description of a 'Wild West' style takeover battle that involved an attempt to take control of the Erie Railway in 1868:

> The takeover attempt pitted Cornelius Vanderbilt against Daniel Drew, Jim Fisk and Jay Gould. As one of the major takeover defences, the defenders of the Erie Railway issued themselves large quantities of stock (that is, shares), even though they lacked the authorisation to do so. At that time, bribery of judges and elected officials was common, and so legal remedies for violating corporate laws were particularly weak. The battle for control of the railway took a violent turn when the target corporation hired guards, equipped with firearms and cannons, to guard their headquarters. The takeover attempt ended when Vanderbilt abandoned his assault on the Erie Railway and turned his attention to weaker targets.

Source: Gaughan, P. (2002) *Mergers, Acquisitions, and Corporate Restructurings*, 3rd edn, John Wiley & Sons Inc. p. 27.

Overcoming resistance to a bid

Managers of the bidding business may try to overcome resistance to the bid by circularising shareholders of the target business with information that counters any claims made against the commercial logic of the bid or the offer price. They may also increase the offer price for the shares in the target business. In some cases, the original offer price may be pitched at a fairly low level as a negotiating ploy. The offer price will then be increased at a later date, thereby allowing the target business's managers and shareholders to feel that they have won some sort of victory.

DUE DILIGENCE

Before committing to the takeover of another business, the prospective buyer should carry out due diligence procedures. This involves a thorough appraisal of the risks, obligations and overall health of the target business. Key areas for investigation may, therefore, include:

- *Financial health.* The current, past and forecast financial position and performance of the target business.
- *Legal obligations.* Any onerous contracts and commitments entered into by the target business and key regulatory requirements affecting the business.
- *Assets owned.* The nature, condition and suitability of property, equipment and other assets owned.
- *Strategic fit.* The extent to which the acquisition aligns with the overall objectives of the bidding business.
- *Market prospects.* The market share and reputation of the target business's products, the degree of competition within the industry, technological changes affecting the business and the state of the order book.
- *Key relationships.* Relations with customers, suppliers, employees and other key stakeholders.
- *Marketing and production.* Marketing and pricing strategies as well as production plans relating to output, R&D and use of sub-contractors.
- *Other issues.* Including such matters as environmental obligations, key insurance policies and tax liabilities.

The above list is not meant to be exhaustive. All necessary steps should be taken to confirm key facts and to ensure a proper examination of significant issues before finalising the deal.

Activity 12.17

We discussed the need to carry out due diligence in a previous chapter. Can you recall in which context it was raised?

It was discussed in the context of business angels and private equity investments (Chapter 7). The topics identified above would also be relevant when undertaking due diligence for these investments.

PROTECTING SHAREHOLDERS AND THE PUBLIC

To protect the interests of shareholders of both the bidding business and the target business, there is the City Code on Takeovers and Mergers. The Code sets out rules for conducting takeover activity in an orderly manner and has statutory underpinning. It seeks to ensure that all shareholders are treated equally when a takeover is being negotiated. The Code requires shareholders to be supplied with the information needed to make a proper decision. Forecasts provided by both parties to the bid must be carefully prepared and key assumptions underlying the forecast figures must be stated. Furthermore, time limits must be set for each stage of a takeover bid. The Code is issued and administered by the Panel on Takeovers and Mergers. This is an independent body that draws its membership from major business and financial institutions.

Protecting the interests of the consumer also becomes a consideration when larger businesses combine. Where a business with UK sales revenue in excess of £70 million is being taken over, or where the combined business has a 25 per cent share of a particular market, the proposed merger may be investigated by the **Competition and Markets Authority (CMA)**. This is an independent public body charged with ensuring that a merger does not adversely affect competition within a market.

Activity 12.18

Try to think of at least two ways in which a merger that reduces competition might adversely affect the consumer.

The consumer could be adversely affected through:

- higher prices
- reduced choice
- lower quality.

Where the CMA believes that competition within a market would be substantially lessened by a merger it has power to take action. This may involve imposing conditions on the merger, such as the sale of part of the business to be acquired, or preventing the merger from taking place.

The CMA obtains information concerning proposed and completed mergers from different sources. Though there is no requirement to do so, the businesses involved may notify the CMA directly of a proposed merger. If an investigation is launched, it may take several months to carry out. The delay and trouble this causes can make the bid less attractive to the bidding business. It can therefore play into the hands of managers of a target business who are fending off a hostile bid.

MERGERS AND CONGLOMERATES

Arguments against diversification as a motive for mergers raise doubts about the need for large conglomerate businesses. These doubts have been fuelled by studies showing that conglomerates do not often deliver on promised synergies. Furthermore, attempts to 'pick winners' lead to reinvesting surplus funds into their weaker operations, resulting in waste and inefficiency (see reference 9 at the end of the chapter). As a result, conglomerates' shares frequently trade at a significant discount to the market.

The conglomerate form, however, still retains some support. Warren Buffett is chairman and CEO of the highly successful conglomerate Berkshire Hathaway Inc. He believes, unsurprisingly, that this type of business structure has much to commend it. **Real World 12.12** below sets out his views.

The case for the defence

If the conglomerate form is used judiciously, it is an ideal structure for maximising long-term capital growth. One of the heralded virtues of capitalism is that it efficiently allocates funds. The argument is that markets will direct investment to promising businesses and deny it to those destined to wither. That is true: With all its excesses, market-driven allocation of capital is usually far superior to any alternative.

Nevertheless, there are often obstacles to the rational movement of capital. A CEO with capital employed in a declining operation seldom elects to massively redeploy that capital into unrelated activities. A move of that kind would usually require that long-time associates be fired and mistakes be admitted. Moreover, it's unlikely *that* CEO would be the manager you would wish to handle the redeployment job even if he or she was inclined to undertake it.

At the shareholder level, taxes and frictional costs weigh heavily on individual investors when they attempt to reallocate capital among businesses and industries. Even tax-free institutional investors face major costs as they move capital because they usually need intermediaries to do this job. A lot of mouths with expensive tastes then clamour to be fed – among them investment bankers, accountants, consultants, lawyers and such capital re-allocators as buyout operators. Money-shufflers don't come cheap.

In contrast, a conglomerate such as Berkshire is perfectly positioned to allocate capital rationally and at minimal cost. Of course, form itself is no guarantee of success: We have made plenty of mistakes, and we will make more. Our structural advantages, however, are formidable.

At Berkshire, we can – without incurring taxes or much in the way of other costs – move huge sums from businesses that have limited opportunities for incremental investment to other sectors with greater promise. Moreover, we are free of historical biases created by lifelong association with a given industry and are not subject to pressures from colleagues having a vested interest in maintaining the status quo. That's important: If horses had controlled investment decisions, there would have been no auto industry.

Source: Buffett, W. (2014) Shareholders Letter, Berkshire Hathaway Inc., www.berkshirehathaway.com, p. 30.

In a study of 39 conglomerates that managed to be successful over a 20-year period, the Boston Consulting Group found they possessed two distinguishing features. The first was the use of strict criteria when selecting businesses for their portfolio. They only acquired businesses that had similar business models and underlying economics. This allowed them to manage their various businesses using similar systems and structures. The second feature was the identification of managers responsible for growing each business and making them accountable. A 'no excuses' culture operated and failure to meet non-negotiable targets led to severe consequences (see reference 10 at the end of the chapter).

RESTRUCTURING A BUSINESS: DIVESTMENTS AND DEMERGERS

A business may wish to decrease, rather than increase, its scale of operations. This can be done through either a divestment or a demerger. Each of these is discussed below.

Divestment

A **divestment** involves selling off part of the business's operations to a third party. This may be carried out for various reasons, including:

- *Financial problems.* A business that is short of cash, or too highly geared, may sell off certain operations to improve its financial position.
- *Defensive tactics.* A business that is vulnerable to a takeover may take pre-emptive action by selling its 'crown jewels'. This would be a fairly drastic step for a business but may be necessary in order to retain its independence.
- *Strategic focus.* A business may wish to focus exclusively on 'core' operations. That is, those operations which align with its strategic objectives. As a consequence, non-core operations will be sold off.
- *Poor performance.* Where the performance of a particular business operation is disappointing, it may be sold off to enable more profitable use of resources.
- *Reverse synergy.* The value of the sum of the individual parts of a business may be greater than the whole. In such circumstances, selling off individual business operations may unlock shareholder value.

Activity 12.19

Can you think of a type of business that may be particularly susceptible to this reverse synergy problem? (*Hint*: We considered it earlier in the chapter.)

This may occur with a conglomerate business where positive synergies have not been gained and where senior managers struggle to control its different operations. Shareholders may also find it difficult to value the whole business because of its diversity.

Real World 12.13 provides an example of a large business selling part of its operations to improve its strategic focus.

Real World 12.13

Keeping focused

Essentra plc, a component manufacturing and packaging business, made a divestment of Swiftbrook, a paper merchant based in Dublin. Commenting on the divestment, Paul Forman, Chief Executive, said:

> The sale of our Swiftbrook business is reflective of the portfolio assessment which we are continuing to undertake, to ensure that we focus both our people and investment resource on those activities where we have identified that Essentra has real strategic strengths.

FT *Source*: Adapted from Divestment of Swiftbrook in Packaging Division, Company announcements, ft.com, 31 July 2018.
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The reasons for divestment discussed above are summarised in Figure 12.5.

There are five common reasons for a divestment, as explained above.
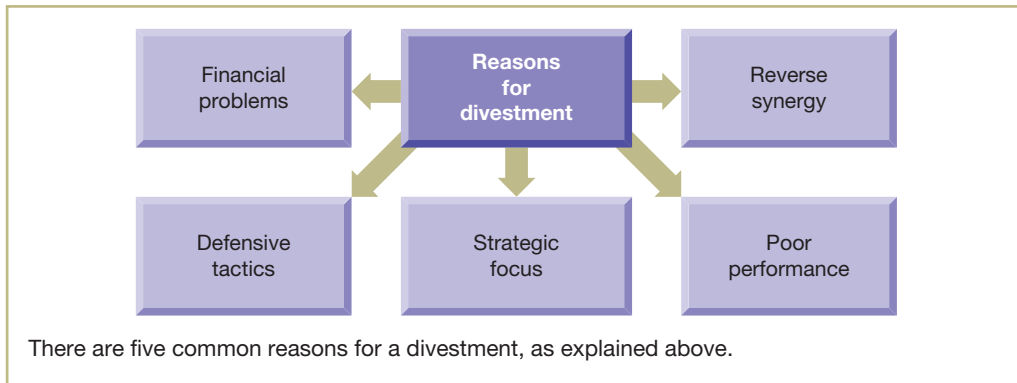
Figure 12.5 Common reasons for divestment

Divestment and the agency problem

When a sell-off is undertaken, the managers of the particular business operations may bid to become the new owners. However, this may give rise to a conflict of interest.

Activity 12.20

Why might the managers experience a conflict of interest?

Managers have a duty to act in the interests of the shareholders. This means they should try to ensure that the sale of the business operations will maximise shareholders' wealth. By increasing the selling price, however, they will be increasing the cost they must incur for acquiring the operations.

This conflict of interest creates a risk that unscrupulous managers will suppress important information or will fail to exploit profitable opportunities in the period leading up to a buyout in order to obtain the business operations at a cheap price. Shareholders must be aware of this risk and should seek independent advice concerning the value and potential of the business operations for which the managers are bidding.

Demerger

Rather than business operations being sold off to a third party, they may be transferred to a newly created business. This kind of restructuring is referred to as a **demerger** or **spin-off**. In this case, ownership of the business operations remains unchanged as the current owners will be given shares in the new business. The allocation of shares to the owners is usually made in proportion to their shareholdings in the existing business.

The reasons for a demerger overlap with those for a divestment. Thus, a demerger may be used as a defensive tactic in a takeover bid and/or may help to provide greater strategic focus to the business. It may also help to unlock shareholder value. This last point may result from the effects of reverse synergy, mentioned earlier, or because managers of the newly created business perform more effectively when given greater autonomy.

Real World 12.14 considers some further issues concerning divestments.

Thinking about shrinking

A recent paper from McKinsey calculates that in a sample of almost 60 large spinoffs since 1992, average operating margins rose markedly over the following five years – both in the spinoff and the parent. In one sense, this is what we should expect. The growth gene in successful companies means their boards have a bias towards acquisition, which tends on average to destroy value. Reducing the scale of the corporation goes against the grain – particularly for executives whose remuneration is tied to size. The case for a big disposal or demerger must therefore be the more compelling.

There are other deterrents to getting smaller. Disposing of a business may be seen as strategic weakness – consider how commentators have leapt swiftly from Tesco's minor exit from Japan to speculating about a bigger one from the US. Boards may also worry about losing economies of scale. But logic also points the opposite way.

Corporations, like states, have a natural tendency towards bureaucracy. And while growth in scale economies – purchasing power, for instance – tends to be linear, that in bureaucracy tends to be exponential. Thus, as a corporation moves from small to medium size its operating staff – in manufacturing, in sales, in accounts – will grow in parallel. But as it gets bigger again, whole new functions sprout up – treasury, legal, investor relations and so forth. All those are costs that must be pushed down to the divisions. But suppose a given division already has the necessary scale within its own market. Hive it off, and it will retain scale economies while shedding the bureaucratic overhead. Hive off enough divisions, and the parent can shed the overhead as well.

A poorly performing division will be unloved. Fixing it properly would mean more immediate damage to the bottom line than leaving it alone. It would also draw attention to the division's underperformance, and carry the risky promise of improvement. Alternatively, the division may be in an industry which needs consolidation. It might be qualified to lead that process. Getting the board to put cash behind it might be another question.

Does that mean small is necessarily beautiful? Not so fast.

Big companies, if properly run, can allocate cash to advantage across their divisions. The purist might say that is unnecessary; any spare cash should be returned to shareholders, who will allocate it themselves. But that presupposes the corporation has no particular skills that the shareholders lack. The whole premise of investing in Berkshire Hathaway over the years has been that Warren Buffett is better at spending his cash flow than outsiders would be.

Big corporations also have the edge in raising debt capital. Banks will lend to them below cost in hopes of corporate and advisory business. Bond markets are open to them when they are closed to smaller and less liquid borrowers.

And big corporations play an important role in buying out entrepreneurs who – as very often happens – have reached their personal wealth targets and would rather quit the game than double up. If the function of entrepreneurs is to take the initial risk, it is usually that of big business to carry it forward and diversify it.

Horses for courses then. But the general case is clear. If I were a portfolio manager, I would sooner back divesters than acquirers any day.

Finally, it is worth emphasising a point made in Real World 12.14. Both forms of restructuring will result in a smaller business. Thus, any benefits arising from size, such as economies of scale and greater protection from takeover, will be lost.

THE VALUATION OF SHARES

An important aspect of any merger or takeover negotiation is the value to be placed on the shares of the businesses to be merged or acquired. In this section, we explore various methods that can be used to derive an appropriate share value for a business. Share valuation methods are not, of course, used only in the context of merger or takeover negotiations; they will also be required in other circumstances such as business flotations and liquidations. Nevertheless, mergers and takeovers are an important area for their application.

In theory, the value of a share can be defined in terms of either the current value of the assets held or the future cash flows generated from those assets. In a world of perfect information and perfect certainty, share valuation would pose few problems. However, in the real world, measurement and forecasting problems conspire to make the valuation process difficult. Various valuation methods have emerged to deal with these problems, but often produce quite different results.

The main methods employed to value a share can be divided into three broad categories:

- methods based on the value of a business's net assets
- methods that use stock market information
- methods based on future cash flows.

To examine the more important methods falling within each of these categories, we shall use Example 12.2.

Example 12.2

CDC Ltd owns a chain of tyre and exhaust-fitting garages. The business has been approached by ATD plc, which owns a large chain of motor service stations, with a view to a takeover of CDC Ltd. ATD plc is prepared to make an offer in cash or a share-for-share exchange. The most recent financial statements of CDC Ltd are summarised below.

Income statement for the year ended 30 November Year 8

	£m
Sales revenue	18.7
Operating profit	6.4
Interest	(1.6)
Profit before taxation	4.8
Tax	(1.2)
Profit for the year	3.6

$\rightarrow$

Statement of financial position as at 30 November Year 8

	£m
ASSETS	
Non-current assets (cost less depreciation)	
Property	4.0
Plant and machinery	5.9
	9.9
Current assets	
Inventories	2.8
Trade receivables	0.4
Bank	2.6
	5.8
Total assets	15.7
EQUITY AND LIABILITIES	
Equity	
£1 ordinary shares	2.0
Retained earnings	3.6
	5.6
Non-current liabilities	
Loan notes	3.6
Current liabilities	
Trade payables	5.9
Tax	0.6
	6.5
Total equity and liabilities	15.7

The accountant for CDC Ltd has estimated the future free cash flow of the business to be as follows:

Year 9	Year 10	Year 11	Year 12	Year 13
£4.4m	£4.6m	£4.9m	£5.0m	£5.4m

After Year 13, the free cash flows are expected to remain constant at £5.4 million for the following 12 years. The business has a cost of capital of 10 per cent.

CDC Ltd has recently had a professional valuer to establish the current resale value of its assets. The current resale value of each asset group was as follows:

	£m
Property	18.2
Plant and machinery	4.2
Inventories	3.4

The current resale values of the remaining assets are considered to be in line with their values as shown on the statement of financial position.

A business listed on the Stock Exchange, which is in the same industry as CDC Ltd, has a gross dividend yield of 5 per cent and a price/earnings ratio of 11 times. It also has a share price to sales ratio of 2.4 times.

The chief financial officer (CFO) believes that replacement costs are £1 million higher than the resale values for both property and plant and machinery, and £0.5

million higher than the resale value of the inventories. The replacement costs of the remaining assets are considered to be in line with their statement of financial position values. In addition, the CFO believes that brands held by the business, which are not shown on the statement of financial position, have a replacement value of £10 million. The values of liabilities, as shown on the statement of financial position, reflect their current values.

Asset-based methods

Asset-based methods attempt to value a share by reference to the value of the net assets (that is, total assets less liabilities) held by the business. Shareholders own the business and so own the underlying net assets. The total value of these net assets represents the total shareholders' worth. A single ordinary share can, therefore, be valued by dividing the total value of the net assets by the number of ordinary shares in issue.

Net assets (book value) method

The simplest approach is to use the statement of financial position (book) values of the assets held. The **net assets (book value) method** will determine the value of an ordinary share (P_0) as follows:

$$P_0 = \frac{\text{Net assets at statement of financial position values}}{\text{Number of ordinary shares issued}}$$

Where preference shares are in issue, they must also be deducted (at their statement of financial position value) from total assets to obtain the value of an ordinary share.

Activity 12.21

Calculate the net assets (book value) of an ordinary share in CDC Ltd.

The value of an ordinary share (P_0) will be:

$$P_0 = \frac{(15.7 - (3.6 + 6.5))}{2.0}$$
$$= £2.80$$

This method has the advantage that the valuation process is straightforward and the data are easy to obtain. The share value derived, however, usually provides a conservative figure. Some intangible assets, such as internally generated goodwill and brand names, may not be reported on the statement of financial position and will, therefore, be ignored for the purposes of valuation. In addition, assets shown on the statement of financial position are often reported at their original cost (less any depreciation to date, where relevant), which may be below their current market value. During a period of inflation, the current market values of certain assets held, such as property, normally exceed their original cost.

For businesses listed on the Stock Exchange it is possible to compare the current market price of a share with its net asset (book) value. **The price/book value (P/B) ratio**, which is expressed as a number of times, is calculated as follows:

$$\text{P/B ratio} = \frac{\text{Market value per share}}{\text{Net asset (book) value per share}}$$

Real World 12.15 sets out the average price/book value ratios of European listed businesses operating in different industries. Assuming that the market price of a share is a reasonable guide to its intrinsic value, this ratio highlights the conservative nature of the net asset (book) value figure for valuation purposes.

Real World 12.15

Going by the book

The average price/book value ratio for different industries in Western Europe is shown in Figure 12.6.

The figure shows a wide range of values for this ratio.
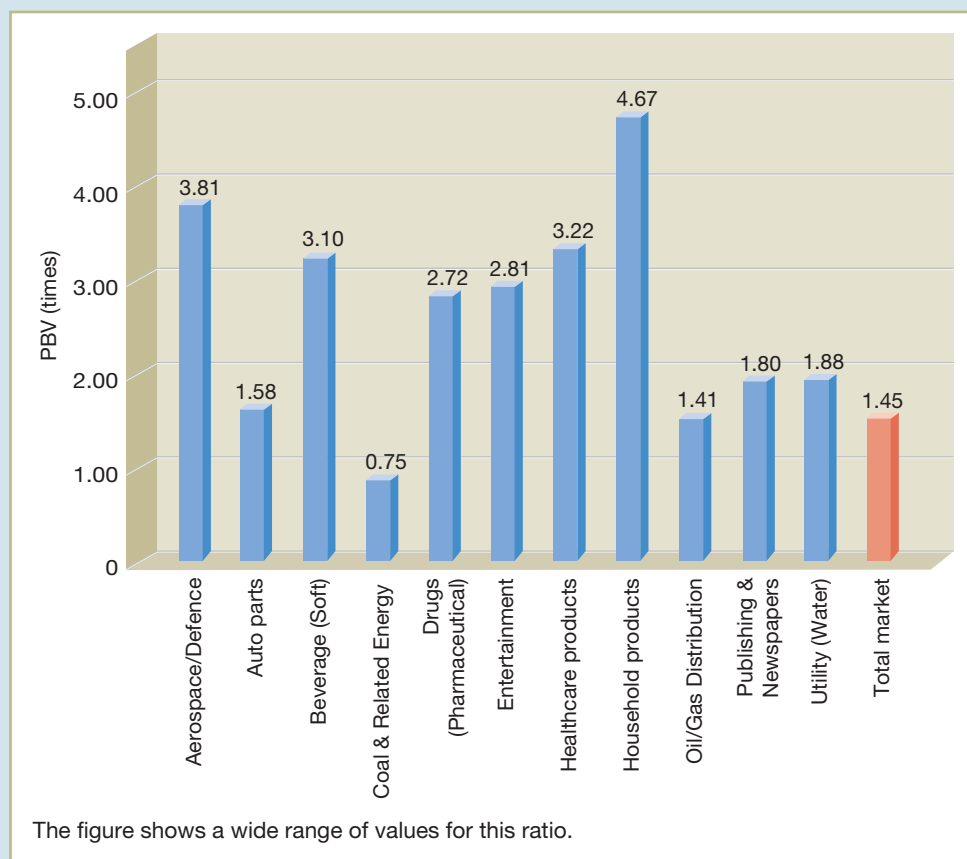
Figure 12.6 Average P/B value ratios for selected industries in Western Europe

In the context of takeovers, the net asset (book) value figure may be used to measure 'downside' risk. Where the bid price is close to this figure, the level of investment risk is likely to be small. The market price of a share in a listed business, for example, will not normally dip below the net asset (book) value figure.

Current market value methods

The current market value of net assets may also be used as a basis for valuation. In economic theory, the value of an asset (such as a share in a business) should reflect the present value of future benefits generated. Furthermore, the current market value of an asset should reflect the market's view of the present value of these future benefits as investors will be prepared to pay up to this amount to acquire the asset. Current market values can be expressed in terms of either:

1 **net realisable values**, which reflect the price obtained from the resale of the assets, less any selling costs, or
2 replacement costs, which reflect the cost of replacing the assets with identical assets in the same condition.

The **net assets (liquidation) method** values the assets held according to their net realisable values that could be obtained in an orderly liquidation of the business. It adopts the same basic equation as before, but uses net realisable values instead of statement of financial position values for assets and liabilities. Thus, the value for an ordinary share is calculated as follows:

$$P_0 = \frac{\text{Net assets at net relisable values}}{\text{Number of ordinary shares issued}}$$

Activity 12.22

Calculate the value of an ordinary share in CDC Ltd using the net assets (liquidation) method.

The value for an ordinary share will be:

$$P_0 = \frac{((18.2 + 4.2 + 3.4 + 0.4 + 2.6) - (6.5 + 3.6))}{2.0}$$
$$= £9.35$$

Although an improvement on the previous method, the net assets (liquidation) method is also likely to provide a conservative share value. This is because it fails to take account of the value of the business as a going concern. Normally, this is higher than the sum of the individual values of assets, when sold piecemeal, because of the benefits from combining them. Net

realisable value represents a lower limit for the current market value of an asset. The value of an asset *in use* is normally greater than its net realisable value. If this were not the case, the asset would be sold rather than held.

Using net realisable values may present practical difficulties. Where, for example, the asset is unique, such as a custom-built piece of equipment, it may be impossible to obtain a reliable figure. Furthermore, any goodwill, which normally exists only when the business is a going concern, will not be included in the calculations. Finally, net realisable values may vary according to the circumstances of the sale. The amount obtained from a hurried sale may be much lower than that obtained from an orderly, managed, sale.

The **net assets (replacement cost) method** can also be used to derive a share value. Once again the basic equation of the net assets (book value) method is tweaked so that it now becomes:

$$P_0 = \frac{\text{Net assets at replacement cost}}{\text{Number of ordinary shares issued}}$$

This approach takes account of the brand values of CDC Ltd as well as the other assets held. The amount derived represents an upper limit for the market value of assets held.

Activity 12.23

Calculate the value of an ordinary share in CDC Ltd using the net assets (replacement cost) method.

This will yield the following value for an ordinary share:

$$P_0 = \frac{((19.2 + 5.2 + 3.9 + 0.4 + 2.6 + 10.0) - (3.6 + 6.5))}{2.0}$$

$$= £15.60$$

Using replacement costs may also present practical difficulties. Where there is no active market for assets, such as brand values, or where major technological changes occur, such as with computers, deriving accurate replacement costs can be a problem.

Stock market methods

Where a business is listed on the Stock Exchange, the quoted share price usually provides a reliable guide to its economic value. We saw in Chapter 7 that the efficiency of stock markets means that share prices tend to react quickly and in an unbiased manner to new information. As information is fully absorbed in share prices it implies that, until new information becomes available, share prices reflect the market's view of its true worth.

It is possible to use stock market information and ratios to help value the shares of an unlisted business. The first step in this process is to find a listed business within the same industry that has similar risk and growth characteristics. Stock market ratios relating to the listed business can then be applied to the unlisted business in order to derive a share value. Three ratios that can be used in this way are the price/earnings ratio, price/sales ratio and the dividend yield ratio.

Price/earnings ratio method

We saw earlier that the equation for the P/E ratio can be rearranged so that:

> **Market value per share (P_0) = P/E ratio × Earnings per share**

Using this equation, the market value is a multiple of the current earnings per share. It is forward looking as the P/E ratio reflects the market's view of the prospects for the business: the higher the P/E ratio, the better the prospects.

To derive a share value, the P/E ratio of a listed business can be applied to the earnings per share of a similar unlisted business. The value of an ordinary share of an unlisted business is therefore:

> **P_0 = P/E ratio of a similar listed business × Earnings per share (of unlisted business)**

Activity 12.24

Calculate the value of an ordinary share in CDC Ltd using the P/E ratio method.

The value of an ordinary share using the P/E ratio method will be:

$$P_0 = 11 \times \frac{£3.6 \,(\text{earnings available to shareholders})}{2.0 \,(\text{number of ordinary shares})}$$
$$= £19.80$$

We can see that the valuation calculations are very straightforward. However, employing the P/E ratio method, in practice, poses a number of difficulties. They include:

- finding a listed business with similar risk and growth characteristics. (Even if one can be found, this does not guarantee that the market price of its shares provides a good indicator of their intrinsic value.)
- making suitable adjustments for differences in accounting policies and accounting year-ends between the two businesses being compared.
- making suitable adjustments for differences in operational policies on matters such as directors' remuneration between the two businesses.
- modifying the calculated share value to take account of the fact that shares in unlisted businesses are less marketable than those of similar listed businesses. (To do this, an arbitrary discount, say 30 per cent, may be applied.)
- revising earnings per share where it is not considered representative of the long-run average figure.

To deal with the last problem identified, a variant of the P/E ratio may be employed. The cyclically adjusted price/earnings (CAPE) ratio uses the inflation-adjusted, average earnings per share for the previous ten years in the calculation. This smooths out earnings per share over the business cycle as well as fluctuations arising from unusual events.

Price/sales ratio method

Where an unlisted business is at an early stage of development and has yet to generate earnings, the P/E ratio method cannot be used. However, another market-based multiple, the **prices/sales (P/S) ratio**, can still be used. This ratio is as follows:

$$\text{P/S ratio} = \frac{\text{Market value per share}}{\text{Sales revenue per share}}$$

where sales revenue for the past year is normally used in the equation.

When used for valuation purposes, this ratio can be rearranged so that:

$$P_0 = \text{P/S ratio of similar listed business} \times \text{Sales revenue per share (of unlisted business)}$$

Activity 12.25

Calculate the value of an ordinary share in CDC Ltd using the price/sales ratio method.

First we must calculate the sales revenue per share. This is:

$$\text{Sales revenue per share} = \frac{\text{Sales revenue}}{\text{No. of ordinary shares}}$$
$$= \frac{18.7}{2.0}$$
$$= £9.35$$

The value of an ordinary share using the P/S ratio method will be:

$$P_0 = 2.4 \times £9.35$$
$$= £22.44$$

This valuation method must be treated with caution. It implicitly assumes that the two businesses being compared have similar capital structures. Any differences in the way in which their equity and long-term borrowings are configured, will undermine the share price figure derived. This method also implicitly assumes that sales revenue provides a useful guide to profitability. In some cases, however, sales revenue and profits may move in opposite directions. For example, higher sales may only be achieved through expensive marketing and generous customer discounts. Given the limitations of this valuation method, it is probably best if it is used only as a supplement to other methods.

Dividend yield ratio method

The *dividend yield ratio*, which was discussed in Chapter 3, relates the cash return from dividends to the current market value per share. It is calculated as follows:

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market value per share}} \times 100$$

The dividend yield can be calculated for shares listed on the Stock Exchange as both the market value per share and the dividend per share will normally be known. However, for unlisted businesses, the market value per share is not normally known and therefore this ratio cannot be applied.

The above equation can be expressed in terms of the market value per share by rearranging as follows:

$$\text{Market value per share}(P_0) = \frac{\text{Dividend per share}}{\text{Dividend yield}} \times 100$$

This rearranged equation can be used to value the shares of an unlisted business. For this purpose, the dividend per share of the unlisted business, whose shares are to be valued, and the dividend yield of a similar listed business are used in the equation.

Activity 12.26

Calculate the value of an ordinary share in CDC Ltd using the dividend yield method.

The value of an ordinary share using the dividend yield method will be:

$$P_0 = \frac{0.5}{5} \times 100$$
$$= £10.00$$

This approach to share valuation has a number of weaknesses. Once again, there is the problem of finding a similar listed business as a basis for the valuation. Furthermore, dividend policies may vary considerably between businesses in the same industry. They may also vary between listed and unlisted businesses. One reason for this is that unlisted businesses are under less pressure to pay a smooth pattern of dividends than listed businesses.

Dividends represent only part of the earnings stream of a business, and to value shares on this basis may be misleading. The valuation obtained will be largely a function of the dividend policy adopted (which is at the discretion of management) rather than the earnings generated. Where a business does not make dividend distributions, this method cannot be applied.

Cash flow methods

We have already seen that the value of an asset is equivalent to the present value of the future cash flows that it generates. The most direct, and theoretically appealing, approach is, therefore, to value a share on this basis. The dividend valuation method and free cash flow method adopt this approach and both are discussed below.

Dividend valuation method

The cash returns from holding a share take the form of dividends received. It is possible, therefore, to view the value of a share in terms of the stream of future dividends received. We have

already seen in Chapter 8 that the value of a share will be the *discounted value of the future dividends received* and can be shown as:

$$P_0 = \frac{D_1}{(1 + K_0)} + \frac{D_2}{(1 + K_0)^2} + \cdots + \frac{D_n}{(1 + K_0)^n}$$

where

$D_{1,2,\ldots,n}$ = the divident received in periods $1, 2, \ldots, n$
$\qquad K_0$ = required rate of return on the share.

Although this model is theoretically appealing, there are practical problems in forecasting future dividend payments and in calculating the required rate of return on the share. The first problem arises because dividends tend to fluctuate over time. If, however, dividends can be assumed to remain constant over time, we have already seen that the discounted dividend model can be reduced to:

$$P_0 = \frac{D_1}{K_0}$$

where D_1 = the annual dividend per share in Year 1.

Activity 12.27

Assume that CDC Ltd has a constant dividend payout and the cost of ordinary share capital is estimated at 12 per cent. Calculate the value of an ordinary share in the business using the discounted dividend approach.

The value of an ordinary share using the discounted dividend approach will be:

$$P_0 = \frac{0.5\,(\text{that is},1.0m/2.0m)}{0.12}$$

$$= £4.17$$

The assumption of constant dividends may not be very realistic, however, as many businesses try to increase dividends to shareholders over time.

We saw in Chapter 8 that where businesses increase their dividends at a constant rate of growth, the discounted dividend model can be revised to:

$$P_0 = \frac{D_1}{K_0 - g}$$

where g = the constant growth rate in dividends (the model assumes K_0 is greater than g).

When employing this model, the practical problems of forecasting usually result in the use of simplifying assumptions. An attempt may be made to estimate dividend payments for a manageable forecast horizon (perhaps, five to ten years). Thereafter, accurate forecasting becomes impossible. For dividends beyond the forecast horizon, a constant growth rate may

then be assumed. In other words, the future dividend stream will be divided into two separate elements: the first element based on dividend estimates over a particular forecast horizon, and the second representing dividends beyond the forecast horizon (and involving the use of a simplifying assumption). Although avoiding one problem, this approach creates another: deciding on an appropriate growth rate to use. This decision is important as the share value produced is highly sensitive to this variable.

Activity 12.28

Derriford (Engineering) plc is expected to announce a dividend of £0.40 per share for the forthcoming year. The cost of equity is estimated at 12 per cent. What is the estimated market value of an ordinary share assuming an annual growth rate in dividends of:

(a) 10 per cent and
(b) 7 per cent?

Using the formula:

$$P_0 = \frac{D_1}{K_0 - g}$$

(a) $P_0 = (£0.40/(0.12-0.10)) = £20.00$
(b) $P_0 = (£0.40/(0.12-0.07)) = £8.00$

Thus, a 3 per cent reduction in the growth rate in dividends has led to a 60 per cent reduction in the calculated market value of an ordinary share.

Figure 12.7 illustrates the two-stage valuation process described above.

The figure shows how the future dividend stream is divided into two elements in order to provide a value for a share. In the previous chapter a similar approach was used when making SVA calculations beyond the planning horizon.
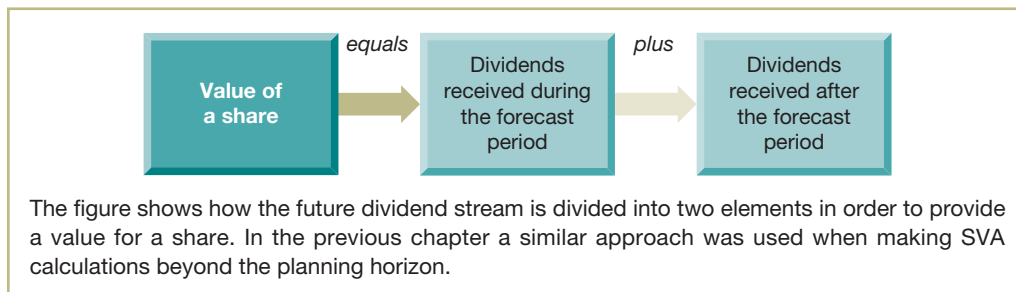
Figure 12.7 Dividend valuation method

As mentioned earlier, the use of dividends as a basis for valuation can create difficulties because of their discretionary nature. Different businesses will adopt different dividend pay-out policies and this can affect the calculation of share values. In some cases, no dividends may be declared by a business for a considerable period. High-growth businesses, for example, often prefer to plough back profits into the business rather than make dividend payments.

Free cash flow method

Another approach to share valuation is to value the free cash flows generated over time. Free cash flows were considered in Chapter 11. They represent the cash flows available to lenders and shareholders after any new investments in assets. In other words, they are

equivalent to the net cash flows from operations after deducting tax paid and cash for new investment.

The valuation process is the same as the process that we looked at in Chapter 11. To value shares using free cash flows, we have to discount the future free cash flows over time, using the cost of capital. The present value of the free cash flows, after deducting amounts owing to long-term lenders at current market values, will represent that portion of the free cash flows that accrues to the ordinary shareholders. If this amount is divided by the number of ordinary shares in issue, we have a figure for the value of an ordinary share. Hence, the value of an ordinary share will be:

$$P_0 = \frac{\text{Present value of future free cash flows} - \text{Long-term loans at current market values}}{\text{Number of ordinary shares issued}}$$

Activity 12.29

Calculate the value of an ordinary share in CDC Ltd using the free cash flow method.

The value of an ordinary share will be calculated as follows:

	Cash flow	Discount rate	Present value
	£m	10%	£m
Year 9	4.4	0.91	4.00
Year 10	4.6	0.83	3.82
Year 11	4.9	0.75	3.68
Year 12	5.0	0.68	3.40
Next 13 years	5.4	4.90*	26.46
Total present value			41.36

$$P_0 = \frac{\text{Total present value} - \text{Long-term loans at current market value}^\dagger}{\text{Number of ordinary shares}}$$

$$= \frac{41.36 - 3.6^\ddagger}{2.0}$$

$$= £18.88$$

* This is the total of the individual discount rates for the 13-year period. This shortcut can be adopted where cash flows are constant. For the sake of simplicity, it is assumed that there are no cash flows after the 13-year period.

$\dagger$ This method, unlike the net asset methods discussed earlier, does not deduct short-term liabilities in arriving at a value per share. This is because they are dealt with in the calculation of free cash flows.

$\ddagger$ We are told in the example that the statement of financial position value of liabilities reflects their current market values.

We saw in Chapter 11 that a major problem with this method is that of accurate forecasting. However, this can be tackled in the same way as described above. Free cash flows may be estimated over a particular forecast horizon (typically five to ten years) and then a terminal value substituted for free cash flows arising beyond that period. Determining the terminal value is, of course, a problem – and an important one – as it may be a significant proportion of the total cash flows.

The particular proportion of total cash flows appearing in the terminal value figure varies according to the maturity of the business and the industry within which it operates. For a mature industry, such as tobacco, this proportion tends to be much lower than for new, high technology, industries.

Activity 12.30

Can you figure out why this may be the case?

New high-tech businesses must often invest heavily and are often unprofitable in the early years. This means that much of the total cash flows is accumulated after the forecast horizon.

In the previous chapter we used an example to illustrate the valuation of a business where it was assumed that returns remained constant after the forecast horizon and used the following formula for a perpetuity in order to determine the terminal value (TV):

$$\text{TV} = \frac{C_1}{r}$$

where

C_1 = the free cash flows in the following year
r = the required rate of return from investors.

Another approach, however, would be to assume a constant growth rate over time, just as we did with dividends earlier. The terminal value would then be:

$$\text{TV} = \frac{C_1}{(r - g)}$$

where

C_1 = the cash flows in the following year
r = the required rate of return from investors (cost of capital)
g = the constant rate of growth in free cash flows.

Real World 12.16 below sheds some light on the use of forecast horizons and terminal value methods used in practice.

Real World 12.16

Forecasting in practice

The study of 272, predominantly Western European, finance professionals mentioned in Real World 8.6 also sought to discover how valuations were carried out in practice. Key findings from the study were as follows:

■ 78 per cent of respondents always, or almost always, used a variation of the dividend growth model described above to calculate terminal values. Other approaches did not come close.

→

Although free cash flows may appear to be clearly defined, in practice there may be problems. The discretionary policies of management concerning new investments will have a significant influence on the figure calculated. Free cash flows are likely to fluctuate considerably between periods. Unlike with earnings, management has no incentive to smooth out cash flows over time. However, for valuation purposes, it may be useful to smooth out cash flow fluctuations between periods in order to establish trends over time.

It is worth emphasising the importance of checking carefully the underlying assumptions, when using discounted cash flow-based methods of valuation. The share value figure derived using this method can be very sensitive to small changes to inputs. Sensitivity analysis, or scenario analysis, may therefore be carried out to help gain a feel for the range of possible values.

Valuing young businesses

Young, high-growth businesses provide a daunting challenge when trying to determine a suitable share value. Take, for example, start-up high-tech businesses. They operate in a fast-changing environment, hold few physical assets, may well be loss making and rarely pay dividends. Despite the difficulties these characteristics pose, McKinsey and Co, the management consultants, believe that the discounted cash flow method of valuation will do the trick. However, when calculating key variables, such as cash inflows, the approach adopted will be different than for an established business. **Real World 12.17** describes the broad approach to be taken.

Real World 12.17

Take our advice

For the past several years, investors have once again been piling into shares of companies with fast growth and high uncertainty – especially internet and related technologies.

In the search for precise valuations critical to investors, we find that some well-established principles work just fine, even for high-growth companies like tech start-ups. Discounted-cash-flow valuation, though it may sound stodgily old school, works where other methods fail, since the core principles of economics and finance apply even in uncharted territories, such as start-ups.

The truth is that alternatives, such as price-to-earnings or value-to-sales multiples, are of little use when earnings are negative and when there aren't good benchmarks for sales multiples. More important, these shorthand methods can't account for the unique characteristics

of each company in a fast-changing environment, and they provide little insight into what drives valuation.

Although the components of high-tech valuation are the same, their order and emphasis differ from the traditional process for established companies: rather than starting with an analysis of the company's past performance, begin instead by examining the expected long-term development of the company's markets – and then work backward. In particular, focus on the potential size of the market and the company's market share as well as the level of return on capital the company might be able to earn.

In addition, since long-term projections are highly uncertain, always value the company under different probability-weighted scenarios of how the market might develop under different conditions. Such techniques can help bound and quantify uncertainty, but they will not make it disappear: high-growth companies have volatile stock prices for sound reasons.

Source: Goedhart, M., Koller, T. and Wessels, D. (2015) *Valuation: Measuring and Managing the Value of Companies,* 6th edn, John Wiley & Sons Inc.

The various share valuation methods discussed are summarised in Figure 12.8.

The main share valuation methods are based on underlying net assets, cash flows or stock market ratios, as described in this chapter.
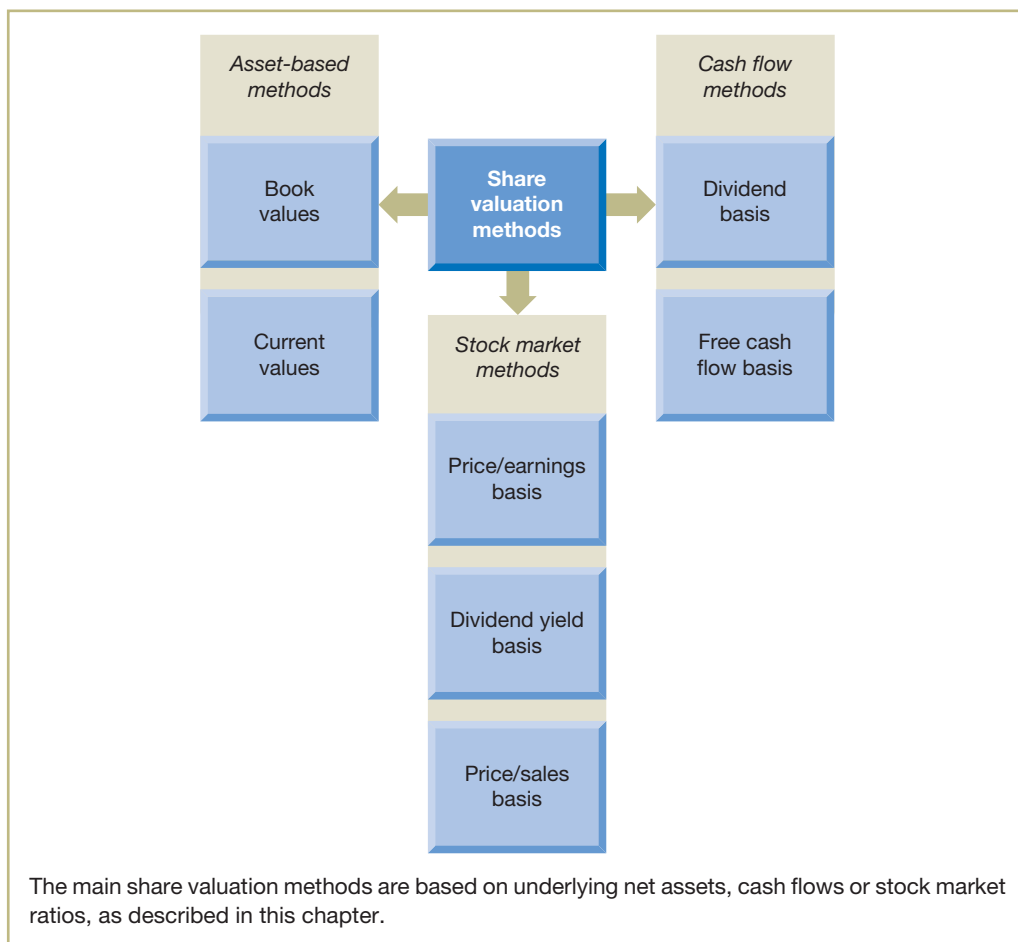
Figure 12.8 Share valuation methods

During a merger or takeover, valuations derived from the models discussed may be used as a basis for negotiation. They may help to set boundaries within which a final share value will be determined. The final figure, however, is likely to be influenced by various factors, including the negotiating skills and relative bargaining position of the parties.

Valuation methods in practice

Let us end the chapter by taking a look at the valuation methods used in practice. **Real World 12.18** sets out the results of a survey that provides us with an insight.

Real World 12.18

Something of value

A global survey of 1,980 investment analysts was carried out to determine what valuation methods were used in practice. The survey results, which are summarised under broad groupings, are shown in Table 12.1 below.

Table 12.1 Most widely used valuation approaches

Valuation approaches used	Percentage of respondents	Percentage of cases where the respondent uses each approach (mean)
Market multiples approach	92.8	68.6
Discounted present value approach	78.8	59.5
Asset-based approach	61.4	36.8
Real options approach	5.0	29.7
Other approaches	12.7	58.1

Source: Adapted from Fabozzi, F., Focardi, S. and Jonas, C. (2017) *Equity Valuation: Science, Art or Craft?*, CFA Institute Research Foundation, p. 14.

The results reveal the popularity of market multiples, such as the P/E ratio and P/S ratio. We can see that they are used by more analysts and also used more frequently than other approaches. Although theoretically more appealing, discounted present value approaches are less popular. This could well reflect unease among analysts over the forecasting difficulties they pose. Asset-based approaches are the least popular of the three approaches covered in this chapter. They are used by significantly fewer analysts and used much less frequently than the other two approaches.

Self-assessment question 12.1

The directors of Kifaru plc are considering taking over Mpaka plc, a smaller business in the same industry as Kifaru plc. Currently, Kifaru plc's shares are trading at £6.40/share and Mpaka plc's shares are trading at £9.60/share. The financial press has given Kifaru plc's PE ratio as 20 and Mpaka plc's PE ratio as 8. The most recent financial statements of each business show that Kifaru plc made after-tax profits of £160 million and Mpaka plc made after-tax profits of £72 million.

It is estimated that the combined business (Kifaru and Mpaka) will be able to maintain the profits of the individual businesses, but would also be able to achieve after-tax annual

savings of £38 million from operating and financial synergies. Kifaru plc's chief financial officer estimates that the combined business's PE ratio will fall to 16. Kifaru plc would like to finance the acquisition of Mpaka plc by offering five of its shares for three of Mpaka plc's shares.

Required:

(a) Calculate the number of shares in each business and the number of shares in the combined business.

(b) Calculate the share price of the combined business and, based on this, calculate the percentage gain per share for each business's shareholders.

(c) Discuss whether the shareholders of the two businesses would accept the offer made by the directors of Kifaru plc. Include any calculations you consider relevant to support your discussion.

The solution to this question can be found at the end of the book on p. 646–47.

SUMMARY

The main points of this chapter may be summarised as follows:

Mergers and takeovers

- A merger is when two businesses of roughly equal size combine; a takeover is when a larger business absorbs a smaller business.
- Mergers can be achieved through horizontal or vertical integration or by combining with unrelated businesses.
- Surges in merger activity occur from time to time, often as a result of a combination of political, economic and technological factors.
- To make economic sense, the merged business should generate greater cash flows than if the two businesses remained apart.

Rationale for mergers

- Reasons for a merger that are consistent with maximising shareholder wealth include:
    - benefits of scale
    - eliminating competition
    - eliminating weak and inefficient management
    - combining complementary resources
    - protecting sources of supply or revenue.
- Other reasons that may be more difficult to justify include:
    - diversification
    - shares in the target business being undervalued
    - pursuing managers' interests.

Forms of purchase consideration

- Payment for the shares in an acquired business may take the form of:
    - cash
    - shares
    - loan capital.

Who benefits?

- Shareholders in the target business usually see an increase in the value of their investment.
- Shareholders in the bidding business often see a decrease or, at best, a very modest increase in the value of their investment.
- Managers of the bidding business may gain through an increase in status, income and security.
- Managers of the target business often leave within a few years of the takeover.
- Financial advisers and lawyers usually benefit from a merger.

Other merger issues

- Underlying assumptions concerning expected synergies should be carefully examined.
- Arguments against diversification call into question the need for conglomerate businesses.
- Shareholders in the target business and advisers are often the key beneficiaries from a takeover.

Ingredients for successful mergers

- Should be in line with the strategy of the business.
- Tend to work best between businesses in the same, or related, industries.
- Early planning to ensure proper integration is essential.

Resisting a takeover bid

- Various defensive tactics may be employed before a bid is received, including:
  - conversion to private company status
  - employee share option schemes
  - maintaining good investor relations
  - share repurchases
  - increasing efficiency and profitability.
- Defensive tactics after a bid is received include:
  - presenting a case to shareholders
  - increasing dividend payouts
  - white knight defence
  - white squire defence.
- Managers of the bidding business may try to overcome resistance by circularising shareholders to explain the logic of the case or by increasing the bid price.

Protecting shareholders and the public

- The City Code on Takeovers and Mergers aims to ensure that shareholders are given every opportunity to evaluate a merger on its merits.
- The Competition and Markets Authority has the power to investigate mergers where a substantial lessening of competition may occur.

Restructuring the business

■ A divestment involves selling off part of the business operations.

■ A demerger, or spin-off, involves transferring business operations to a new business that is owned by the current shareholders.

Valuing shares in a business

■ Shares may be valued on the following bases:

  ■ methods based on the value of the net assets (book value, liquidation value and replacement cost methods)

  ■ methods based on stock market information (P/E ratio method, P/S ratio method and dividend yield method)

  ■ methods based on future cash flows (dividend valuation method and free cash flow method).

KEY TERMS

Merger p. 540	**Competition and Markets Authority (CMA)** p. 564
Takeover p. 540	
Horizontal merger p. 540	**Divestment** p. 566
Vertical merger p. 540	**Demerger (spin-off)** p. 567
Conglomerate merger p. 540	**Net assets (book value) method** p. 571
White knight p. 561	**Price/book value (P/B) ratio** p. 572
White squire p. 561	**Net realisable value** p. 573
Poison pill p. 562	**Net assets (liquidation) method** p. 573
Crown jewels p. 562	**Net assets (replacement cost) method** p. 574
Golden parachute p. 562	
Pac-man defence p. 562	**Price/sales (P/S) ratio** p. 576

For definitions of these terms, see the Glossary, pp. 685–94.

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1 Gregory, A. (1998) 'The long-run performance of UK acquirers: motives underlying the method of payment and their influence on subsequent performance', University of Exeter Discussion Paper.

2 Kengelbach, J., Keienburg, G., Schmid, T., Degen D. and Sievers S. (2018) *Mergers & Acquisitions (M&A) Report – Elevating Synergies on the Board Agenda*, Boston Consulting Group, www.bcg.com, 12 September.

3 Weston, F., Siu, J. and Johnson, B. (2001) *Takeovers, Restructuring and Corporate Governance*, 3rd edn, Prentice Hall, Chapter 8.

4 Alexandridis, G., Fuller, K., Terhaar, L. and Travlos, N. (2013) 'Deal size, acquisition premia and shareholder gains', *Journal of Corporate Finance*, April, 20, pp. 1–13.

5 Gregory, A. (2005) 'The long run abnormal performance of UK acquiring firms and the free cash flow hypothesis', *Journal of Business Finance and Accounting*, June/July, pp. 777–814.

6 Conn, R., Cosh, A., Guest, P. and Hughes, A. (2005) 'The impact of UK acquirers of domestic, cross-border, public and private acquisitions', *Journal of Business Finance and Accounting*, June/July, pp. 815–70.

7   Franks, J. and Mayer, C. (1994) 'Corporate ownership and corporate control: a study of France, Germany and the UK', *Economic Policy*, No. 10.

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9   Almeida, H. and Wolfenzon, D. (2004) 'Should business groups be dismantled? The equilibrium costs of internal capital markets', *Social Science Research Network*, http://papers.ssrn.com, 7 July.

10 Shulman, L. (2017) *How Premium Conglomerates Sustain Success*, Boston Consulting Group, www.bcg.com, 20 November.

FURTHER READING

If you wish to explore the topics discussed in this chapter in more depth, try the following books:

Damodaran, A. (2015) *Applied Corporate Finance*, 4th edn, John Wiley & Sons, Chapter 12.

Fabozzi, F., Focardi, M. and Jonas, C. (2017) *Equity Valuation: Science Art or Craft?*, CFA Institute Research Foundation, Chapters 1–3.

Gaughan, P. (2018) *Mergers, Acquisitions and Corporate Restructurings*, 7th edn, John Wiley & Sons, Chapters 1–2 and 4–6.

Peek, E., Palepu, K. and Healy, P. (2016) *Business Analysis and Valuation: IFRS Edition*, 4th edn, Cengage Learning, Chapters 6–8 and 11.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on p. 657–58.

12.1   Outline the case for and against a business pursuing a policy of diversification.

12.2   It was mentioned in the chapter that, in the context of a planned takeover, the financial health of the target business is an important aspect of a due diligence investigation. Identify nine areas that might be investigated when dealing with this aspect.

12.3   When a business demerges part of its operations, it becomes smaller in size. What disadvantages might this bring to the business?

12.4   Lampet plc trades its shares on the London Stock Exchange. Recently, the chief financial officer calculated the value of a share in the business, using the free cash flow method, at £8.65. These calculations incorporated current growth predictions. Each share is currently trading at £7.90. Suggest at least three possible reasons for the difference between the two share values mentioned.

EXERCISES

Exercises 12.4 to 12.7 are more advanced than 12.1 to 12.3. Those with **coloured numbers** have solutions at the back of the book, starting on p. 659.

 If you wish to try more exercises, visit the students' side of this book's companion website.

12.1   Accona plc operates a successful chain of furniture retail stores. For the year that has just ended, the business reported after-tax profits of £250 million. It has 200 million £0.50 shares in issue and has a P/E ratio of 7.8 times.

    Some years ago, in an effort to boost sales, the business created a subsidiary business, Tenere plc, to offer hire-purchase facilities to customers wishing to buy its more expensive

furniture items. The subsidiary has grown steadily and now offers hire purchase facilities to customers of other retailers as well as to Accona plc customers.

For the year that has just ended, the subsidiary contributed £30 million of the total after-tax profits of Accona plc. Accona plc is now considering a demerger and a separate Stock Exchange listing for the subsidiary. The financial advisers of Accona plc have suggested that Tenere plc should be floated with a share capital of 40 million £0.50 ordinary shares and that the shareholders of Accona plc should receive one share in Tenere plc for every 5 shares held.

The financial advisers expect that the P/E ratio of the newly-listed business will be somewhere between 12 and 14 times. The P/E ratio of Accona plc is expected to reduce to 7.0 times as a result of the demerger.

Ignore taxation.

Required:

Calculate the likely effect of the demerger on the wealth of a shareholder holding 5,000 ordinary shares in Accona plc, assuming that the P/E ratio of Tenere plc will be:

(i) at the lower end, and
(ii) at the higher end

of the financial advisers' expectations and comment on your findings.

12.2 Dawn Raider plc has just offered one of its shares for two shares in Sleepy Giant plc, a business in the same industry as itself. Extracts from the financial statements of each business for the year ended 31 May Year 8 appear below:

	Dawn Raider £m	Sleepy Giant £m
Income statements		
Sales revenue	150	360
Profit for the year	18	16
Statement of financial position data		
Non-current assets	150	304
Net current assets (Note 1)	48	182
	198	486
Loans	(80)	(40)
	118	446
Share capital (Note 2)	50	100
Reserves	68	346
	118	446

	Dawn Raider	Sleepy Giant
1 Includes cash/(overdrafts)	(£60m)	£90m
2 Shares	25p	50p
3 Dividends paid and proposed	£4m	£14m

Stock market data for each business is as follows:

	31 May Year 6	31 May Year 7	31 May Year 8
Dawn Raider plc			
Share price (pence)	120.0	144.0	198.0
Earnings per share (pence)	5.3	6.9	9.0
Dividends per share (pence)	2.0	2.0	2.0
Sleepy Giant plc			
Share price (pence)	45.0	43.0	72.0
Earnings per share (pence)	8.4	7.4	8.0
Dividends per share (pence)	8.0	7.0	7.0

If the takeover succeeds, Dawn Raider plans to combine Sleepy Giant's marketing and distribution channels with its own, with a post-tax saving of £1 million a year. In addition, it expects to be able to increase Sleepy Giant's profits after tax by at least £5 million a year by better management. Dawn Raider's own profits after tax are expected to be £23 million (excluding the £1 million saving already mentioned) in the year ended 31 May Year 9.

One of the shareholders of Sleepy Giant has written to its chairman arguing that the bid should not be accepted. The following is an extract from his letter: 'The bid considerably undervalues Sleepy Giant since it is below Sleepy Giant's net assets per share. Furthermore, if Dawn Raider continues its existing policy of paying only 2p a share as a dividend, Sleepy Giant's shareholders will be considerably worse off.'

Required:

(a) Calculate:
- (i) The total value of the bid and the bid premium.
- (ii) Sleepy Giant's net assets per share at 31 May Year 8.
- (iii) The dividends the holder of 100 shares in Sleepy Giant would receive in the year before and the year after the takeover.
- (iv) The earnings per share for Dawn Raider in the year after the takeover.
- (v) The share price of Dawn Raider after the takeover assuming that it maintains its existing price/earnings ratio.

(b) Comment on:
- (i) the points that the shareholder in Sleepy Giant raises in his letter
- (ii) the amount of the bid consideration.

12.3 An investment business is considering taking a minority stake in two businesses, Monaghan plc and Cavan plc. Both are in the same line of business and both are listed on the London Stock Exchange. Monaghan plc has had a stable dividend policy over the years. In the financial reports for the current year, the chairman stated that a dividend of 30p a share would be paid in one year's time and financial analysts employed by the investment business expect dividends to grow at an annual compound rate of 10 per cent for the indefinite future.

Cavan plc has had an erratic dividend pattern over the years and future dividends have been difficult to predict. However, to defend itself successfully against an unwelcome takeover, the business recently announced that dividends for the next three years were expected to be as follows:

Year	Dividend per share (pence)
1	20
2	32
3	36

Financial analysts working for the investment business believe that, after Year 3, Cavan plc will enjoy a smooth pattern of growth, and dividends will be expected to grow at a compound rate of 8 per cent for the indefinite future.

The investment business believes that a return of 14 per cent is required to compensate for the risks associated with the type of business in which the two businesses are engaged.

Ignore taxation.

Required:

(a) State the arguments for and against valuing a share on the basis of its future dividends.

(b) Calculate the value of a share in:
- (i) Monaghan plc
- (ii) Cavan plc

based on the expected future dividends of each business.

12.4 The directors of Simat plc have adopted a policy of expansion based on the acquisition of other businesses. The special projects division of Simat has been given the task of identifying suitable businesses for takeover.

Stidwell Ltd has been identified as being a suitable business and negotiations between the board of directors of each business have begun. Information relating to Stidwell Ltd is set out below:

Statement of financial position as at 31 May Year 9

	£
ASSETS	
Non-current assets (at cost less depreciation)	
Property	180,000
Plant and machinery	90,000
Motor vehicles	19,000
	289,000
Current assets	
Inventories	84,000
Receivables	49,000
Cash	24,000
	157,000
Total assets	446,000
EQUITY AND LIABILITIES	
Equity	
Ordinary £0.50 shares	150,000
Retained earnings	114,000
	264,000
Non-current liabilities	
10% loan notes	140,000
Current liabilities	
Payables and accruals	42,000
Total equity and liabilities	446,000

Stidwell Ltd's profit for the year ended 31 May Year 9 was £48,500 and the dividend paid for the year was £18,000. Profits and dividends of the business have shown little change over the past five years.

The realisable values of the assets of Stidwell Ltd, at the end of the year, were estimated to be as follows:

	£
Property	285,000
Plant and machinery	72,000
Motor vehicles	15,000

For the remaining assets, the values as per the statement of financial position were considered to reflect current realisable values.

The special projects division of Simat plc has also identified another business, Asgard plc, which is listed on the Stock Exchange and is broadly similar to Stidwell Ltd. The following details were taken from a recent copy of a financial newspaper:

Years 8–9 High	Low	Stock	Price	± or	Dividend	Cover (times)	Yield (gross %)	P/E (times)
560p	480p	Asgard plc	500p	+ 4p	10.33p	4.4	2.76	11

Required:

Calculate the value of an ordinary share of Stidwell Ltd using each of the following valuation methods:

(a) net assets (liquidation) basis
(b) dividend yield
(c) price/earnings ratio.

12.5 Alpha plc, a dynamic, fast-growing business in microelectronics, has just made a bid of 17 of its own shares for every 20 shares of Beta plc, which manufactures a range of electric motors. Financial statements for the two businesses are as follows:

Income statements for the year ended 31 March Year 9

	Alpha plc £000	Beta plc £000
Sales revenue	3,000	2,000
Operating profit	300	140
Interest	(100)	(10)
Profit before tax	200	130
Tax	(100)	(65)
Profit for the year	100	65

Other information:

	Alpha plc	Beta plc
Number of issued shares (million)	1.0	0.5
Earnings per share	10p	13p
Price/earnings ratio	20	10
Market price per share	200p	130p
Capitalisation (that is, market price per share × number of shares)	£2m	£0.65m
Dividend per share	2p	6p
Dividends paid and proposed	20,000	30,000

Historical share prices (in pence) at 31 March each year have been:

	Year 4	Year 5	Year 6	Year 7	Year 8
Alpha plc	60	90	150	160	200
Beta plc	90	80	120	140	130

Statements of financial position at 31 March Year 9

	Alpha plc £000	Beta plc £000
ASSETS		
Non-current assets	1,200	900
Current assets	900	700
Total assets	2,100	1,600
EQUITY AND LIABILITIES		
Equity		
Share capital £0.25 ordinary shares	250	125
Retained earnings	750	755
	1,000	880
Non-current liabilities – loans	800	120
Current liabilities	300	600
Total equity and liabilities	2,100	1,600

The merger of the two businesses will result in post-tax savings of £15,000 per year to be made in the distribution system of Alpha plc.

One of the shareholders of Beta plc has queried the bid and has raised the following points. First, he understands that Alpha plc normally pays only small dividends and that his dividend per share will decrease. Second, he is concerned that the bid undervalues Beta plc since the current value of the bid is less than the figure for shareholders' funds in Beta's statement of financial position.

Required:

(a) Calculate the bid consideration.

(b) Calculate the earnings per share for the combined group.

(c) Calculate the theoretical post-acquisition price of Alpha plc shares assuming that the price/earnings ratio stays the same.

(d) Comment on the shareholder's two points.

12.6 Mojave plc supplies frozen desserts to supermarkets and restaurant chains throughout the UK. The business has enjoyed strong growth since it was formed six years ago and is now considering a listing on the Stock Exchange. At a forthcoming meeting of the board of directors, the likely price of the business's shares upon listing is one of the key items on the agenda.

The draft financial statements for Mojave plc for the most recent financial year are set out below:

Statement of financial position as at 30 November 2019

	£m
ASSETS	
Non-current assets	
Property plant and equipment	
Land and buildings	19.1
Motor vans	2.6
Fixtures, fittings and equipment	6.7
	28.4
Current assets	
Inventories	2.3
Trade receivables	5.9
Cash and cash equivalents	1.3
	9.5
Total assets	37.9
EQUITY AND LIABILITIES	
Equity	
Ordinary share capital (£0.25 nominal)	12.0
Retained earnings	13.6
	25.6
Non-current liabilities	
Loan notes	8.0
Current liabilities	
Trade payables	3.8
Taxation	0.5
	4.3
Total equity and liabilities	37.9

Income statement for the year ended 30 November 2019

	£m
Revenue	40.6
Cost of sales	(21.5)
Gross profit	19.1
Distribution expenses	(6.7)
Administration expenses	(7.2)
Operating profit	5.2
Finance expenses	(0.8)
Profit before taxation	4.4
Taxation	(1.2)
Profit for the year	3.2

The assets of Mojave plc have recently been provided with the following independent valuations concerning realisable values:

	£m
Land and buildings	29.8
Motor vehicles	2.0
Fixtures and fittings	4.1
Inventories	3.5
Trade receivables	4.7

The following additional information is also available:

1 The current dividend payout ratio is 60 per cent.
2 Dividends are expected to grow at the rate of 5 per cent per year for the foreseeable future.
3 The required return to equity shares in similar companies listed on the Stock Exchange is 9 per cent.
4 The average price/earnings (P/E) ratio for similar businesses listed on the Stock Exchange is 12.6 times.

Required:

(a) Calculate the value of an ordinary share in Mojave plc using the following valuation methods:
    (i)   net assets (net book value) basis;
    (ii) net assets (liquidation) basis;
    (iii) dividend growth basis;
    (iv) price earnings ratio basis.
(b) State, with reasons, which one of the valuation methods identified in (a) above is likely to provide the most realistic estimate of the market price of an ordinary share in Mojave plc.

12.7   The senior management of Galbraith Ltd is negotiating a management buyout of the business from the existing shareholders. The most recent financial statements of Galbraith Ltd are as follows:

Statement of financial position as at 30 November Year 6

	£
ASSETS	
Non-current assets (cost less depreciation)	
Property	292,000
Plant and machinery	145,000
Motor vehicles	42,000
	479,000

	£
Current assets	
Inventories	128,000
Trade receivables	146,000
	274,000
Total assets	753,000
EQUITY AND LIABILITIES	
Equity	
£0.50 ordinary shares	100,000
General reserve	85,000
Retained earnings	169,000
	354,000
Non-current liabilities	
13% loan notes (secured)	180,000
Current liabilities	
Trade payables	147,000
Tax	19,000
Bank overdraft	53,000
	219,000
Total equity and liabilities	753,000

Income statement for the year ended 30 November Year 6

	£
Sales revenue	1,430,000
Cost of sales	(870,000)
Gross profit	560,000
Selling and distribution expenses	(253,000)
Administration expenses	(167,000)
Operating profit	140,000
Finance expenses	(35,000)
Profit before taxation	105,000
Tax	(38,000)
Profit for the year	67,000

The following additional information is available:

1 Dividends of £5,000 were proposed and paid during the year.
2 A professional surveyor has recently established the current realisable value of the business's assets as being:

	£
Property	365,000
Plant and machinery	84,000
Motor vehicles	32,000
Inventories	145,000

The current realisable value of trade receivables was considered to be the same as their statement of financial position (balance sheet) values.
3 The free cash flows of the business over the next ten years are estimated as follows:

	£
Year 7	97,000
Year 8	105,000
Years 9–16	150,000

4   The cost of capital for the business is 10 per cent.
5   A similar business which is listed on the Stock Exchange has a price/earnings ratio of 8 and a dividend yield of 2.2 per cent.

Required:

(a) Calculate the value of a share in Galbraith Ltd using the following valuation methods:

(i)   net assets (liquidation) basis
(ii)   price/earnings ratio basis
(iii) dividend yield ratio basis
(iv)   free cash flow basis (assuming a ten-year life for the business).

(b) Briefly evaluate each of the share valuation methods set out in (a).

(c) Which share valuation method, if any, do you consider most appropriate as a basis for negotiation and why?

(d) What potential problems will a management buyout proposal pose for the shareholders of Galbraith Ltd?

INTERNATIONAL ASPECTS OF FINANCIAL MANAGEMENT

INTRODUCTION

The internationalisation of business is not a new phenomenon. Many businesses, in Europe and the USA in particular, have traded internationally on a large scale for more than a century. The current scale of internationalisation, however, is vast and would have been unimaginable as recently as twenty years ago. Nowadays, most businesses of any size engage, to a greater or lesser extent, in some form of international activity.

In this final chapter, we begin by considering the various aspects of business operations that may be internationalised and the benefits that may accrue. We then go on to examine the problems of internationalisation and, in particular, those relating to foreign exchange. We shall see how the foreign exchange market operates and identify the forms of foreign exchange risk to which a business may become exposed. We shall also spend some time discussing how these risks may be managed.

Although the same principles of investment appraisal apply whether a business operates within national boundaries or internationally, we shall see there are additional issues to be considered when dealing with international projects. We shall also see that some of these issues are accompanied by additional risks.

We end the chapter by asking whether an international business should seek to manage the specific risks arising from internationalising its activities. Although this task may appear to be of obvious importance for a business, portfolio theory suggests that these risks may be better managed by investors through holding a diversified portfolio of shares.

Learning outcomes

When you have completed this chapter, you should be able to:

■ Explain the nature of international business.

■ Describe the nature and importance of foreign exchange markets.

■ Explain exchange rate, economic and translation risk and discuss how they may be managed.

■ Discuss international diversification and the management of risk in the context of modern portfolio theory.

THE INTERNATIONALISATION OF BUSINESS

A striking feature of many modern businesses is the extent to which one or more aspects of their activities have become internationalised. Take, for example, Vodafone Group plc, the mobile communications business. This is ostensibly a UK business, insofar that its head office is in London and its shares are listed, and principally traded, on the London Stock Exchange. According to the business's 2018 annual report, however:

- 88 per cent of its employees are based outside the UK
- 85 per cent of its sales revenue is made outside the UK
- it operates in about 150 different countries, in many parts of the world, as well as in the UK
- a large part of its borrowing is from outside the UK
- its ordinary shares are listed on the US NASDAQ market as well as the London Stock Exchange
- a large proportion of its shares are held by non-UK-based investors.

Vodafone is, perhaps, one of the more international of UK businesses, but it is by no means an unusual case. Most large businesses, and a great number of small ones, internationalise their activities. Presumably, this is done in a bid to enhance shareholder wealth.

Below we consider the ways in which a business may internationalise.

Importing and exporting

Many businesses depend on the import of raw materials and/or components in order to produce their products or services. These imported items may only be available, or only available at an economic price, outside the home country. A chocolate manufacturer, for example, would not be able to produce chocolate in the UK unless it imported cocoa.

Many businesses also depend on the export of their products or services as a means of expanding their businesses. Exporting can provide the opportunity for a business to reach a larger market for its output. In some cases, the export market may also offer more profitable returns. Where the home market for a particular product is saturated, penetrating overseas markets may provide a business with the only means of profitable expansion.

Overseas investment

By directly investing in production, or other, facilities in a foreign country, businesses may be better placed to supply local foreign markets. It may also help them to supply the home market with goods or services at more economic prices. Many UK businesses, for example, have call centres located outside the UK from which they supply services to UK customers. Manufacturing in a location close to the market obviously reduces transport costs. Production costs may be lower in certain foreign locations, so that it may be cheaper to manufacture there for export to the home market. Local manufacture may also be the only profitable means of entering certain markets. The attraction of the UK as a manufacturing location for Japanese car producers, for example, is not simply to avoid transport costs. UK customers may also be more inclined to buy a car that is locally made.

Overseas financing

The home capital market may not offer the cheapest, or most suitable, financing options available. In theory, the relatively free movement of capital should mean that financing costs will be

the same wherever the cash is raised. Imperfections in the market, however, mean that this is not always the case.

INTERNATIONALISATION AND RISK REDUCTION

Internationalising operations provides the opportunity for diversification of risk. Many businesses may consider this an important benefit. It may be possible to counter the risk of an economic downturn in the home market by operating in overseas markets that are not exposed to the same risk. We shall examine this point in more detail later in the chapter.

INTERNATIONALISATION AND SHAREHOLDERS' WEALTH

By refusing to be constrained by national boundaries, an increased number of investment opportunities may become available. It may also provide the opportunity to lower the cost of capital. This is illustrated in Figure 13.1.

When the business looks only to the home market, a home country productive base and, exclusively, home country sources of finance, it will invest in all opportunities to the left of point A. It will earn returns equal to the vertical distance between the two purple lines for each investment. If the business embraces internationalisation, the number of profitable opportunities expands and the cost of finance (the blue lines) reduces, leading to larger returns and greater wealth generation.

Figure 13.1 The investment opportunities and cost of finance for a business assuming (A) a strictly home country outlook and (B) an international one

The purple curved line shows the investment opportunities available to a business, assuming that it buys its supplies in the home country and sells only in the home market. To the left are the most profitable opportunities, which the business will take first. As these are exploited, the business moves to the right, to the less profitable ones. The purple straight, horizontal line is the cost of finance, assuming the business uses only home country sources of finance. It would choose to invest in all of the projects up to point A, where the return on the investment just equals its cost of financing.

The two blue lines represent the investment opportunities and financing cost where the business exploits overseas opportunities. Here, there are higher-yielding investment projects and the average cost of finance is lower. This means that the business could invest in all investment opportunities up to point B. The return on these various opportunities is the vertical distance between the blue lines. Thus, the business will generate more wealth for shareholders, because it can exploit a higher number of profitable opportunities and because the cost of finance is lower.

Figure 13.1 provides a theoretical and simplified model of the benefits of internationalisation. At any particular point in time, the best investment opportunities may lie in the home country. Similarly, when the business is looking to raise finance, the home country capital market may offer the cheapest source. In the long run, however, businesses that widen their commercial horizons are likely to generate more wealth.

In theory, it should not matter whether finance is raised in Tokyo or London. Similarly, a UK business should value a customer in Mumbai as much as one in Middlesbrough. In practice, however, problems arise when a business ventures beyond its national boundaries.

Activity 13.1

Why, for a UK business, might a customer based in Mumbai pose greater problems than one based in Middlesbrough?

There could be various reasons for this, including:

- language difficulties
- cultural differences with which the UK business is unfamiliar
- trading in a different currency
- logistical difficulties
- transportation costs.

The rest of this chapter will focus on the problems associated with internationalising operations and how they may be managed.

FOREIGN EXCHANGE

An obvious problem arising from internationalisation is that not all countries use the same currency. The relative values of any two currencies can change over time. Occasionally, significant shifts in relative values can occur within a very short period. This means that a business may suffer uncertainty about the value of a particular transaction, in terms of the home currency. At times, individual national governments agree to 'peg' their currencies to those of others within a group. Many EU countries, for example, agreed to keep their currencies pegged to one another, subject to minor fluctuations, for many years leading up to the introduction of the common currency (the euro) in 1999. Although such agreements make life easier for international businesses, most countries are not members of a currency group. Businesses, therefore, have to deal with the problem of exchange rate fluctuations over time.

Before looking more closely at the problems of shifts in relative values of currencies, and how they may be managed, let us briefly consider how foreign exchange markets operate and why relative currency values can shift over time.

The need for foreign exchange markets

Where a business sells goods or services to a foreign customer, the transaction will normally require that, sooner or later, foreign currency is converted into the home currency. Although a sale may be made in the foreign currency, the seller will normally need home currency to pay employees, suppliers, taxes and other financial obligations. Those in the home country to whom the business has obligations, will normally only be prepared to accept the home currency in settlement.

Where the sale is made in the home currency, the foreign customer will normally need to convert its local (foreign) currency to that of the seller (home currency). The word 'normally' is used here because, in certain circumstances, conversion may not be necessary. The foreign customer may, for example, have the required amount of the seller's home currency, perhaps from a sale made to a home country customer. Alternatively, the seller may have a financial obligation, unconnected with the sales transaction, that must be met in the foreign currency. Generally speaking, however, a sale to a foreign customer will require foreign currency being 'sold' in order to 'buy' the required amount of home currency.

What is the foreign exchange market?

The market in which one currency is converted into another is known as the *foreign exchange market*. This market is operated by commercial banks, national central banks (the Bank of England in the UK), brokers and others. The market does not have a particular location, it exists wherever one currency is converted into another. When preparing to travel overseas, for example, we may buy currency of the destination country through our normal bank. This transaction will form part of the foreign exchange market.

Activity 13.2

Suppose that you had a few dollar bills left following a visit to the USA and exchanged these for sterling with a friend who was shortly to go there. Would you and your friend form part of the foreign exchange market?

The answer is yes. You would both, briefly, form part of the foreign exchange market.

Dealing in foreign exchange

When dealing with foreign exchange professionals, it is normally possible to trade on one of two bases. The currencies can be exchanged immediately, at the rate ruling at the time of exchange, known as the **spot rate**. Alternatively, the contract can be to exchange the currencies at some specified future date, at a rate determined at the time of the agreement, known as the **forward rate**. For reasons to be discussed shortly, the spot and forward rates frequently differ from one another.

When foreign exchange dealers are approached with a view to a spot foreign exchange transaction, they will quote two rates at which they will deal: one at which they will sell and one at which they are prepared to buy. For example, dealers may be prepared to accept $1.32 in exchange for £1, but only be prepared to give $1.30 in exchange for £1. This is to say that they will sell £1 for a price of $1.32, but will pay only $1.30 to buy £1. For most commercial transactions, the difference between the two rates is usually much closer than in this example. The 'spread' (difference between the two rates) represents the dealers' profit. The existence

of this spread means that there is a cost involved in using the foreign exchange market. The size of the spread tends to reflect the operational efficiency of the market, the volatility of the exchange rate concerned and the size of the transaction involved. Where the market is operationally efficient, the exchange rate is stable and the transaction is large, the spread tends to be at its smallest.

Activity 13.3

Why do foreign exchange dealers typically offer both a spot rate and a forward rate?

A business may want foreign currency immediately in order to discharge a financial obligation that is now due. Here the spot rate would be relevant. Where a business has an obligation to discharge in, say, six months' time, it may prefer to fix the rate immediately, but complete the transaction (and pay) at the later date. Here, a forward rate transaction may be more relevant. It is, of course, always open to the business to leave the foreign exchange issue until payment is due and then convert at the spot rate. This, however, runs the risk of currency movements adversely affecting the business.

How are foreign exchange rates determined?

A glance at the financial pages of the newspapers in early 2019 would have shown that £1 sterling was worth about €1.18 (euro). Why was that the rate at that time? The answer is that the free market, that is, a market subject to the laws of supply and demand, determines the rate. Relative supply and demand is caused, in turn, by the extent to which individuals, businesses and institutions want to convert euros into sterling, or sterling into euros.

There are broadly five reasons why individuals, businesses or institutions may wish to convert currencies:

■ to enable them to exchange cash, received from a sale of goods or services in a foreign currency, to the home currency
■ to enable them to pay for goods or services in the relevant foreign currency (including taking a holiday in the foreign country concerned)
■ to hold part of their wealth in the foreign currency
■ to speculate, for example by buying a particular foreign currency in the expectation that its value will appreciate in relation to the home currency
■ in the case of a central bank, to try to manage the exchange rate between the two currencies.

The first and second of these are obvious enough. If these were the only reasons for the existence of foreign exchange markets, exchange rates would tend to reflect the relative exports and imports of goods and services between the two countries.

Activity 13.4

Now consider reason 3 above. Why might individuals, businesses and institutions prefer to hold part or all of their wealth in the foreign currency rather than in the home currency?

They may believe that the foreign currency will strengthen relative to the home one. They may then convert back, if and when this occurs, and have more of the home currency than they had originally.

As well as the reason given in Activity 13.4, they may wish to convert to a foreign currency in order to lend money to an overseas borrower paying a higher rate of interest than is available in the home country. The relative strength of sterling in the late 1990s and early 2000s was attributed to this reason. During that period, UK interest rates were high compared with those of many other economies. Governments, through their central banks, ultimately determine interest rates. A government might decide to raise interest rates in order to strengthen the currency. This could be done for various reasons, such as keeping the value of the currency fixed ('pegged') against certain other currencies. High interest rates in the UK, however, were used by the Bank of England to curb inflationary pressures within the economy. Most countries regard interest rates as an important tool of counter-inflationary policy.

The fourth reason, speculation, is often regarded as a parasitic and antisocial activity. A powerful counterargument, however, is that speculators help, through their buying and selling, to bring liquidity to the foreign exchange market. This can be of great benefit to all market participants as it becomes easier to enter and exit the market.

Activity 13.5

What other role might speculators play in the smooth functioning of the foreign exchange market?

By searching out and exploiting market anomalies, speculators can contribute towards a more efficient market. This should give market participants greater confidence in the pricing of currencies.

The fifth reason cited is also concerned with managing the exchange rate. Governments, usually through their central banks, may create supply or demand for their national currencies by selling or buying them. The UK government, for example, may convert some of its reserves of dollars into sterling (that is, sell dollars, buy sterling) in an attempt to strengthen sterling against the dollar. Alternatively, it may do the opposite in an attempt to weaken sterling.

Both the adjustment of interest rates and direct intervention in the market are common practices of governments when they attempt to manage exchange rates.

A THEORETICAL EXPLANATION OF RELATIVE EXCHANGE RATES

Various attempts have been made to explain and predict relationships between two national currencies. We shall now briefly review this issue, along with some relevant research evidence.

The law of one price

The theories explaining relative exchange rates are underpinned by the general notion that, where there are many wealth-maximising buyers and sellers with access to information, the prices of identical goods and services in two different countries (each with its own currency) must logically be the same, when expressed in the same currency. The exchange rate will adjust to ensure that this is the case. This is known as the **law of one price**.

If, for example, the exchange rate was US$1.32 = £1, a product costing $13.20 in the US should cost £10 in the UK. Where this is not the case, market forces would soon make sure that it became so. Suppose that the particular product costs £11 in the UK and $13.20 in the

US. Businesses would try to make a profit by buying the product in the US and selling it in the UK. This would provoke a chain of events. It would create additional demand in the US, which would tend to drive up the price of the product there. In the UK, it would create additional supply, which would tend to drive down the price there. By selling a US-derived product in the UK market, there would be a need to convert sterling into dollars. This would increase the demand for dollars and increase the supply of sterling, leading to a strengthening of the dollar against sterling. These adjustments in the supply and demand, both of the product and of the two currencies, should result in the effective cost of the product being the same on both sides of the Atlantic. In theory, the law of one price should also extend to financial assets, such as loans, shares and so on.

In practice, the law of one price does not always work as theory would suggest. This is for several reasons:

■ There are currency conversion costs. This means that it would not be worth businesses exploiting very small price differences; after meeting the costs of converting currency, there would be little or no gain. This point is not hugely significant in economic terms.
■ There may be legal restrictions on importing the particular product from the overseas country.
■ Transport costs mean that buying a product in one country and selling in another would not completely equalise the price in the two countries.
■ The exchange rate, as discussed above, is not always determined by independent traders in goods and services. Governments are often major interveners in the foreign exchange market.

We saw earlier in the chapter that there are two bases on which foreign currencies may be bought or sold. They can be traded for immediate delivery, which involves trading at a 'spot' rate of exchange. Alternatively, or they can be bought or sold under a **forward exchange contract**. Here, delivery will take place at some specified future date, but the exchange rate is set immediately. The 'forward' rate will be closely linked to the spot rate. In theory, if the nominal interest rates are the same in the countries of both currencies, then the spot and forward rates would be the same. (Nominal interest rates reflect both real interest rates and the rate of inflation.)

FOREIGN EXCHANGE MARKETS AND MARKET EFFICIENCY

We saw in Chapter 7 that the major stock exchanges tend to be price efficient to a significant degree. This means that new information is quickly and accurately reflected in share prices. It is not possible, therefore, to make abnormal returns on a consistent basis without access to information that is not generally available to other investors.

It might be assumed that the foreign exchange market is also efficient, thereby preventing abnormal gains, on a consistent basis, by trading in currencies. Both markets, after all, share certain common features. They both attract many well-informed participants who study the market closely in order to spot profitable opportunities. Furthermore, these participants have access to finance that can be used to exploit any anomalies. In one important respect, however, the foreign exchange markets and major stock exchanges differ. Governments do not usually intervene in the major stock exchanges, whereas they do intervene in foreign exchange markets. They do so in an attempt to manage the exchange rate.

Knowing that a government has a particular exchange rate objective can help market participants to predict what will happen in the foreign exchange market. The evidence seems to

bear this out. Studies show that where there is a clear government policy not to intervene in the market, that is, where the currency is allowed to 'float' freely, the markets appear to be efficient, at least in the weak-form. Where governments have a known policy, such as raising interest rates, or buying their currency in the market, to support its value, the evidence indicates that the market is not efficient (see reference 1 at the end of the chapter).

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PROBLEMS OF INTERNATIONALISATION

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We have now seen that businesses can benefit from internationalising their operations. We have also seen how foreign exchange markets work and how exchange rates may be determined. In the sections that follow, we consider the problems involved with operating internationally and how these problems may be managed.

Problems with foreign exchange

Foreign exchange problems are seen as a major headache by many large international businesses. **Real World 13.1** shows the results of a 2018 survey of 500 senior managers on their attitudes to foreign exchange risk management.

Real World 13.1

Managing foreign exchange is a worry

According to a survey of senior finance managers in a number of businesses across the globe, conducted jointly by HSBC (the bank) and the *Financial Times*:

- 58 per cent of chief financial officers feel that managing the risk associated with foreign exchange is one of the two areas that occupy the largest proportion of their time
- 72 per cent of corporate treasurers see foreign exchange risk management as the most important aspect of their job
- only 51 per cent of chief financial officers feel that their business is well placed to deal with foreign exchange risk
- 70 per cent of chief financial officers say that their business has been hit by losses resulting from foreign exchange risk exposure that could have been protected against.

Source: Information contained in: HSBC (2018) 'Risk management survey', www.gbm.hsbc.com/the-new-future/treasury-thought-leadership/risk-management-survey (accessed 10 February 2019).

As mentioned earlier, foreign exchange risk can provide the impetus for countries to peg their currencies against those of countries with which they frequently deal, or to adopt a common currency, as many EU countries have done.

Exchange rate risk

Exchange rate risk is the risk that the rate of exchange between two currencies will move adversely for a particular business. The effect of an adverse movement will be to reduce the wealth of the business. Where the change is favourable, however, it will lead to an increase in wealth.

Exchange rate risk can be broken down into three areas: transaction risk, economic risk and translation risk. Each of these is considered below.

Transaction risk

Suppose that a UK business buys goods, priced in dollars, from a US supplier for $100 at a time when £1 = $1.32. At that point, the business has an obligation to pay the supplier the equivalent of £75.75 (that is, $100/1.32). Suppose further that, by the time that the business comes to settle the bill, the sterling exchange rate has depreciated to £1 = $1.21. Now the amount that will have to be paid is £82.64 (that is, $100/1.21). This means the bill has turned out to be £6.89 higher. The risk of such an event occurring is known as **transaction risk**. It is the risk that the exchange rate will move in a direction that adversely affects the business partway through a transaction.

DEALING WITH TRANSACTION RISK

There are various ways of dealing with transaction risk, which we shall now consider.

Doing nothing

Methods for dealing with transaction risk either seek to prevent the worst happening, or seek to ensure that the business will not suffer if it does. In some ways, these methods are like insurance policies and, like insurance policies, costs must be incurred to use them. Businesses do not insure against all adverse events. They tend to do so only where these events have a low probability of occurring and/or a high probability of significant loss. One example of this may be property insurance for a factory or office.

Activity 13.6

Try to think of at least two other forms insurance that a business might consider necessary.

These may include:

- product liability insurance (for manufacturers)
- professional liability insurance (for accountants, solicitors and so on)
- vehicle insurance
- business interruption insurance
- workers' compensation insurance.

Each of the above is likely to have a low probability of occurring and/or a high probability of significant loss.

Where a potential loss has a high probability of occurring, insurance premiums to make good the loss are likely to be uneconomic. An ice cream seller, for example, could insure against spells of bad summer weather. In the UK, however, there is such a high probability of these occurring that the premiums would be prohibitive. As a result, ice cream sellers will 'self-insure', that is, they will bear the risk themselves.

Adverse exchange rate movements for an international business are like bad summer spells in the UK – common but difficult to predict. Where a business is owed money denominated in a foreign currency, the exchange rate may move in a favourable, or an unfavourable, direction for the business. It may also remain approximately the same. Thus, a business with a continuous

stream of foreign transactions may find that, over time, gains and losses from exchange rate movements tend to cancel one another out. It is only where the business is exposed to an unusually large, perhaps isolated, transaction risk that managing it, by one of the methods described below, may be considered useful.

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Activity 13.7

A US exporter sold goods to a Belgian importer. The goods were invoiced in euros and the invoice was paid one month after it was issued. During the period between the issue of the invoice and its payment, the US$ strengthened against the euro.

Assuming that neither the US exporter nor the Belgian importer hedge against foreign exchange risk, what was the foreign exchange gain or loss arising from this transaction for each party?

We are told that the sale is invoiced in euros and so the Belgian importer will be unaffected by changes in the exchange rate. Hence, the business will make neither a gain nor a loss. The US exporter will suffer a loss, however. A strengthening US$ will mean that fewer dollars will be received in exchange for the euros.

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Trading in the home currency

It is possible for a UK business to avoid transaction risk by insisting that purchases and sales prices are denominated in sterling. This, however, is not common practice. The effect of adopting this policy will be to transfer the risk from the business to its customers and suppliers. By shifting the transaction risk to foreign customers, the business may well lose sales (or be penalised by having to accept lower prices). By shifting the transaction risk to foreign suppliers, the opportunity to buy from those invoicing only in their home currency will be lost. In each case, therefore, eliminating one type of risk will only be achieved by exposing the business to another.

A key point to consider in this context is market power. If the business's goods or services are sought after and in short supply, foreign customers may agree to being invoiced in the seller's home currency. Similarly, foreign suppliers, eager to make a sale, may agree to be invoiced in the customer's home currency, even though it is against their normal practice. Both customers and suppliers may also feel that they are not in a strong enough position to adjust the prices in order to compensate for bearing the transaction risk.

Maintaining a foreign currency bank account

By maintaining a separate bank account in each of the currencies in which it transacts foreign operations, a business may be able to delay conversion until it judges the rate to be favourable. If, for example, a UK business has US customers, it could open a bank account in US dollars and pay all dollar cash receipts into it. The account would then attract interest until such time as the dollar strengthened against sterling. At that point, the business could convert the balance to sterling.

Where a UK business buys from US suppliers that invoice in dollars, it could convert sterling amounts to dollars when sterling is relatively strong. These amounts could be paid into an interest-bearing, dollar-denominated bank account and used to make payments in dollars when necessary.

A problem with this strategy, however, is the opportunity cost of having cash tied up in the foreign currency bank account that could be used more profitably elsewhere in the business.

Activity 13.8

Apart from incurring an opportunity cost, what other problem may arise with this strategy?

Deciding on the best time to convert may be difficult. The more efficiently the foreign exchange market operates for the two currencies, the more difficult it becomes to judge future exchange rate movements.

Netting the transactions

A business that trades both as a buyer and a seller in the same foreign currency may be able to set receipts from sales against payments for purchases. This is often best achieved by opening a bank account in the foreign currency. Netting transactions in this way provides a neat solution to the problem. It relies, however, on particular conditions arising that most businesses may not experience. Nevertheless, where precise netting cannot be achieved because, for example, receipts in the foreign currency exceeded payments, partial netting may still be possible. Only the balance would then have to be converted.

Forward exchange contracts

Earlier in this chapter, we saw that a business can enter into a foreign exchange contract today, at an agreed exchange rate, but where the currencies will not be exchanged until a specified future date. If, for example, a UK business knows that it will receive $1 million in three months' time, it can enter into a forward exchange contract immediately. This will fix the rate of exchange and thus eliminate transaction risk. The rate of exchange will be closely linked to the spot rate. If interest rates are higher in the USA than in the UK, the rate will be at a discount to the spot price in sterling for $1. If interest rates are higher in the UK, the price will be higher than (at a premium to) the spot price.

A business will use the forward market where it has an obligation to make a future payment in a foreign currency and it wishes to avoid the risk that the foreign currency will strengthen against the home currency during the contract period. Where strengthening of the foreign currency occurs, the business will be protected as the forward exchange contract has 'locked in' the exchange rate. But what if the home currency strengthened against the foreign one? In this case, the business would lose out. It would have paid less to discharge the obligation by leaving the risk uncovered. Thus, by using the forward market, potential gains from a favourable movement in exchange rates are foregone in order to avoid potential losses through an adverse movement.

A further problem associated with this hedging method is that the contract is binding. Both parties must, therefore, complete it. If the UK business, expecting to receive the $1 million, fails to receive it for whatever reason, it is still left with its obligation under the forward contract.

Example 13.1 shows how the receipts from a forward contract are calculated.

Example 13.1

Jurassic plc, a UK business, expects to receive €500,000 in three months' time for goods sold to a French customer. It has decided to hedge the currency risk by taking out a forward contract. The following rates have been quoted:

	Spot rate	3 months forward
Euro per £	1.1925–1.1985	1.1890–1.1897

If the forward contract is taken out, what are the sterling receipts for Jurassic plc?

Solution

In this case, Jurassic plc is selling euros. This means that the higher three months' forward rate applies. Hence:

$$\text{Sterling receipts} = 500,000/1.1897$$
$$= £420,274$$

The use of forward contracts seems to be very widespread, among larger businesses at least. A 2018 survey of the largest 330 businesses that are clients of Wells Fargo bank found that 93 per cent of respondents used forward contracts (see reference 2 at the end of the chapter).

Money market hedges

Businesses use **money market hedges** to avoid transaction risk by combining the spot foreign exchange market with borrowing or lending. Suppose that a UK business is expecting to receive $1 million in three months' time. It can borrow an amount in dollars that, with interest, will grow to $1 million. The borrowed dollars can be converted to sterling immediately, thus eliminating the transaction risk. If the interest rate for three months is 2 per cent, the amount to be borrowed is $980,392 (that is, $1 million × 100/102). This will be converted to sterling immediately on the spot market. When the $1 million is received, it will exactly pay off the borrowed amount, with interest.

Similarly, if another UK business has to pay $1 million to a US supplier in three months' time, it can immediately convert sterling into dollars such that the amount of dollars would be, with interest, $1 million in three months' time. Again, assuming a 2 per cent interest rate for three months, the amount needed would be $980,392. With an exchange rate of £1 = $1.32, £742,721 (that is, £980,392/1.32) would have to be converted into dollars on the spot market.

The disadvantages of this method are similar to those of using the forward market. The opportunity to gain from a potential favourable exchange rate movement is foregone. The business also has a liability, or an asset, in a foreign currency and is reliant on a foreign currency receipt, or payment, to complete the hedge.

Activity 13.9

Hutton plc, a UK business, is due to receive €800,000 in four months' time for goods supplied to a Spanish customer. The business has decided to use a money market hedge to manage currency risk. The following information concerning borrowing rates is available:

Country	Borrowing rate per year
Spain	6%
UK	4%

The spot rate is £1 = €1.1490 − 1.1520.
Using the money market approach, what is the £ sterling value of the amount that Hutton plc will have to borrow now in order to match the receipt?

We are told that the annual borrowing rate for euros is 6 per cent, that is, 2 per cent for four months.
   The business will borrow:

$$€800,000/1.02 = €784,314$$

This amount must then be converted at the spot rate. As the business is selling euros, the higher rate will apply. Hence:

$$€784,314/1.1520 = £680,828$$

(Note: The UK borrowing rate is not relevant to the problem.)

Currency options

With the methods for eliminating transaction risk discussed so far, there is no opportunity for a business to benefit from a favourable movement in exchange rates. These hedging methods also leave the business exposed to the risk that an overseas customer will default.

   Currency options offer a solution to both of these problems. A foreign exchange option gives the owner the right, but not the obligation, to exchange a specified amount of a particular currency for another one, at a rate and at a time specified in the option contract. Suppose a business is expecting to receive a sum in a foreign currency in three months' time. It could buy an option to exchange the specified amount of foreign currency for the home currency in three months' time at a specified rate (known as the *strike rate*). This is known as a 'put' option because it enables the holder to sell the foreign currency.

   Note that the holder of the option has the right to sell the currency to the grantor of the option, but does not have to do so. If the foreign currency has strengthened against the home one during the three months, the option holder can allow the option to lapse and sell the currency in the spot market when it is received. Similarly, if the customer defaults, the option can be allowed to lapse. The option acts rather like an insurance policy. A business will be prepared to take out the option because, if the worst happens and the foreign currency weakens against the home one, it can exercise its option. If all goes well, however, the option will be allowed to lapse. The maximum loss incurred will be the cost of the option.

Activity 13.10

A business has a put option on £500,000 in exchange for US dollars at a strike rate of £1 = $1.30. The exchange rate at the option expiry date is £1 = $1.34. Should the option be exercised or should it be allowed to lapse?

The put option should be allowed to lapse as more US dollars would be received by selling in the market.

It is also possible to buy a 'call' option. This gives the holder the right to buy a specified amount of a foreign currency, at a specified exchange rate and a specified time in the future. Thus, a business expecting to pay a bill denominated in a foreign currency might choose to avoid transaction risk by buying a call option in the currency concerned.

Activity 13.11

A Singapore-based business has a call option on £850,000 in exchange for Singapore $ at an exchange rate of £1 = Singapore $1.7540. The exchange rate is £1 = Singapore $1.7520 at the expiry date of the option.
Should the option be exercised or allowed to lapse?

The call option should not be exercised and should be allowed to lapse. This is because it is cheaper to buy UK sterling at the current exchange rate.

We saw above that currency options provide the holder with a choice. This can be extremely useful where there is uncertainty over future receipts or payments. Most currency options are negotiated 'over the counter' with a bank. These options cannot be traded on an exchange because they are tailored to the needs of the option holder rather than offered in a standardised form.

The main disadvantage of using foreign exchange options is the cost. This can be significant and must be paid when the option is first taken out. Remember that the grantor of the option cannot insist that the business exercises the option. It will only be exercised if the exchange rate movement is disadvantageous from the grantor's point of view. This means that the grantor must have a strong incentive to grant an option.

Example 13.2 shows how an option may be used to deal with foreign exchange risk.

Example 13.2

Yukon Inc. is a US-based shipping business that operates throughout the world. In recent years, heavy demand for commodities, particularly among developing nations, has created significant opportunities for the business. To exploit these opportunities further, Yukon Inc. has agreed to purchase a new oil tanker from a German shipyard for €20.2m. The oil tanker is near completion as it was due to be sold to another business. The order, however, was recently cancelled and Yukon Inc has agreed to buy the tanker, subject to certain changes in the tanker's specifications. The German shipyard will deliver the ship in four months' time and Yukon Inc. must pay the full purchase price at this point.

To deal with the foreign exchange risk associated with the deal, Yukon Inc is considering the purchase of an over-the-counter option at an exercise price of €1 = $1.1345 with a premium cost of $2.50 per €100. The current spot rate is €1 = $1.1250.

Assume that in four months' time the spot rate moves to €1 = $1.1425.

Calculate the total cost of using the over-the-counter option for hedging.

→

Options do not seem to be very widely used as a means of hedging transaction risk. The Wells Fargo survey, mentioned earlier in the chapter, found that only 20 per cent of respondents use them (see reference 2 at the end of the chapter).

Currency futures

Currency futures contracts are similar to forward contracts in that they bind the parties to an exchange of a specified amount of currency, at an exchange rate and future date set out in the contract. Futures differ from forwards, however, as the contracts are standardised rather than tailored to the specific needs of the holder. They are available for only particular units of currency (euros, for example are traded in units of €125,000) and for set maturity dates. They are also available for only a limited number of currencies. This lack of flexibility may make currency futures an inefficient form of hedging. It may not be possible to hedge a particular exchange rate risk because the traded units, and currencies do not match the needs of the business. Transactions costs for futures, however, tend to be fairly low and their standardised form enables them to be bought and sold. As a result, there is a market for currency futures. This means that businesses can create a hedge without having to identify a counterparty: they can simply buy a futures contract in the market. Similarly, a futures contract that is no longer required can be sold.

To explain how futures contracts work, assume that a US business is due to receive €2 million in three months' time from a German customer. To hedge the risk of adverse exchange rate movements, the US business could sell futures contracts for these euro receipts. Euro futures contracts are denominated in €125,000 units and so a total of 16 (that is, €2m/€125,000) contracts would be required. By selling the euros in this way, the US business will have 'locked in' the exchange rate. To settle a futures contract, a business will usually do so by taking an equal but opposite position by the last day of trading. This will have the effect of offsetting the original position. In the example used above, this means that the US business would buy euro futures to close its position.

Example 13.3 shows how a hedge using futures contracts may be carried out and how the efficiency of the hedge may be calculated.

Example 13.3

Let us now assume that Yukon Inc (see Example 13.2) wishes to manage the foreign exchange risk through the purchase of euros' futures contracts. These contracts will be purchased immediately and then sold in four months' time in order to 'close' the business's position. The relevant futures contract size is €125,000.

The tick value is $12.50 and one tick is 0.01 cents per €. (These terms will be explained below.) Euro futures contracts are currently priced at €1 = $1.1140.

Assume that in four months' time the spot rate moves to €1 = $1.1425 and the futures price moves to $1.1290.

Calculate the total cost of using futures contracts and the hedge efficiency.

Solution

The starting point is to determine the number of contracts, to the nearest whole number, that will be required. This is calculated by dividing the total payment due (in euros) by the futures contract size. Thus:

$$\text{No. of contracts} = €20.2m/€125,000$$
$$= 162$$

The hedge involves the immediate purchase of 162 contracts followed by the sale of these contracts in four months' time. The loss, or gain, on the sale of each contract is calculated as follows:

	$
Immediate purchase cost per contract	1.1140
Selling price per contract in four months' time	1.1290
Gain per contract	0.0150 (that is 1.5 cents)

The tick size of $0.01 cents per euro, mentioned above, represents the minimum amount by which the price of a futures contract can change. The tick value of $12.50, also mentioned above, means that for every $0.01 cents by which the price of a futures contract increases, or decreases, the overall gain, or loss, will be $12.50 per contract.

The total gain from hedging by the use of futures contracts is, therefore:

$$\text{No. of contracts} \times \text{(Gain per contract/tick size)} \times \text{Tick value}$$

Thus:

		$
Total gain	162 × (1.5/0.01) × $12.50	303,750

This gain must be deducted from the cost of converting €20.2m in four months' time to US$ at the spot rate in order to find the cost of the hedge. Thus,

		$
Purchase of €20.2m in 4 months' time	(€20,200,000 × 1.1425)	23,078,500
Total cost		22,774,750

To calculate the efficiency of the hedge, we first compare the number of dollars required to obtain €20.2m, based on the current spot rate, with the number of dollars required based

→

on the spot rate in four months' time. The difference between the two figures will reveal the loss, or gain, arising from movements in the spot market. Thus:

		$
Immediate conversion	(€20,200,000 × 1.1250)	22,725,000
Conversion after 4 months	(€20,200,000 × 1.1425)	23,078,500
Loss on the spot market		353,500
This loss, however, has been largely offset by gains from		
futures contracts as calculated earlier. That is:		303,750

The overall efficiency of the hedge is calculated by dividing the gain from futures contract by the loss from the spot market. The answer is then expressed as a percentage. Thus:

$$\text{Hedge efficiency ratio} = (303{,}750/353{,}500) \times 100\% = \underline{85.9\%}$$

Activity 13.12

Compare the findings from the two methods of hedging being considered by Yukon Inc to deal with currency risk (see Examples 13.2 and 13.3). Which do you think is the more suitable and why?

Futures contracts are slightly less expensive than the purchase of an over-the-counter option. We saw, however, that they do not provide a perfect hedge for the deal. The hedge efficiency ratio is less than 100%. Futures contracts are binding agreements. This means that Yukon Inc. will be committed to buying euros. Before taking this course of action, there should therefore be a high degree of confidence that the tanker deal will be finalised. If there is uncertainty surrounding this deal, a currency option may provide the better course of action.

Currency futures are also referred to as *foreign exchange futures* or *FX futures*. The Wells Fargo survey of large, mainly US, businesses, mentioned earlier in the chapter, indicated that currency futures are not a very popular approach to dealing with exchange rate risk (see reference 2 at the end of the chapter).

Activity 13.13

Girton plc is a UK business that has recently purchased machinery from a US supplier. Girton plc expects to pay $600,000 in three months' time for this purchase. To hedge against foreign exchange risk, the business uses currency futures. US$ futures contracts are currently trading at £/$1.40, which is also the current spot rate. The contract size is £62,500, the tick size is $0.01 and the tick value is $6.25 per tick.
   What is the total gain or loss from trading futures contracts if, in three months' time, the futures price is £/$1.35? (Work to the nearest contract)

We must first calculate the number of contracts required. This means dividing the payment required (in £ sterling) by the contract size. The required £ sterling amount is calculated by

dividing the amount to be paid in US$ by the current futures rate/spot rate stated in the question, that is $1.40. Hence:

$$\$600{,}000/1.40 = £428{,}571$$

The number of contracts required to hedge the transaction is, therefore:

$$£428{,}571/£62{,}500 = 7 \text{ (to nearest contract)}$$

There will be a gain on the futures contracts as currency movements favour the business. The gain per contract is $1.40 − $1.35 = $0.05 (that is 5 cents).

The total gain from trading futures contracts will therefore be:

$$= 7 \times (5.0/0.01) \times \$6.25$$
$$= \$21{,}875$$

The UK online fashion and beauty business, Asos plc, is an example of a business that has transaction and economic foreign exchange risk exposure. This is because the business both sources and sells its products internationally. **Real World 13.2** is an extract from Asos plc's 2018 annual report.

Real World 13.2

Foreign exchange risk management is in fashion

The Group operates internationally and is therefore exposed to foreign currency transaction risk, primarily on sales denominated in US dollars, euros and Australian dollars and on costs denominated in US dollars and euros.

The Group's policy is to match foreign currency transactions in the same currency, taking into account where both sales and costs arise in the same currency. Where appropriate, the Group uses financial instruments in the form of forward foreign exchange contracts to hedge future highly probable forecast foreign currency cash flows.

Source: Extract from: Asos plc, 2018 Annual Report, p. 113.

Futures, forward contracts and options are all examples of financial derivatives that can be used to reduce or eliminate risk.

ECONOMIC RISK

The problem

When a business's fortunes can be affected by exchange rate movements, the business is exposed to **economic risk**. In view of this, transaction risk is sometimes seen as a part of economic risk. Transaction risk, however, tends to be related to short-term receivables and payables, whereas economic risk tends to be related to more long-term hazards of exchange rate movements.

Economic risk covers such hazards as:

■ long-term borrowings in a foreign currency costing more to service and to repay, as a result of the home currency weakening against the relevant foreign currency

■ investment projects becoming less profitable, because the home currency has strengthened against the relevant foreign currency, thereby reducing the value of operating cash flows

■ sales revenue decreasing because the home currency has strengthened against the relevant foreign currency, thereby making home-produced goods or services less competitive.

Businesses affected by economic risk

It is tempting to think that only businesses transacting part of their activities in a foreign currency are exposed to foreign exchange economic risk. However, this is not necessarily the case. Most businesses are affected by foreign exchange economic risk. Suppose a UK business uses only UK suppliers, manufactures in the UK and sells its product, or service, exclusively in the UK market. At first sight, such a business may seem immune from economic risk. What if, however, it has a market competitor who supplies the product or service from Japan and sterling has strengthened against the yen? Now the Japanese product could become cheaper, in sterling terms, without the Japanese business receiving less in terms of yen. This could severely damage the UK business's ability to sell, at least at prices normally charged. Now suppose that a major element of the UK business's market is other UK businesses largely engaged in the export market. What would happen if sterling strengthens against most other currencies? The UK business's main customers may find their markets under pressure as a result of strong sterling. This could, in turn, lead to a fall in sales for the UK business, even though it does not sell overseas itself.

Managing economic risk

Managing economic risk is not as straightforward as managing transaction risk. Economic risk usually requires a more strategic approach that is focused on limiting exposure. This may, therefore, involve:

■ avoiding excessive exposure to a single foreign currency by diversifying production facilities, raw material sources and markets

■ trading in foreign countries where the home government pegs the home currency to the relevant foreign ones

■ matching payments and receipts in the same currency.

Adopting the methods identified above, however, may be easier said than done. It may be difficult, for example, to trade in countries of a business's choice; sales must be made wherever they can.

There are certain hedging methods that can be used to mitigate this form of risk. Two of these are considered below.

Back-to-back loans

A **back-to-back loan** is an arrangement between two businesses located in different countries. It involves each business making a loan to the other in its home currency and receiving in return an equivalent loan in a foreign currency as security. The loans are for a specified period, which is usually less than ten years. When the loans are due to be repaid, it will be at the rate agreed when the hedging arrangement is first made. As the loans will be repaid in the home currency, there is no exposure to the risk of currency fluctuations.

This form of hedging arrangement is no longer popular and has been largely replaced by **currency swaps**, which we now discuss.

Currency swaps

A problem of borrowing funds in a foreign country is that exchange rate fluctuations can alter the sterling cost of servicing and repaying the debt. Currency swaps can overcome this problem. Here, two borrowers based in different countries, each holding debt of equivalent size, agree to swap the cash flow obligations of their debts. Thus, a UK business may agree to take over the interest payments on a foreign business's debt in sterling. In exchange, the foreign business takes over the obligations regarding the UK business's debt in its home currency.

The agreement to swap debt of equivalent size will be based on an expressed, or implied, exchange rate. Thus, if a UK business agrees to swap a debt of £100 million for a debt of $130 million from a US business, the exchange rate will be £1 = $1.30. While the principal sums can be exchanged, it is not necessary to do so. Instead, notional principal sums can be used to form the basis of a swap agreement. These are then employed to calculate interest payments. Each party to the swap agreement can select either a fixed or floating rate of interest.

In Chapter 6 we came across interest rate swaps, which are based on a similar idea to currency swaps.

Currency swaps are negotiable, which means that maturity dates, interest rates and so on, are all subject to agreement between the parties. This makes them a flexible form of hedging. The Wells Fargo survey, mentioned earlier in the chapter, revealed that around 13 per cent of respondents use currency swaps (see reference 2 at the end of the chapter).

A final aspect of managing economic risk, which is concerned with diversification, will be picked up later in this chapter.

TRANSLATION RISK

The problem

The final element of exchange rate risk is **translation risk**. This arises where a business generates income or holds assets, liabilities, or equity in a foreign country. There is a risk that these items will change in value as a result of changes in the exchange rate. Translation risk is a concern because the accounting rules in most countries require the performance and position of the whole of a business's operations, including foreign ones, to be incorporated in its income statement and statement of financial position. Reporting foreign operations involves translating figures expressed in foreign currencies into the home currency. If the foreign currency is weak relative to the home one, both reported profits and asset values will be lower than would have been the case had the foreign currency been stronger.

To illustrate this form of risk let us assume that a UK business buys an asset in the US for $10 million at the beginning of the financial year. If the exchange rate, at this point, was £1 = $1.32, the asset would be initially reported in the accounts of the UK business at £7.58 million (that is, $10m/1.32). If, at the end of the financial year, there had been no change in the asset's dollar value but the exchange rate is now £1 = $1.35, the asset would now be reported in the UK business's accounts at £7.41m (that is $10m/1.35). A foreign currency translation loss of £0.17 million (that is £7.58m – £7.41m) will have occurred. This loss must be reported in the income statement and the asset must be reported in the statement of financial position at the revised (lower) sterling value. It is nevertheless the case that the business holds the same asset and its value, in dollar terms, remains unchanged.

We can see that translation risk is different from either transaction or economic risk insofar that it is not associated with cash flows. Exposure to this form of risk is not dependent on cash flowing from the foreign operation to the home country.

It is a matter of some debate as to whether translation risk has any economic impact. Where a business has assets in a foreign country whose exchange rate weakens against the home currency, those assets along with the future profits they generate, will be worth less in home currency terms (assuming all other things remain equal). Given the situation just described, the evidence appears to show that the business's share price will fall. It therefore seems difficult to deny that translation risk presents a real problem. In can, nevertheless, be argued that the foreign assets will remain just as valuable and productive, as measured in the local currency, irrespective of exchange rate movements.

The question probably hinges on the location and local currency of shareholders. If they are based in the business's home country, the value of their assets, in terms of the home currency, will be less. If they are based elsewhere, there may not be a problem.

Managing translation risk

Translation risk can be very difficult to manage and, as with economic risk, a strategic approach is probably most suitable. The following actions may be possible:

■ avoiding excessive exposure to a single foreign currency by having operations in a range of countries, each with different, unconnected, currencies
■ having foreign operations in countries where the government intends to peg the home currency to the relevant foreign currencies
■ financing much of the foreign investment with borrowings in the local currency, so that translation losses of assets' values are matched by gains on liabilities.

As with transaction risk and, to a lesser extent, economic risk, there are arguments for ignoring translation risk. One reason is the commercial difficulties and cost of taking the strategic steps listed above. It may be very expensive, for example, to raise finance in a country where the business wishes to make an investment in a manufacturing plant. The other reason, which is concerned with portfolio effects, we shall consider later in the chapter.

Although many UK businesses do not appear to hedge translation risk, Associated British Foods plc, the food manufacturer, makes some attempt to do so. **Real World 13.3** is an extract from its 2018 annual report.

Real World 13.3

Lost in translation

The group presents its financial statements in sterling. As a result of its worldwide operations, the group is exposed to foreign currency translation risk where overseas operations have a functional currency other than sterling. Changes in foreign currency exchange rates impact the translation into sterling of both the income statement and net assets of these foreign operations.

Where appropriate, the group finances its operations by borrowing locally in the functional currency of its operations. This reduces net asset values reported in functional currencies other than sterling, thereby reducing the economic exposure to fluctuations in foreign currency exchange rates on translation.

The group also finances its operations by obtaining funding at group level through external borrowings and, where they are not in sterling, these borrowings may be designated as net investment hedges. This enables gains and losses arising on retranslation of these foreign currency borrowings to be charged to other comprehensive income, providing a partial offset in equity against the gains and losses arising on translation of the net assets of foreign operations.

The group does not actively hedge the translation impact of foreign exchange rate movements on the income statement (other than via the partial economic hedge arising from the servicing costs on non-sterling borrowings).

Source: Extract from Associated British Foods plc, 2018 Annual Report, p. 148.

The main forms of foreign exchange risk discussed are summarised in Figure 13.2.
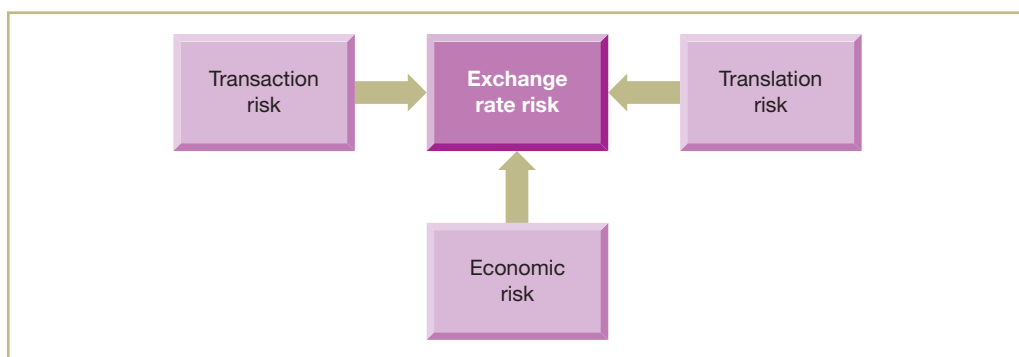
Figure 13.2 Forms of foreign exchange risk

INTERNATIONAL INVESTMENT APPRAISAL

All investment projects should be appraised in the same manner, irrespective of whether their cash flows emanate from the home country or from a foreign country. The NPV method (described in Chapter 4) is applicable to all investment projects, whatever their location and in whichever currency the cash flows are generated. There are, however, certain aspects of international investment projects that need to be considered.

Estimating exchange rates

Where part of the cash flows associated with a project is in a foreign currency, the appraisal process requires that all the relevant cash flows be expressed in a common currency. This will normally be the business's home currency. Thus, future cash flows must not only be estimated, but also translated into the home currency. In theory, this should be done by using an estimate of the exchange rate prevailing when the future cash flows are expected to occur. Given the difficulties of estimating future exchange rates, however, it is often assumed that they will stay at the same rate as when the investment appraisal is carried out, unless there is good reason to believe otherwise.

Taxation

There will usually be foreign taxation on profits generated outside the home country to take into account. Taxes on other aspects of the project, such as the occupation of property or the employment of workers, may also have to be considered.

Taxes on profits from foreign operations are often subject to a **double-taxation agreement**. This form of inter-governmental agreement seeks to avoid the levying of tax by more than one country on the same profits. In effect, this means that tax is paid at the higher of the home country's rate and the relevant foreign country's rate. Since UK corporation tax rates are low by international standards, UK businesses may therefore be faced with a higher tax bill for its foreign profits than for those generated in the UK.

Restriction of remittances

Some governments restrict the amount of profit that can be remitted by foreign investors to their home country.

Activity 13.16

Why might a government wish to do this?

Governments often impose this policy as remittances, when converted to another currency, will weaken their currency.

A restriction on remittances abroad also means that funds can only be reinvested in the country in which they were generated. This is likely to further benefit the country concerned. Whatever the reason for the restriction, it should be taken into account when making an investment decision.

Environmental and cultural factors

There may be particular environmental and cultural issues connected to a foreign location that require investigation. Environmental issues may relate to matters such as air pollution, natural hazards and resource depletion. By investing in a particular location, a business may also find itself at risk of promoting environmental degradation. Cultural issues may arise that conflict with the way in which the business normally operates. These issues may be related to various matters including leadership style, communication patterns and management practices. The greater the cultural differences that exist, the more difficult international expansion is likely to be.

Risk assessment

There are likely to be risks inherent in a foreign environment that do not arise at home. These may include political risk, that is, the risk concerned with the effects of war and civil unrest, unexpected increases in taxes, restriction of remitting funds to the UK and the expropriation of foreign assets. Such risks may not make the investment project, overall, more risky than an equivalent project in the home country. They may, however, be different to those faced at home.

One way to avoid political risk is simply to avoid investing in those countries where the political risk is high. There are commercial services that provide information on political risk, country by country. Another way of avoiding political risk is to insure against it. It is quite common for businesses to insure their foreign investments.

The UK supermarket retailer, Tesco, plc, operates in foreign countries. **Real World 13.4** is an extract from its 2018 annual report. In this report, the business describes two key risks arising from its foreign operations and how these risks are being controlled.

Real World 13.4

Going to the local

Long-term changes in the global political environment mean that in some markets there is a push towards greater regulation of foreign investors and a favouring of local companies.

The engagement of leadership and senior management is critical in the successful management of this risk area and leaders provide clear tone from the top for colleagues.

Source: Extract from: Tesco plc, 2018 Annual Report, p. 24.

International investment and risk reduction

We saw in Chapter 5 that it is probably better for businesses to concentrate on the most profitable opportunities and to leave risk diversification to the shareholders at the portfolio level. This is because shareholders can eliminate nearly all specific risk from their portfolios by having a reasonably large number (15 to 20) of holdings of shares in businesses across a range of industries. Logically, we can extend this principle to diversifying into international shares. This is because risks that are systematic within one country might be specific to that country and so can be eliminated through international diversification.

The evidence (see reference 3 at the end of the chapter) supports this assertion, showing that international portfolio diversification leads to a relationship between portfolio risk, on the one hand, and the number of different holdings in the portfolio, on the other, as shown in Figure 13.3.

As the size of the portfolio is increased the level of risk diminishes, but at a decreasing rate such that, for a portfolio consisting of 15 to 20 securities, adding more securities does little or nothing to reduce total risk further. This is true for both domestic and international portfolios, but the level of risk reduction is significantly greater with the international portfolio.

Figure 13.3 The risk of various-sized, randomly selected portfolios, comparing a domestic share portfolio with an international one

Figure 13.3 shows the standard deviation (a measure of risk) for portfolios of increasing levels of diversification. The risk of the portfolio decreases significantly as the number of securities making up the portfolio is increased. This decrease is significantly more pronounced when international securities are included in the portfolio.

Real World 13.5 provides some indication of the level of correlation between the returns from the world's stock markets.

Real World 13.5

Spreading the risk

Valadkhani, Chancharat and Harvie showed that there is a relatively low degree of correlation between the returns from equity investment in one country and those from others. For example, in the period December 1987 to April 2007, the correlation between the UK and Japanese equity markets was only 0.47 (perfect positive correlation = 1.00). Between the UK and Thailand, it was even lower at 0.17. The correlation between the UK and Germany was 0.66. So even diversification by a holder of UK shares into German shares seems likely to yield significant risk reduction. Diversification into Japanese or Thai shares seem likely to lead to even greater risk reduction.

Mathur, Singh and Gleason examined the accounting-based measures of performance of a set of chemical industry businesses that had diversified internationally over three years. They found strong support for gains from international diversification.

Ferreira and Ferreira looked at businesses operating in the countries that were members of the European Economic and Monetary Union (EMU) before 1999 and then took up the euro in 1999. The researchers found that, both before and after 1999, the risk reduction benefits of international diversification were significant. Before 1999, international diversification was

more effective at risk reduction than diversifying investments between different industries. After 1999, the two types of diversification were similar to one another in their effectiveness.

It might be imagined that, as time passes, stock markets around the world would become more and more in step. However, several more recent studies (for example, Bouslama and Ben Ouda (in 2014) and Moosa, Tawadros and Hallahan (in 2015)) show that the benefits of international diversification, in terms of risk reduction, remain significant.

Sources: Valadkhani, A., Chancharat, S. and Harvie, C. (2008) 'A factor analysis of international portfolio diversification', *Studies in Economics and Finance*, vol. 25, no. 3; Mathur, I., Singh, M. and Gleason, K. (2004) 'Multinational diversification and corporate performance: evidence from European firms', *European Financial Management*, September; Ferreira, M. and Ferreira, M. (2006) 'The importance of the industry and country effects in the EMU equity markets', *European Financial Management*, vol. 12, no. 3; Bouslama, O. and Ben Ouda, O. (2014) 'International portfolio diversification benefits: the relevance of emerging markets', *International Journal of Economics and Finance*, vol. 6, no. 3; Moosa, I. Tawadros, G. and Hallahan, T. (2015) 'The effectiveness of international diversification: whole markets versus sectors', *Applied Economics*, vol. 47, issue 6.

There is no reason, of course, why investors should not diversify their equity investment both between countries and between industries. The rational investor would do this.

Despite the clear benefits of international diversification, the evidence shows that investors are fairly reluctant to invest in overseas shares. International diversification is nowhere near the level that might be expected.

INTERNATIONAL INVESTMENT AT THE PORTFOLIO LEVEL

Given the shareholders' ability to eliminate specific risk by internationalising their portfolios, it can be argued that businesses should not spend time and money to avoid specific risks associated with international activities. Exchange rate risk provides a very good example of a specific risk. By the nature of things, currencies weaken and strengthen relative to one another. If the US dollar is weakening against sterling, sterling is strengthening against the dollar. Exchange rate risk cannot be, on an international basis, a systematic risk since a decline in the strength of one currency cannot go in lockstep with a decline in all other currencies. This, from an internationally diversified shareholders' perspective, means that businesses should leave international specific risks uncovered.

INTERNATIONAL INVESTMENT AND AGENCY COST

The vast amount of trading in the international currency futures and options markets implies that businesses do not follow the message of modern portfolio theory as applied to internationalised businesses. The reasons for this are not known with certainty. It may be that managers are not clear on the theory and evidence of risk reduction through portfolio diversification.

Another possibility is that managers pursue their own interests at the expense of the shareholders. Managers cannot normally diversify their employments. If their business suffers a major loss, perhaps as a result of being exposed to a significant exchange rate risk, and subsequently collapses, the managers will lose their jobs. The well-diversified shareholder can be more relaxed, however, since this loss is likely to be matched by a larger than expected gain elsewhere.

Despite the insights provided by portfolio theory, it seems that many businesses internationalise, at least partly, for risk diversification purposes. Thus, the costs of managing exchange rate risks may provide a further example of an agency cost.

Robinson plc is an international construction business that is based in the UK. The business expects to receive €10 million in six months' time as the final payment for a bridge that the business recently completed in Germany. The senior executives of the business have been debating whether, and if so, how, to hedge against the foreign exchange risk associated with the receipt.

The euro has been falling against the £ sterling in recent months and some commentators believe that this trend will continue. Others believe, however, that the euro is likely to strengthen against the £ sterling in the near future as the eurozone economies begin to grow. Faced with this uncertainty, the business is considering three possible options:

(i) To take out a currency option to hedge against the risk. An option is available from a bank at an exercise price of £1 = €1.20 and at a premium cost of £1.20 per €100.

(ii) To take out a forward exchange contract. Exchange rates are:

£/€ spot	1.1904−1.1944
£/€ 6-months forward	1.1809−1.1859

(iii) To do nothing.

Required:

(a) Show the effect of each of the three options that are being considered, assuming that the exchange rate has moved in six months' time to:
   (i) £1 = €1.25
   (ii) £1 = €1.15

(b) Discuss the results from (a) above.

The solution to this question can be found at the end of the book on p. 647.

SUMMARY

Business internationalisation

- Many businesses are international, at least to some extent.
- Expanded investment opportunities and financing options can enhance shareholder wealth.

Foreign exchange (forex)

- A market exists where prices are determined by supply and demand.
- Because of predictable central bank actions, the market is not necessarily price efficient.
- Currencies can be traded (exchanged) for immediate settlement (spot rate) or for settlement at a point in the future, at a different rate (forward rate).
- Currency dealers will quote two spot rates (for example, US$ per £1): the first (lower figure) at which they will sell the foreign currency; the second (higher) at which they will buy.

Theoretical explanations of relative exchange rates

■ Law of one price: a good or service will have the same price in all countries and prices for individual commodities and/or foreign exchange rates will adjust to make this true.

Exchange rate risk

■ Transaction risk – risk that the exchange rate will alter during the transaction period leading to a loss. Can be tackled in various ways:
   ■ Do nothing:
      ■ On average, a business will gain as often as it loses from foreign exchange movements.
      ■ Dangerous strategy where averaging may not work, for example with a particularly large or unusual transaction.
   ■ Trade in the business's home currency:
      ■ Often difficult to make sales in other than the customer's home currency, so there may be costs.
   ■ Maintain a foreign currency bank account:
      ■ Use it to make payments and bank receipts in the foreign currency concerned.
      ■ Make transfers to and from it (by converting from or to home currency) when the exchange rate is favourable.
      ■ Ties up cash (may create an opportunity cost), also difficult to judge when the rate is favourable.
   ■ Net transactions:
      ■ Set payments for purchases against sales receipts in the same currency, perhaps using a bank account in the currency.
      ■ Requires equal and opposite transactions in the same currency, which would be unusual – could work partially.
   ■ Use the forward market:
      ■ Deal done at an agreed (forward) rate, but the currencies are not exchanged until a specified future date, when the foreign debt or obligation is due.
      ■ Advantage: business knows how much it will receive or pay in terms of home currency.
      ■ Disadvantages: (1) business cannot gain from a favourable exchange rate movement because it is committed to the foreign exchange transaction; (2) the business is locked into the forward transaction should the overseas supplier or buyer default.
   ■ Use currency futures:
      ■ Exactly the same as forward contracts, except they are for standard amounts and dates, which means that there can be a market for them.
      ■ Advantages: (1) business knows how much it will receive, or pay, in terms of home currency; (2) futures can be bought and sold as required.

→

- Disadvantages: (1) business cannot gain from a favourable exchange rate movement because it is committed to the foreign exchange transaction; (2) business is locked into the futures contract should the overseas supplier or buyer default; (3) futures are inflexible (standardised amounts and dates).
- Use the spot market and a money market (borrowing or lending) hedge. For example, businesses expecting a receipt in foreign currency at a known future date should:
  1 borrow (in the foreign currency) an amount that will grow with interest to the expected receipt amount
  2 exchange the borrowings for home currency immediately
  3 in due course, use the receipt exactly to pay off the loan.
- Advantage: conversion takes place at the time of the sale or purchase and rate is known.
- Disadvantages: (1) cannot benefit from any favourable movement in the rate because forex transaction undertaken at the beginning; (2) the business is locked into the hedge should the overseas supplier or buyer default.
- Buy currency options – a right but not an obligation to exchange specified amounts of specified currencies on a specified date at a specified rate. For example, a business with a creditor to pay in a foreign currency in three months' time should:
  1 buy a call option for the amount of currency and date concerned, at the best rate available
  2 on the due date, exercise the option if the rate specified in the option is better than the spot rate at that time, or, if the spot rate is better than the option rate, use the spot market and let the option lapse.
- Advantage: can benefit from a favourable shift in the rate – no obligation to exercise the option.
- Disadvantage: buying the option costs money.
- Economic risk – similar to transaction risk, but long term. Can be tackled in various ways:
  - Strategic approaches, such as avoiding being too exposed in a particular currency.
  - Back-to-back loans: two businesses located in different countries make a loan to each other in their own currency and receive in return an equivalent loan in a foreign currency as security.
  - Currency swaps: two businesses with borrowings in different currencies agree to service each other's debt, each in its home currency.
- Translation risk – risk that assets held abroad will lose value in the home currency with an exchange rate movement thereby reducing shareholders' wealth.
  - Can be managed with strategic approaches.

International investment appraisal

- Raises problems additional to home country investment, for example assessment and estimating future exchange rates, foreign taxes, inability to repatriate investment returns.

International portfolio theory

- International security investment should increase the benefits of diversification because returns from securities in different countries tend to be relatively uncorrelated.

REFERENCES

1 Lee, H. and Khatanbaatar, S. (2012) 'Efficiency tests in foreign exchange market', *International Journal of Economic and Financial Issues*, vol. 2, no. 2.

2 Wells Fargo (2018) *2018 Risk Management Practices Survey* (online), Wells Fargo Foreign Exchange.

3 Shapiro, A. C. and Balbirer, S. D. (2000) *Modern Corporate Finance*, 2nd edn, Macmillan.

FURTHER READING

If you would like to explore the topics covered in this chapter in more depth, try the following books:

Arnold, G. and Lewis, D. (2019), *Corporate Financial Management*, 6th edn, Pearson, Chapter 22.

Brigham, E. and Ehrhardt, M. (2019) *Financial Management: Theory and Practice*, 16th edn, Cengage Learning Custom Publishing, Chapter 17.

Madura, J. and Fox, R. (2017) *International Financial Management*, 4th edn, Cengage Learning EMEA, Chapters 4, 11 and 12.

Pike, R., Neale, B., and Akbar, S. (2018) *Corporate Finance and Investment*, 9th edn, Pearson, Chapters 21 and 22.

CRITICAL REVIEW QUESTIONS

Solutions to these questions can be found at the back of the book on p. 658.

13.1 Why might a UK business achieve its objectives more effectively by internationalising its activities?

13.2 What are the advantages of doing nothing in relation to exchange rate risk? Under what circumstances might this approach be most suitable?

13.3 Compare and contrast the main features of forward exchange contracts with those of currency futures.

13.4 Although portfolio theory suggests that international diversification is best undertaken by shareholders, is this always the case? Can you think of a situation where shareholders may benefit from a business undertaking diversification?

Exercises 13.5 to 13.7 are more advanced than 13.1 to 13.4. Those with coloured numbers have solutions at the back of the book, starting on p. 659.

If you wish to try more exercises, visit the students' side of this book's companion website.

13.1 Planters plc manufactures agricultural implements, components for which are acquired from a number of sources, including some overseas ones. The implements are marketed in the UK and, increasingly, overseas.

The directors are aware that the business is exposed to exchange rate risk, but in the past have taken the view that this leads to losses and gains at a level that it has been prepared to accept. Recently, the scale of overseas trading has led the directors to consider the possibility of managing their foreign exchange risk exposure.

Required:

Draft a note for the directors explaining how buying and selling in foreign currencies exposes the business to risk. The note should then explain, in reasonable detail, how this risk might be managed in practice.

13.2 A French business is due to pay $3 million in six months' time to a US supplier. In order to hedge against currency risk, the French business decides to sell euro futures immediately at €1 = $1.1306 and to close its position by buying euro futures in six months' time. The contract size is €125,000 (Work to the nearest contract). The tick size is 0.01 cents and the tick value is $12.50.

Required:

Assuming that in six months' time the spot rate is €1 = $1.1274 and the euros future rate is €1 = $1.1289, what is the hedging gain or loss on the futures contract?

13.3 Tetron plc, a UK business, has purchased goods from an Italian supplier. This requires payment of €400,000 in two months' time. The business intends to take out an option at a strike price of £1 = €1.2226 to hedge the currency risk. A call option costs £0.60 per €100 and a put option cost £0.48 per €100. These options relate to the purchase or sale of euros.

Required:

State whether a put option or a call option would be required to hedge the risk and calculate the maximum amount to be paid if the spot rate in two months' time is £1 = €1.2042.

13.4 Mithras plc is a UK business that is due to receive €200,000 from a German customer in three months' time. A money market hedge will be used to manage currency risk and the following borrowing rates are available:

Country	Borrowing rate per year
Germany	16%
UK	10%

The spot rate is £1 = €1.18 − 1.19.

Required:

What is the sterling amount which Mithras plc will need to deposit now as part of the money market hedge?

13.5 Farndale plc is a UK supermarket chain with subsidiaries in a number of different countries. Some years ago, the business entered the US market but the financial results proved to be disappointing. As a result, the business recently agreed to sell its US stores to a rival US supermarket chain for $250 million. An initial payment of $100 million has already been received and the balance is due to be received in three months' time.

   The directors of Farndale plc have to decide whether, and if so, how, to hedge against the foreign exchange risk arising from this balancing payment. They are considering three possible options:

   (i) To take out a forward exchange contract. Exchange rates are:

£/$ spot	1.2806−1.2852
£/$ 3-months forward	1.2724−1.2780

   (ii) To take out a currency option. A bank has offered an option at an exercise price of £1 = $1.30 and at a premium cost of £1.10 per $100.
   (iii) To do nothing.

   Required:

   (a) Show the effect of each of the three options being considered, assuming that the exchange rate has moved in three months' time to:
   (i) £1 = $1.35
   (ii) £1 = $1.20
   (b) Discuss the results in (a) above.

13.6 Mistor S.A. is a large, event-management business based in Spain that has recently agreed to organise a large trade fair in the US. On 1 August Year 7, the business expects to receive $10 million for the work carried out and expects to pay suppliers and sub-contractors $7 million for their contribution to the fair. The business wishes to hedge against the risk of currency fluctuations and is considering the use of either a forward contract or futures contracts to achieve this. It is now 1 December Year 6 and the following information is available:

   1 The spot rate is quoted as $1.1300 per € and the August Year 7 forward rate is quoted at $1.109 per €.
   2 Euro futures contracts with a September Year 7 settlement date are quoted at $1.0950 per €.
   3 The contract size for euro futures is €125,000. The tick size is 0.01 cents and the tick value of each contract is $12.50.

   Assume that on 1 August Year 7 the spot rate is $1.0860 per € and that the September Year 7 futures price will be $1.0640 per €.

   Required:

   (a) State, with reasons, how much should be hedged using either a forward contract or a futures contract.
   (b) Assuming a forward contract is used to hedge against currency risk, calculate the net amount to be received in euros.
   (c) Assuming futures contracts are used to hedge against currency risk, calculate the number of futures contracts required, the total profit or loss arising from using futures contracts and the net amount to be received in euros.
   (d) Comment on the results obtained in your calculations in (b) and (c) above.

13.7 Larunda plc operates a shipyard in the UK and has recently completed the building of a passenger ferry for a French business. The ferry has successfully completed its sea trials and final payment of €20 million is due to Larunda plc in three months' time. The board of directors of Larunda plc will soon meet to decide whether, and if so, how, to hedge against the currency risk to which the business will be exposed.

Over the past few months there has been considerable volatility in the currency markets. As a result, the value of the euro has changed frequently against most major currencies, including the £ sterling. This period of volatility is set to continue and it is by no means clear how the euro will perform against major currencies, at least in the short term.

Faced with this uncertainty, three possible options are being explored by Larunda plc:

(i) To bear the currency risk by doing nothing.
(ii) To hedge against the risk by using a currency option. An over-the-counter option may be bought from a bank at a premium cost of £1.10 per €100 and at an exercise price of £1 = €1.19.
(iii) To hedge against the risk by taking out a forward exchange contract. Exchange rates are:

£/€ spot rate	1.1705−1.1755
£/€ 3-months forward	1.1640−1.1710

Required:

(a) Show the financial result of each of the three options being explored, assuming that the exchange rate in three months' time will be:
  (i) £1 = €1.1208
  (ii) £1 = €1.2432
(b) Discuss the financial results calculated in (a) above.
(c) Outline the main advantages and disadvantages of each of the options that Larunda plc is considering.

Appendix A
PRESENT VALUE TABLE

Present value of 1, that is, $(1 + r)^{-n}$
where: r = discount rate
n = number of periods until payment.

DISCOUNT RATE (r)

Period (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	Period (n)
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	Period
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

Period

(*n*)	16%	17%	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	0.862	0.855	0.847	0.840	0.833	0.826	0.820	0.813	0.806	0.800	0.794	0.787	0.781	0.775	0.769
2	0.743	0.731	0.718	0.706	0.694	0.683	0.672	0.661	0.650	0.640	0.630	0.620	0.610	0.601	0.592
3	0.641	0.624	0.609	0.593	0.579	0.564	0.551	0.537	0.524	0.512	0.500	0.488	0.477	0.466	0.455
4	0.552	0.534	0.516	0.499	0.482	0.467	0.451	0.437	0.423	0.410	0.397	0.384	0.373	0.361	0.350
5	0.476	0.456	0.437	0.419	0.402	0.386	0.370	0.355	0.341	0.328	0.315	0.303	0.291	0.280	0.269
6	0.410	0.390	0.370	0.352	0.335	0.319	0.303	0.289	0.275	0.262	0.250	0.238	0.227	0.217	0.207
7	0.354	0.333	0.314	0.296	0.279	0.263	0.249	0.235	0.222	0.210	0.198	0.188	0.178	0.168	0.159
8	0.305	0.285	0.266	0.249	0.233	0.218	0.204	0.191	0.179	0.168	0.157	0.148	0.139	0.130	0.123
9	0.263	0.243	0.225	0.209	0.194	0.180	0.167	0.155	0.144	0.134	0.125	0.116	0.108	0.101	0.094
10	0.227	0.208	0.191	0.176	0.162	0.149	0.137	0.126	0.116	0.107	0.099	0.092	0.085	0.078	0.073
11	0.195	0.178	0.162	0.148	0.135	0.123	0.112	0.103	0.094	0.086	0.079	0.072	0.066	0.061	0.056
12	0.168	0.152	0.137	0.124	0.112	0.102	0.092	0.083	0.079	0.069	0.062	0.057	0.052	0.047	0.043
13	0.145	0.130	0.116	0.104	0.093	0.084	0.075	0.068	0.061	0.055	0.050	0.045	0.040	0.037	0.033
14	0.125	0.111	0.099	0.088	0.078	0.069	0.062	0.055	0.049	0.044	0.039	0.035	0.032	0.028	0.025
15	0.108	0.095	0.084	0.074	0.065	0.057	0.051	0.045	0.040	0.035	0.031	0.028	0.025	0.022	0.020
16	0.093	0.081	0.071	0.062	0.054	0.047	0.042	0.036	0.032	0.028	0.025	0.022	0.019	0.017	0.015
17	0.080	0.069	0.060	0.052	0.045	0.039	0.034	0.030	0.026	0.023	0.020	0.017	0.015	0.013	0.012
18	0.069	0.059	0.051	0.044	0.038	0.032	0.028	0.024	0.021	0.018	0.016	0.014	0.012	0.010	0.009
19	0.060	0.051	0.043	0.037	0.031	0.027	0.023	0.020	0.017	0.014	0.012	0.011	0.009	0.008	0.007
20	0.051	0.043	0.037	0.031	0.026	0.022	0.019	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005

Appendix B

ANNUAL EQUIVALENT FACTOR TABLE

Annual equivalent factor $A_{N,i}^{-1}$

	i	0.04	0.06	0.08	0.10	0.12	0.14	0.16	0.18	0.20
N	1	1.0400	1.0600	1.0800	1.1000	1.1200	1.1400	1.1600	1.1800	1.2000
	2	0.5302	0.5454	0.5608	0.5762	0.5917	0.6073	0.6230	0.6387	0.6545
	3	0.3603	0.3741	0.3880	0.4021	0.4163	0.4307	0.4453	0.4599	0.4747
	4	0.2755	0.2886	0.3019	0.3155	0.3292	0.3432	0.3574	0.3717	0.3863
	5	0.2246	0.2374	0.2505	0.2638	0.2774	0.2913	0.3054	0.3198	0.3344
	6	0.1908	0.2034	0.2163	0.2296	0.2432	0.2572	0.2714	0.2859	0.3007
	7	0.1666	0.1791	0.1921	0.2054	0.2191	0.2332	0.2476	0.2624	0.2774
	8	0.1485	0.1610	0.1740	0.1874	0.2013	0.2156	0.2302	0.2452	0.2606
	9	0.1345	0.1470	0.1601	0.1736	0.1877	0.2022	0.2171	0.2324	0.2481
	10	0.1233	0.1353	0.1490	0.1827	0.1770	0.1917	0.2089	0.2225	0.2385
	11	0.1141	0.1268	0.1401	0.1540	0.1684	0.1834	0.1989	0.2148	0.2311
	12	0.1066	0.1193	0.1327	0.1468	0.1614	0.1767	0.1924	0.2086	0.2253
	13	0.1001	0.1130	0.1265	0.1408	0.1557	0.1712	0.1872	0.2037	0.2206
	14	0.0947	0.1076	0.1213	0.1357	0.1509	0.1666	0.1829	0.1997	0.2169
	15	0.0899	0.1030	0.1168	0.1315	0.1468	0.1628	0.1794	0.1964	0.2139

Appendix C
SOLUTIONS TO SELF-ASSESSMENT QUESTIONS

Chapter 2

2.1 Quardis Ltd

(a) Projected income statement for the year ended 31 May Year 9

	£000	£000
Sales revenue		280
Cost of sales		
Opening inventories	24	
Purchases	186	
	210	
Closing inventories	(30)	(180)
Gross profit		100
Wages		(34)
Other overhead expenses		(21)
Depreciation – Property		(9)
Fixtures		(6)
Operating profit		30
Interest payable		(12)
Profit before tax		18
Tax (35%)		(6)
Profit for the year		12

(b) Projected statement of financial position as at 31 May Year 9

	£000	£000
ASSETS		
Non-current assets		
Property	460	
Accumulated depreciation	(39)	421
Fixtures and fittings	60	
Accumulated depreciation	(16)	44
		465
Current assets		
Inventories		30
Trade receivables (60% × 280 × 3/12)		42
		72
Total assets		537
EQUITY AND LIABILITIES		
Equity		
£1 ordinary shares		200
Retained earnings [144 + (12 − 10)]		146
		346

	£000	£000
Non-current liabilities		
Borrowings – loan		95
Current liabilities		
Trade payables ($186 \times 2/12$)	31	
Accrued expenses ($3 + 4$)	7	
Bank overdraft (balancing figure)	55	
Tax due ($50\% \times 6$)	3	
	96	
Total equity and liabilities		537

(c) The projected statements reveal poor profitability and a poor liquidity position for the business. The business generates only 4.0p for shareholders for every £1 generated in sales (that is, 12/280). The liquidity position at 31 May Year 9 reveals a serious deterioration when compared with the previous year. The business has become very dependent on the continuing support of the bank for short-term finance.

As a result of preparing these projected statements, the management of Quardis Ltd may wish to make some changes to their original plans. For example, the pricing policy of the business and the level of expenses proposed may be reviewed in order to improve profitability. In addition, the repayment of part of the loan may be deferred, or the dividend may be reduced, in order to improve liquidity.

Chapter 3

3.1 Ali plc and Bhaskar plc

(a) To answer this question, you may have used the following ratios:

	Ali plc	*Bhaskar plc*
Return on ordinary shareholders' funds ratio	$99.9/687.6 \times 100 = 14.5\%$	$104.6/874.6 \times 100 = 12.0\%$
Operating profit margin ratio	$151.3/1,478.1 \times 100 = 10.2\%$	$166.9/1,790.4 \times 100 = 9.3\%$
Inventories turnover period ratio	$592.0/1,018.3 \times 12 = 7.0$ months	$403.0/1,214.9 \times 12 = 4.0$ months
Settlement period for trade receivables ratio	$176.4/1,478.1 \times 12 = 1.4$ months	$321.9/1,790.4 \times 12 = 2.2$ months
Current ratio	$\dfrac{853.0}{422.4} = 2.0$	$\dfrac{816.5}{293.1} = 2.8$
Acid test ratio	$\dfrac{(853.0 - 592.0)}{422.4} = 0.6$	$\dfrac{(816.5 - 403.0)}{293.1} = 1.4$
Gearing ratio	$\dfrac{190}{(687.6 + 190)} \times 100 = 21.6\%$	$\dfrac{250}{(874.6 + 250)} \times 100 = 22.2\%$
Interest cover ratio	$\dfrac{151.3}{19.4} = 7.8$ times	$\dfrac{166.9}{27.5} = 6.1$ times
Earnings per share	$99.9/320 = 31.2$p	$104.6/250 = 41.8$p
Price/earnings ratio	$650/31.2 = 20.8$ times	$820/41.8 = 19.6$ times

(*Note*: It is not possible to use any average ratios because only the end-of-year figures are provided for each business.)

Ali plc seems more effective than Bhaskar plc at generating returns for shareholders as indicated by the higher ROSF ratio. This may be partly caused by Ali plc's higher operating profit margin.

Both businesses have a very high inventories turnover period; this probably needs to be investigated. This ratio is particularly high for Ali plc. Both may suffer from poor inventories management.

Ali plc has a lower settlement period for trade receivables than Bhaskar plc. This may suggest that Bhaskar plc needs to exert greater control over trade receivables.

Ali plc has a much lower current ratio and acid test ratio than Bhaskar plc. The acid test ratio of Ali plc is substantially below 1.0, which may suggest a liquidity problem.

The gearing ratio of each business is quite similar. Neither business seems to have excessive borrowing. The interest cover ratio for each business is also similar. The ratios indicate that both businesses have good profit coverage for their interest charges.

Earnings per share is significantly higher for Bhaskar plc than for Ali plc. However, the P/E ratio for Bhaskar plc is slightly lower. This latter ratio suggests that the market considers Ali plc has slightly better prospects than Bhaskar plc.

To draw better comparisons between the two businesses, it would be useful to calculate other ratios from the financial statements. It would also be helpful to calculate ratios for both businesses over (say) five years as well as key ratios of other businesses operating in the same industry.

(b) The Altman Z-score model is as follows:

$$Z = 1.2a + 1.4b + 3.3c + 0.6d + 1.0e$$

where a = Working capital (current assets – current liabilities)/Total assets

b = Accumulated retained earnings/Total assets

c = Operating profit/Total assets

d = Market value of equity shares/Total liabilities at book (statement of financial position) value

e = Sales revenue/Total assets

For Ali plc, the Z-score is:

$$1.2[(853.0 - 422.40/1{,}300.0] + 1.4\,(367.6/1{,}300.0) + 3.3(151.3/1{,}300.0) +$$
$$0.6[(320 \times 6.50)/(190.0 + 422.4)] + 1.0(1{,}478.1/1{,}300.00) = \underline{4.36}$$

For Bhaskar plc, the Z-score is:

$$1.2[(816.5 - 293.1/1{,}417.7] + 1.4\,(624.6/1{,}417.7) + 3.3(166.9/1{,}417.7) +$$
$$0.6[(250 \times 8.20)/(250 + 293.1)] + 1.0(1{,}790.4/1{,}417.7) = \underline{4.97}$$

(c) The Z-scores for these two businesses are fairly close, with Bhaskar looking the safer of the two. They are both well within the 'safe zone' category of businesses: that is, they have a score of >2.99.

It is questionable whether the Altman model is strictly applicable to UK wholesale businesses, since it was derived from data relating to US manufacturing businesses. It may, however, provide some insight.

Chapter 4

4.1. Beacon Chemicals plc

(a) Relevant cash flows are as follows:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Sales revenue		80	120	144	100	64
Loss of contribution		(15)	(15)	(15)	(15)	(15)

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Variable cost		(40)	(50)	(48)	(30)	(32)
Fixed cost (Note 1)		(8)	(8)	(8)	(8)	(8)
Operating cash flows		17	47	73	47	9
Working capital	(30)					30
Capital cost	(100)					
Net relevant cash flows	(130)	17	47	73	47	39

Notes:
1 Only the elements of fixed cost that are incremental to the project (existing only because of the project) are relevant. Depreciation is irrelevant because it is not a cash flow.
2 The research and development cost is irrelevant since it has been spent irrespective of the decision on X14 production.

(b) The payback period is as follows:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m
Cumulative cash flows	(130)	(113)	(66)	7

The equipment will have repaid the initial investment by the end of the third year of operations. Therefore, the payback period is three years.

(c) The net present value is as follows:

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Discount factor	1.00	0.926	0.857	0.794	0.735	0.681
Present value	(130)	15.74	40.28	57.96	34.55	26.56
NPV	45.09 (that is, the sum of the present values for years 0 to 5)					

Chapter 5

5.1 Tocantins Co.

Project 1
(a) In evaluating the two machines, the first step is to calculate the NPV of each project over their respective time periods:

Lo-tek

	Cash flows £	Discount rate 12%	Present value £
Initial outlay	(10,000)	1.00	(10,000)
1 year's time	4,000	0.89	3,560
2 years' time	5,000	0.80	4,000
3 years' time	5,000	0.71	3,550
		NPV	1,110

Hi-tek

	Cash flows £	Discount rate 12%	Present value £
Initial outlay	(15,000)	1.00	(15,000)
1 year's time	5,000	0.89	4,450
2 years' time	6,000	0.80	4,800
3 years' time	6,000	0.71	4,260
4 years' time	5,000	0.64	3,200
		NPV	1,710

The shortest common period of time over which the machines can be compared is 12 (that is, 3 × 4) years. This means that Lo-tek will be repeated four times and Hi-tek will be repeated three times during the 12-year period.

The NPV for Lo-tek will be:

$$\text{Total NPV} = £1,110 + \frac{£1,110}{(1 + 0.12)^6} + \frac{£1,110}{(1 + 0.12)^9} + \frac{£1,110}{(1 + 0.12)^{12}}$$

$$= £2,358.8$$

The NPV for Hi-tek will be:

$$\text{Total NPV} = £1,710 + \frac{£1,710}{(1 + 0.12)^8} + \frac{£1,710}{(1 + 0.12)^{12}}$$

$$= £2,840.3$$

The equivalent-annual-annuity approach will provide the following results for Lo-tek:

$$£1,110 \times 0.4163 = £462.09$$

and the following results for Hi-tek:

$$£1,710 \times 0.3292 = £562.93$$

(b) Hi-tek is the better buy because calculations show that it has the higher NPV over the shortest common period of time and provides the higher equivalent-annual-annuity value.

Project 2

(c) *Expected net cash flows*

	Net cash flows (a) £m	Probability of occurrence (b)	Expected cash flows (a × b) £m
Year 2	4.5	0.2	0.9
	5.0	0.4	2.0
	6.0	0.4	2.4
Expected net cash flow			5.3
Year 3	5.0	0.3	1.5
	6.5	0.4	2.6
	8.0	0.3	2.4
Expected net cash flow			6.5
Year 4	5.0	0.2	1.0
	7.0	0.6	4.2
	9.0	0.2	1.8
Expected net cash flow			7.0
Year 5	2.0	0.5	1.0
	2.5	0.4	1.0
	3.0	0.1	0.3
Expected net cash flow			2.3

Expected net present value

Year	Expected net cash flow	Discount rate	Expected present value
	£m	12%	£m
1	(16.0)	1.00	(16.0)
2	5.3	0.89	4.7
3	6.5	0.80	5.2
4	7.0	0.71	5.0
5	2.3	0.64	1.5
		ENPV	0.4

(d) Worst possible outcome

Year	Estimated cash flow	Discount rate	Present value
	£m	12%	£m
1	(16.0)	1.00	(16.0)
2	4.5	0.89	4.0
3	5.0	0.80	4.0
4	5.0	0.71	3.6
5	2.0	0.64	1.3
		ENPV	(3.1)

The probability of occurrence is $(0.2 \times 0.3 \times 0.2 \times 0.5) = 0.006$.

(e) The ENPV of the investment is positive (£0.4 million). The decision rule is to accept projects with a positive ENPV as this will increase shareholder wealth. However, the investment outcome is only just in positive territory. A thorough review of critical assumptions, as well as the gathering of further information, should be undertaken before a final decision is made.

Projects 3 and 4

(f) Project 4 has the higher standard deviation and therefore the greater variability of possible outcomes. Hence, it has the higher level of risk. Using the expected value-standard deviation rule, we should accept Project 3. This is because the expected return of Project 3 is equal to that of Project 4 but the standard deviation of Project 3 is lower than that of Project 4.

Chapter 6

6.1. Helsim Ltd

(a) The liquidity position may be assessed by using the liquidity ratios discussed in Chapter 3:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{£7.5m}{£5.4m} = 1.4$$

$$\text{Acid test ratio} = \frac{\text{Current assets (excluding inventories)}}{\text{Current liabilities}} = \frac{£3.7m}{£5.4m} = 0.7$$

These ratios reveal a fairly weak liquidity position. The current ratio seems quite low and the acid test ratio very low. This latter ratio suggests that the business does not have sufficient liquid assets to meet its maturing obligations. It would be useful, however, to have details of the liquidity ratios of similar businesses in the same industry in order to make a more informed judgement. The bank overdraft represents 67 per cent of the current liabilities and 40 per cent of the total liabilities of the business. The continuing support of the bank is therefore important to the ability of the business to meet its commitments.

(b) The finance required to reduce trade payables to an average of 40 days outstanding is calculated as follows:

	£m
Trade payables at the date of the statement of financial position	1.80
Trade payables outstanding based on 40 days' credit (40/365 × £8.4m) (that is, credit purchases))	(0.92)
Finance required	0.88 (say £0.9m)

(c) The bank may not wish to provide further finance to the business. The increase in overdraft will reduce the level of trade payables but will increase the risk exposure of the bank. The additional finance invested by the bank will not generate further funds (it will not increase profit) and will not, therefore, be self-liquidating. The question does not make it clear whether the business has sufficient security to offer the bank for the increase in overdraft facility. The profits of the business will be reduced and the interest cover ratio, based on the profits generated last year, would reduce to about 1.6* times if the additional overdraft were granted (based on interest charged at 10 per cent each year). This is very low and means that only a small decline in profits would leave interest charges uncovered.

* Existing bank overdraft (3.6) + extension of overdraft to cover reduction in trade payables (0.9) + loan notes (3.5) = £8.0m. Assuming a 10 per cent interest rate means a yearly interest payment of £0.8 million. The operating profit was £1.3 million. Interest cover would be 1.63 (that is, 1.3/0.8).

(d) A number of sources of finance might be considered. Four possible sources are as follows:

- *Issue ordinary (equity) shares.* This option may be unattractive to investors. The return on ordinary shareholders' funds is fairly low at 7.9 per cent (that is, profit for the year (0.3)/equity (3.8)) and there is no evidence that the profitability of the business will improve. If profits remain at their current level, the effect of issuing more equity will be to reduce further the returns to equity.

- *Further borrowings.* This option may also prove unattractive to investors. The effect of making further borrowings will have a similar effect to that of increasing the overdraft. The profits of the business will be reduced and the interest cover ratio will decrease to a low level. The gearing ratio of the business is already quite high at 48 per cent (that is, loan notes (3.5)/(loan notes + equity (3.5 + 3.8)) and it is not clear what security would be available for the loan. The gearing ratio would be much higher if the overdraft were to be included.

- *Chase trade receivables.* It may be possible to improve cash flows by reducing the level of credit outstanding from customers. At present, the average settlement period is 93 days (that is, (trade receivables (3.6)/sales revenue (4.2)) × 365), which seems quite high. A reduction in the average settlement period by approximately one-quarter would generate the funds required. However, it is not clear what effect this would have on sales.

- *Reduce inventories.* This appears to be the most attractive of the four options. At present, the inventories turnover period is 178 days (that is, (closing inventories (3.8)/cost of sales (7.8)) × 365), which seems very high. A reduction in this period by less than one-quarter would generate the funds required. However, if the business holds a large amount of slow-moving and obsolete items, it may be difficult to reduce inventories levels.

Chapter 7

7.1 Ceres plc

(a) (i) **Preliminary calculations**

Annual depreciation is £4 million [that is, property (£40m $\times$ $2^1/_2$%) and plant (£20m $\times$ 15%)].

Cost of acquiring the business is £120 million (that is, £10m $\times$ 12).

Loan finance required is £70 million (that is, £120m $-$ £50m).

Loan outstanding at 31 May Year 10

Year to 31 May	Year 7	Year 8	Year 9	Year 10
	£m	£m	£m	£m
Operating profit	10.0	11.0	10.5	13.5
Add Annual depr'n	4.0	4.0	4.0	4.0
	14.0	15.0	14.5	17.5
Less Working capital	–	(1.0)	–	–
Loan interest	(7.0)	(6.3)	(5.5)	(4.6)
Cash to repay loan	7.0	7.7	9.0	12.9
Loan at start of year	70.0	63.0	55.3	46.3
Cash to repay loan	(7.0)	(7.7)	(9.0)	(12.9)
Loan at end of year	63.0	55.3	46.3	33.4

(ii) **Internal rate of return (IRR)**

The net amount to be received in Year 10 by the private-equity firm is calculated as follows:

	£m
Sale proceeds ($12 \times £13.5m$)	162.0
Loan repayment	(33.4)
Proceeds to shareholders	128.6
Less	
Amount to shareholder/managers (10%)	(12.9)
For private-equity firm	115.7

Trial 1 – Discount rate 24%
NPV is:

$$(£115.7m \times 0.42) - £45m = £3.6m$$

As it is positive, the IRR is higher.

Trial 2 – Discount rate 28%
NPV is:

$$(£115.7m \times 0.37) - £45m = (£2.2m)$$

As it is negative, the IRR is lower.

A 4 per cent change in the discount rate leads to a £5.8m ($£3.6m + £2.2m$) change in the NPV. Thus, a 1 per cent change in the discount rate results in a £1.45m change in NPV. The IRR is:

$$24\% + \left(\frac{3.6}{1.45}\right)\% = 26.5\%$$

(b) The IRR exceeds the cost of capital and so the investment should go ahead. However, the calculations are likely to be sensitive to forecast inaccuracies. The forecast inputs should be re-examined, particularly the anticipated profit in the year of sale. It is much higher than in previous years and forms the basis for calculating the sale price.

Chapter 8

8.1 Hackney Wholesalers plc

(a) The weighted average cost of capital (WACC) is worked out as follows:

Cost of ordinary shares

$$K_0 = \frac{D_1}{P_0} + g$$

$$= \frac{16 \times 1.05}{280} + 5\%$$

$$= \underline{11.0\%}$$

Cost of preference shares

$$K_p = \frac{D_p}{P_p}$$

$$= \frac{10}{120} \times 100\%$$

$$= \underline{8.33\%}$$

Cost of loan notes

$$K_d = \frac{I(1-t)}{P_d}$$

$$= \frac{12(1.0 - 0.2)}{125} \times 100$$

$$= \underline{7.68\%}$$

WACC

	Cost %	Target capital structure (weights)	%
Ordinary shares	11.00	0.50	5.50
Preference shares	8.33	0.20	1.66
Loan notes	7.68	0.30	2.30
WACC			9.46

(b) The advantages of loan capital include:

- *Lower returns.* Lenders will normally require lower returns than investors in ordinary and preference shares. This is because there is lower risk involved with this type of finance. Lenders will normally have security for the amount invested and priority over ordinary and preference shareholders when interest payments are due.
- *Tax benefits.* Interest is an allowable expense for taxation purposes, which further lowers the cost of this form of finance. There is no tax relief, on the other hand, on dividends paid to ordinary and preference shareholders.
- *Gearing effect.* Borrowing may boost returns to ordinary shareholders. This will occur where the income generated from the borrowed funds exceeds the cost of interest payments.
- *Asset matching.* The borrowing period can be matched to the expected life of the asset to which it relates. (This can also be achieved, however, by the issue of redeemable shares.)

The disadvantages of loan capital include:

- *Risk.* Borrowing brings with it the burden of interest payments and capital repayments (where the borrowing is redeemable). This can place a financial strain on the business, which can become intolerable when borrowing levels are too high.
- *Conditions.* Loan contracts often contain restrictive covenants, which can hinder managers' freedom of action. These covenants may interfere with the pursuit of profitable opportunities and the prospects of raising more finance at a later date.

■ *Returns.* The risks that accompany loan notes may lead ordinary shareholders to seek higher returns as compensation. The gearing effect may therefore be largely illusory as any benefits from borrowing may be offset by the increased cost of equity.

Chapter 9

9.1 Sandarajan plc

(a) The dividend per share and dividend payout ratio over the five-year period under review are as follows:

Year	Dividend per share	Dividend payout %
1	22.0p	52.4
2	14.0p	26.4
3	17.3p	40.0
4	7.3p	14.9
5	30.7p	52.3

The figures above show an erratic pattern of dividends over the five years. Such a pattern may not be welcomed by investors. In an imperfect market, dividends may be important to investors. We saw in the chapter that this may be due to the clientele effect, the catering effect, the need to reduce agency costs and information signalling.

(b) Managers should decide on a payout policy and then make every effort to stick to it. This will help ensure that dividends are predictable and contain no 'surprises' for investors. Any reduction in the dividend is likely to be seen as a sign of financial weakness and the share price is likely to fall. If a reduction in dividends cannot be avoided, the managers should make clear the change in policy and the reasons for the change.

Chapter 10

10.1 Town Mills Ltd

(a) *Operating cash cycle*

	Days
Inventories turnover period $(192/652) \times 365$	107
Trade receivables settlement period	
$202 \times (105/110)/903 \times 365$ (Note 1)	_78_
	185
Trade payables settlement period	
$260 \times (105/110)/652 \times 365$ (Notes 1 and 2)	(139)
Operating cash cycle	_46_

Notes:

1 Since the closing level of trade receivables/payables was 10 per cent higher at the end of the year than at the start, the average balance would be 105/110 of the end-of-year balance.

2 Since inventories were the same at both ends of the year, purchases equal cost of sales.

Knowledge of the length of the operating cash cycle (OCC) allows the business to monitor it over time, perhaps relative to other businesses or to some target. It is not possible to draw any helpful conclusions from looking at just one figure; there needs to be a basis of comparison.

A problem with using the 'bottom line' figure for the OCC is that values within it are not equivalent. In the case of Town Mills, one day's sales are worth £2,474, whereas one day's purchases or inventories holding are worth £1,786. So, while an extra day of trade receivables period coupled with an extra day of trade payables period would leave the OCC unchanged at 46 days, it would involve an additional £700 or so of investment in working capital.

(b) As mentioned in (a) above, knowing the number of days of the OCC tells us little without some basis of comparison.

The acid test ratio for this business is very low at 0.55:1. If inventories were fairly fast moving with a short trade receivables period, this might not be a worry, but this is not the case.

The current ratio is close to 1:1, which seems low. It is not possible, however, to say too much without making a comparison with similar businesses or with this business over time.

The level of the overdraft is a cause for concern. It represents almost 20 per cent of the total financing of the business, according to statement of financial position values. This represents a lot of short-term finance that could be recalled instantly, or at very short notice. A term loan may be a better arrangement than an overdraft.

The level of trade payables also seems high, compared with trade receivables. This too could be a problem. It depends on the relative bargaining positions of Town Mills and its suppliers.

Overall, liquidity does not seem strong and probably needs to be reviewed. It is not possible to be too emphatic on this point, however, given such limited bases for comparison.

(c) The types of risk and cost that might be associated with high inventories levels of a wholesaler include:

- *Financing cost.* Inventories need to be financed. Buying on trade credit, which is free, normally covers at least some of this. In the case of Town Mills, trade payables are currently greater than the value of inventories. Trade credit is linked to purchases, not to inventories levels. If inventories levels were to be reduced, the level of trade payables would not follow suit.
- *Storage costs.* These are likely to be lower where inventories are lower. How significant these costs are will depend on the nature of the inventories. Those that are high value and/or need special treatment are typically more expensive to store than other inventories.
- *Insurance cost.* This is likely to be subject to the same considerations as storage cost, of which it may be seen as forming part.
- *Obsolescence cost.* The more inventories held, the greater the risk that they will lose value through physical deterioration or obsolescence. A spare part for a machine may be in perfect condition and, in principle, capable of being used. If the machine is no longer being used, however, the spare part may be worthless.

Chapter 11

11.1 Romeo plc

Adjusted net assets (capital invested)

	£m	£m
Total assets less current liabilities as per the statement of financial position		231.0
Add Property (£200m − £60m)	140.0	
R&D (9/10 × £10m)	9.0	149.0
Adjusted total assets less current liabilities		380.0*

* This figure represents the adjusted figure for share and loan capital.

Market value added calculation

	£m
Market value of shares (60m × £8.50)	510.0
Less Capital invested (see above)	(380.0)
MVA	130.0

Chapter 12

12.1 Kifaru plc

(a) The number of shares in each business and number of shares in the combined business may be calculated as follows:

	(a) Share price	(b) P/E ratio	(c) EPS (a/b)	(d) Profit	(e) No. of shares (d/c)
Kifaru plc	£6.40	20	£0.32	£160m	500m
Mpaka plc	£9.60	8	£1.20	£72m	60m

Kifaru plc shares offered to Mpaka plc shareholders $(60m \times 5/3) = 100m$
Thus, total number of shares of the combined business $(500m + 100m) = 600m$

(b) *Combined profit*

	£m
Kifaru plc profit	160
Mpaka plc profit	72
Savings	38
Combined profit	270

Predicted share price

$$\text{Combined business EPS } (£270m/600m) = £0.45/\text{share}$$
$$\text{P/E ratio of the combined business} = 16 \text{ times}$$
$$\text{Thus, predicted share price of combined business } (£0.45 \times 16) = £7.20 \text{ per share}$$

Kifaru plc shareholder benefits

$$\text{Value of one share prior to takeover} = £6.40$$
$$\text{Predicted value of one share following the takeover} = £7.20$$
$$\%\text{increase in value} = (7.2 - 6.4)/6.4 \times 100\% = 12.5\%$$

Mpaka plc shareholder benefits

$$\text{Value of three shares prior to takeover} = £9.6 \times 3 = £28.80$$
$$\text{Predicted value of equivalent five shares following takeover} = £7.2 \times 5 = £36$$
$$\% \text{ increase in value} = (36 - 28.8)/28.8 \times 100\% = 25\%$$

(c) Based on the calculations above, the proposed takeover benefits the shareholders of both businesses. However, these benefits are not evenly allocated. This may well cause the shareholders of Kifaru plc some concern.

It is the anticipated savings arising from the takeover that make the takeover appealing. They represent 14.1% (38/270) of the combined business profits. These savings, in turn, boost the share price.

The total value of the combined business is predicted to be $(£7.2 \times 600m \text{ shares}) = £4,320m$.

When taken together, the value of the two individual businesses is:

$$(£6.40 \times 500m \text{ shares} + £9.60 \times 60m \text{ shares}) = £3,776m$$

Combining the two businesses has, therefore, increased shareholder value by 14.4% $((4,320 - 3,776)/3,776 \times 100\%)$.

We can see that the percentage contribution to the combined profits of the business by the anticipated savings, corresponds, almost exactly, to the percentage increase in value of the

combined business. It seems, therefore, that the value created by combining the two businesses is heavily dependent on the savings generated. Without these savings, the logic of the takeover bid is unclear. As a result, there should be a sharp focus on whether the predicted savings can really be achieved. All too often, they prove to be illusory.

Chapter 13

13.1 Robinson plc

(a) (i) *Currency option*

The results for each of the spot rates in six months' time are as follows:

	(i)	(ii)
Spot rate	€1.25	€1.15
Exercise price	€1.20	€1.20
Option decision	Exercise	Lapse
	£	£
Receipts from UK £ sterling		
€10,000,000/1.20	8,333,333	
€10,000,000/1.15		8,695,652
Option premium [(€10m/€100) × £1.20]	(120,000)	(120,000)
	8,213,333	8,575,652

Note: The premium is a cost that must be incurred irrespective of whether the option is exercised or allowed to lapse.

(ii) *Forward exchange contract*

The forward rate is £1 = €1.1859 as the business is selling euros.

The sterling amount is: €10,000,000/1.1859　= £8,432,414

(iii) *To do nothing*

The amount to be received in sterling for each of the spot rates in six months' time are:

Spot rate	€1.25	€1.15
	£	£
€10,000,000/1.25	8,000,000	
€10,000,000/€1.15		8,695,652

(b) We can see that if the spot rate is £1 = €1.15 in six months' time, it would be best not to hedge the transaction. Both hedging methods result in lower sterling receipts. The forward contract offers a lower exchange rate than the spot rate in six months' time. The currency option is burdened with a premium cost even though it will be allowed to lapse.

If, on the other hand, the spot rate is £1 = €1.25 in six months' time, a forward contract would be the best choice. Although the currency option is better than doing nothing, despite the premium cost that must be borne, it provides lower sterling receipts than the forward contract.

Appendix D
SOLUTIONS TO CRITICAL REVIEW QUESTIONS

Chapter 1

1.1 Some believe that modern capitalism is less ethical than the capitalism of previous eras. It is claimed that the free movement of capital (and labour) across frontiers has weakened ties between the various stakeholders. Where managers of global businesses are geographically remote from the business's operations, they can more easily ignore the pain inflicted on other stakeholders resulting from their decisions. Roger Scruton, the eminent philosopher, has argued that, in the past, things were different. Owners and managers lived in the same country and same town as those affected by their decisions and it was very difficult to avoid the obligations of neighbourhood.

1.2 When approached by a shareholder activist, the board of directors should first:

■ establish the underlying motivation of the activist, the tactics used and the past history of activism
■ evaluate the proposals that the activist wishes to see implemented
■ ascertain the degree of support among other shareholders to the proposals.

To deal with the proposals, the board should:

■ set up a team of senior directors to create a dialogue with the activist and to advise the board on any developments
■ prepare a detailed response to the proposals raised by the activist
■ establish whether there are any areas where collaboration with the activist is possible
■ create a dialogue with other shareholders to ensure they are fully informed of the position of the board and the actions taken.

1.3 Survival may be a basic objective for a business. However, shareholders will expect to receive returns from their investment and will not be interested in businesses that simply see this as their primary objective. Nevertheless, there may be times when survival has to become the main objective.

In a highly competitive economy, a business has to pursue shareholder wealth maximisation in order to survive. Under such circumstances, shareholder wealth maximisation and survival become inextricably linked.

1.4 The stakeholder approach raises various difficult issues, including:

■ who the stakeholders are and their relative importance
■ the extent to which each stakeholder group should benefit from the business and the ways in which managers should mediate between the conflicting interests of the various groups
■ how accountability can be achieved where multiple objectives are being pursued. In particular, how performance can be measured and how managers can be prevented from pursuing their own interests behind a screen of multiple objectives.

Chapter 2

2.1 When a business is growing fast, it is vital that managers maintain a balance between increases in the level of sales and the finance available to sustain this increase. They must not pursue sales growth to the point where the business becomes financially overstretched and then collapses. Projected financial statements will show the impact of future changes in sales on the profitability, liquidity and financing requirements of the business. If the business shows signs of being unable to sustain future sales growth, managers can take corrective action.

2.2 It is true that the future is uncertain. It is also true that projected financial statements will often prove inaccurate. Nevertheless, most businesses find that, despite the inaccuracies inherent in forecasting, it is better to produce these statements than not to do so. The question to ask is: can a business function effectively without forecasts being provided for managers? The problem of future risks and uncertainty should not prevent forecasting: indeed, the opposite is true. Risk and uncertainty should be dealt with using techniques such as sensitivity analysis and scenario analysis.

2.3 The sales forecast is critical because it will determine the overall level of operations of the business. The future levels of investment, financing and overheads will all be influenced by the level of sales. Cash received from sales will be an important factor in deriving projected cash flows, and sales revenue will be an important factor in deriving projected profits. Projected cash flows and profits, in turn, will be important factors in preparing the projected statement of financial position (balance sheet). For these reasons, care must be taken in deriving a sales forecast for the business.

2.4 Financial gearing arises from the presence of fixed return capital, such as borrowing, within the capital structure of a business. Operating gearing arises as a result of the presence of fixed operating costs within the cost structure of a business. Both types of gearing involve ongoing financial commitments. Financial gearing involves a commitment to pay interest charges and to make capital repayments when due. Operating gearing involves a commitment to pay fixed costs. These commitments must be met irrespective of the profits generated by the business. Furthermore, both types of gearing increase the sensitivity of returns. Financial gearing increases the sensitivity of returns to ordinary shareholders from changes in operating profits. Operating gearing increases the sensitivity of operating profits from changes in sales output. This means that a business with a high degree of financial gearing and a high degree of operating gearing will have returns to ordinary shareholders that are highly sensitive to changes in sales output. This can increase the volatility of returns to shareholders and, as a consequence, the volatility of share prices. Many businesses, therefore, avoid combining high levels of financial and operating gearing.

Chapter 3

3.1 Size may well be an important factor when comparing businesses:

- Larger businesses may be able to generate economies of scale in production and distribution to an extent not available to smaller businesses.
- Larger businesses may be able to raise finance more cheaply, partly through economies of scale (for example, borrowing larger amounts) and partly through being seen as less of a risk to the lender.
- Smaller businesses may have the capacity to be more flexible and nimble in responding to changing circumstances than the typical larger business.

These and other possible factors may lead to differences in performance and position between larger and smaller businesses.

3.2 Three possible reasons for a long inventories turnover period are:

- poor inventories controls, leading to excessive investment in inventories
- a desire to provide customers with greater choice or, perhaps, speedier supply
- inventories building in anticipation of increased future sales.

A short inventories turnover period may be due to:

- tight inventories controls, reducing excessive investment in inventories and/or the amount of obsolete and slow-moving inventories
- an inability to finance the required amount of inventories to meet sales demand
- a difference in the mix of inventories carried by similar businesses (for example, greater investment in perishable goods which are held for a short period only).

These are not exhaustive lists; you may have thought of other reasons.

3.3 In view of the fact that Z-scores are derived from information that is published by the businesses themselves, it is difficult to argue that Z-scores should not be made publicly available. Indeed, many of those connected with a business – shareholders, lenders, employees and so on – may find this information extremely valuable for decision making. However, there is a risk that a poor Z-score will lead to a loss of confidence in the business among investors and suppliers. This may, in turn, prevent the business from taking corrective action as lines of credit and investment will be withdrawn.

3.4 The P/E ratio may vary between businesses within the same industry for the following reasons:

- *Accounting policies.* Differences in the methods used to compute profit (for example, inventories valuation and depreciation) can lead to different profit figures and therefore different P/E ratios.
- *Different prospects.* One business may be regarded as having a much brighter future due to factors such as the quality of management, the quality of products, location and so on. This will affect the market price that investors are prepared to pay for the share and, hence, it will also affect the P/E ratio.
- *Different asset structure.* One business's underlying asset base may be much higher and this may affect the market price of the shares.

Chapter 4

4.1 It is not clear why these businesses have such high target IRRs, but the reasons may include the following:

- a belief that the level of risk attaching to their business's investments is higher than average
- a failure to appreciate that the average IRRs over the years are as low as they are
- building in a 'margin of safety' to protect managers, and their reputations, from the risk of taking on investment projects that might fail. Managers should accept that some projects will fail but, on average, they will be balanced by those that produce better-than-expected results.

The consequence of setting an unrealistically high return requirement (a higher discount factor than necessary) is that it will almost inevitably lead to a rejection of viable investments. This, in turn, will mean that the business will fail to maximise the wealth of shareholders.

4.2 The payback method, in its original form, does not take account of the time value of money. However, it would be possible to modify the payback method to accommodate this requirement. Cash flows arising from a project could be discounted, using the cost of capital as the appropriate discount rate, in the same way as the NPV method. The discounted payback approach is used by some businesses and is an improvement on the original approach described in the chapter. However, it retains the other flaws of the original payback approach that were discussed. For example, it ignores relevant data after the payback period. Thus, even in its modified form, the PP method cannot be regarded as superior to NPV.

4.3 The IRR method does appear to be similar in popularity to the NPV method among practising managers. The main reasons for this appear to be:

- A preference for a percentage return ratio rather than an absolute figure as a means of expressing the outcome of a project. This preference for a ratio may reflect the fact that other financial goals of the business are often set in terms of ratios, such as return on capital employed.
- A preference for ranking projects in terms of their percentage return. Managers find it is easier to rank projects on the basis of percentage returns (although NPV outcomes should be just as easy). We saw in the chapter that the IRR method can provide misleading advice on the ranking of projects and that the NPV method was preferable for this purpose.

4.4 A potential investment project's IRR is compared with the cost of capital to determine whether the project will lead to an increase in shareholder wealth. The IRR must exceed the 'hurdle rate' of the cost of capital for the project in order for this to occur. The extent to which the IRR exceeds the cost of capital can help form a judgement about the riskiness of the project. We can see by how much the cost of capital would have to rise before the project IRR becomes unacceptable (assuming all of the other inputs to the project appraisal turned out to be as projected).

Chapter 5

5.1 Although inflation rates have been quite low in recent years, the effect of inflation on investments should be taken into account. Investments are often made over a long time period and even quite low rates of inflation can have a significant effect on cash flows over time.

    (a) The effect of discounting cash flows that include inflation at real discount rates will be to overstate NPV, as the cash flows will be increased in line with inflation whereas the discount rate will not.

    (b) The effect of discounting real cash flows at a market discount rate will be to understate NPV, as the discount rate will be increased in line with inflation whereas the cash flows will not.

5.2 Objective probabilities are based on demonstrable facts, whereas subjective probabilities are based on opinions. On the face of it, this seems to imply that objective probabilities are more reliable than subjective probabilities. This is not necessarily true, however. Objective probabilities are inevitably based on past experience, which may not provide a good guide to the future.

Subjective probabilities, though based on opinions, can draw on the experience of independent experts. Where the business environment is undergoing rapid change, or where assets will be used in different ways than in the past, subjective probabilities may well prove to be more useful.

5.3 The word 'expected', in the context of expected values does not have the same meaning as in its normal use. This is because an expected value may not actually be capable of occurring. It represents the weighted average of possible outcomes, rather than the single value that is most likely to occur.

5.4 Risk arises when there is more than one possible outcome for a project. The standard deviation measures the variability of returns and can provide a useful measure of risk. Generally speaking, the higher the standard deviation, the higher the level of risk associated with a project. However, when the distribution of possible outcomes is skewed, the standard deviation may not provide a reliable measure of risk as it fails to distinguish between 'downside' and 'upside' risk.

Chapter 6

6.1 A business may decide to repay a loan earlier than required for various reasons including the following:

- A fall in interest rates may make the existing loan interest rates higher than current loan interest rates. Thus, the business may decide to repay the existing loan using finance from a cheaper loan.
- A rise in interest rates or changes in taxation policy may make loan financing more expensive than other forms of financing. This may make the business decide to repay the loan using another form of finance.
- The business may have surplus cash and may have no other profitable uses for the cash.
- The business may wish to reduce the level of financial risk by reducing the level of gearing.

6.2 Convertible loan notes are not necessarily a form of delayed equity. Although they give an investor the right to convert them into ordinary shares at a given future date, there is no obligation to convert. This will be done only if the market price of the shares at the conversion date exceeds the agreed conversion price. The conversion price is usually higher than the market price at the time the convertible loan notes are issued and so the market price of the shares will usually have to rise over time in order for the lender to exercise the option to convert. During a period of stagnant, or falling market prices, the lender is unlikely to exercise the option and so no conversion will take place. Hence, it cannot be assumed that there is an automatic conversion from loan notes to ordinary (equity) share capital.

6.3 The effect of a bonus issue will be as follows:

    (i) A bonus issue is simply a transfer of reserves into ordinary share capital. As a result, the total equity remains the same. This means that financial gearing will remain unchanged. The proportions of finance contributed by equity shareholders and lenders are not affected.

(ii) Earnings per share will be diluted. More shares will be issued but there should be no change in earnings.

(iii) The liquidity of the business will be unaffected. A bonus issue does not raise cash: it is simply a bookkeeping procedure.

(iv) In theory, the total wealth of shareholders will not be affected by the bonus issue. Although each shareholder will own more shares, each will own the same proportion of the business following the bonus issue as before the issue. If, however, the market believes that the business will maintain the same dividend per share following the issue, an increase in shareholder wealth may occur as the share price may rise.

6.4 The following issues should have been carefully considered:

■ *Other financing options.* In order to make an informed choice, other financing options such as equity shares and preference shares should also have been examined.

■ *Loan maturity dates*. Checks should have been carried out to see whether the maturity of the loan coincides with other maturity dates within the business's debt portfolio. Where this occurs, cash flow problems could arise.

■ *Refinancing*. If the loan is to be repaid by the use of replacement finance, the availability of refinancing opportunities should have been considered. Any refinancing costs should also have been taken into account.

■ *Financial risk*. A check should have been made to see whether the interest payable on the loan could be covered by the cash flows generated by the business.

■ *Restrictive covenants* Possible covenants required by a lender should have been considered to see whether they would be acceptable and whether they would conflict with covenants imposed by existing lenders.

Chapter 7

7.1 Various reasons have been put forward to explain the difference in the proportion of total investment made in business start-ups by UK and US private-equity firms. These include:

■ UK firms are more cautious than their US counterparts. Start-ups are more risky and UK private-equity firms may be less willing to take on these risks.

■ UK firms have a shorter-term investment perspective that makes them prefer financing existing businesses.

■ There is greater competition for good investment opportunities among US private-equity firms, which leads them to invest in business start-ups to achieve the required returns.

7.2 Investment analysts and others play a critical role in creating an efficient stock market. They acquire information concerning the performance and position of the business and its likely future prospects. This information will feed in to their calculations and models to derive the 'true value' of a particular share. The value derived is then used as a basis for buying and selling decisions. This, in turn, helps to ensure that share prices reflect their 'true value'. In the quest for profit, investment analysts and others are constantly searching for shares that do not reflect their 'true value', that is, those that are inefficiently priced. Where they come across a share, which they consider to be below its 'true value', they will normally buy the share (or advise clients to do so). Eventually, the mispricing is likely to be recognised by the market and the subsequent buying demand should ensure that the share reaches its true value.

The behaviour of investment analysts and others does represent a paradox. Searching for mispriced shares, in the hope of making a profit, is based on the assumption that the market is inefficient. By undertaking this kind of behaviour, however, they are helping to eliminate share price inefficiencies. As a result, they are contributing towards the creation of an efficient market.

7.3 The board of directors of Beton Ltd should appreciate that accepting private equity finance can have a profound impact on the way in which the business is run. Private equity firms expect businesses in which they invest to generate high returns to compensate for the risks involved. They do not invest in 'life style' business. They will, therefore, expect Beton Ltd to pursue demanding targets. This is likely to put considerable pressure on the directors to perform.

In order to protect its investment, the private equity firm will expect to have a close working relationship with Beton Ltd. It is likely to insist on a seat on the board of directors and will expect to be consulted over any decisions that deviate from what has already been agreed. The private equity firm will also expect to receive frequent updates concerning key performance measures such as sales, profits, cash flows and so on, in order to monitor progress.

The private equity firm will take equity shares in return for their investment but may also insist that Beton Ltd takes on high levels of borrowing to provide additional finance. The equity stake in the business will normally be resold after five years or so and the board of directors may have little influence over who acquires this stake.

7.4 A business should have owners who are:

- committed to realising the growth potential of the business
- prepared to sell some of the ordinary shares in the business
- comfortable with the financing arrangements that private-equity firms usually employ.

It should have a management team that is:

- ambitious
- experienced
- capable
- well balanced.

Chapter 8

8.1 To find out whether or not a planned level of gearing is likely to be acceptable to investors, the managers of a business could look at the levels of gearing in similar businesses operating within the same industry. If the business adopts a much higher level of gearing than these businesses, there may be problems in raising long-term funds. The managers could also discuss the proposed level of gearing with prospective investors such as banks and financial institutions to see whether they regard the level of gearing as acceptable.

8.2 Excessively high levels of borrowing may prevent managers from adopting a planned and ordered approach to running the business. It can provoke a sense of crisis and managers may have to focus on dealing with immediate and pressing issues. They may, for example, have to implement emergency measures, such as selling off assets, in order to accumulate sufficient cash to make interest payments and capital repayments. Such measures may have to be carried out despite the fact that they damage long-term competitiveness. In addition, excessive amounts of managers' time may be spent in negotiations with lenders, particularly where refinancing is required or where covenants have been breached.

8.3 Where businesses base their target capital structures on statement of financial position values rather than market values, the relative proportions of loan capital and equity will be incorrectly calculated. This means, in turn, that the WACC figure will be incorrect. The market value of equity is often much higher than the equity figure shown in the statement of financial position and so the equity proportion is likely to be significantly understated. As equity is more expensive than loan capital, this means that the WACC figure will also be understated.

By employing a higher figure than the WACC as a discount rate to deal with operational constraints, businesses run the risk of rejecting profitable opportunities. It may, therefore, be better to deal with the operational constraints rather than allowing this to happen.

8.4 An important implication of (a), the traditional approach, is that financial managers should try to establish the mix of loan/share finance that will minimise the overall cost of capital. At this point, the business will be said to achieve an optimal capital structure. Minimising the overall cost of capital in this way will maximise the value of the business. An important implication of (b), the MM (excluding tax effects) approach, is that the financing decision is not really important. As the overall cost of capital remains constant, a business does not have an optimal capital structure

as suggested by the traditionalists. This means that one particular capital structure is no better or worse than any other and so managers should not spend time evaluating different forms of financing the business. Instead, they should concentrate their efforts on evaluating and managing the investments of the business. However, (c), the MM (including tax effects) approach, recognises that the tax shield on loan capital benefits the ordinary shareholders and the higher the level of interest payments, the greater the benefits. The implications of this approach are that there is an optimal capital structure (and in that sense it is similar to the traditional approach) and that the optimal structure is a gearing ratio of 100 per cent.

Chapter 9

9.1 It appears that Alpha plc is a cyclical business. Periods of high profits may, therefore, be followed by periods of low profits, or even losses. The evidence suggests that managers would be reluctant to announce an increase in dividends that could not be sustained over the whole business cycle. Investors can react badly to a dividend cut.

Beta has enjoyed a surge in profits but, again, this may not be sustained over time. Managers are normally reluctant to increase dividends, only to cut them at a later date when profits decline.

Delta plc has grown profits at a steady rate. The cosmetics business is not badly affected by business cycles and so managers may feel confident enough to announce an increase in profits in the near future based on the profit record to date and the reputation for quality.

9.2 The MM position is that dividends should be regarded as a residual amount arising when the business does not have enough profitable opportunities in which to invest. The argument assumes that shareholders will prefer the business to reinvest earnings rather than pay dividends, as long as the returns earned by the business exceed the returns that could be achieved by shareholders investing in similar projects. However, when all the profitable projects that meet this criterion have been taken up, any surplus remaining should be distributed to shareholders. Thus, dividends will be, in effect, a by-product of the investment decision, as stated.

9.3 Other explanations for the phenomenon of appearing and disappearing dividends include following:

- There may be a dearth of profitable opportunities for businesses. They may, therefore, decide to return funds to shareholders by paying a dividend. Conversely, when profitable opportunities abound, funds will be retained by businesses in order to exploit them. (This, of course, would be consistent with the MM view of dividends as being a residual.)
- The characteristics of businesses may change over time. When there is an increased concentration of businesses in growth industries, for example, fewer dividends are likely to be paid.
- During an economic downturn, poor profitability and cash flows may prevent, or restrict, businesses from paying dividends.

You may have thought of other explanations.

9.4 Although an increase in dividends is often interpreted in a positive manner by shareholders, there may be occasions when it is not. These include occasions where:

- the dividend increase does not meet the expectations of shareholders – these expectations may have been formed by earlier statements by managers, or by current and expected future profits
- the dividend increase suggests a lack of growth opportunities resulting in surplus cash being returned to shareholders
- shareholders feel that managers could have used the cash more wisely, given the growth opportunities available.

Chapter 10

10.1 Although the credit manager is responsible for ensuring that receivables pay on time, Tariq may be right in denying blame. Various factors may be responsible for the situation described which are beyond the control of the credit manager. These include:

- a downturn in the economy leading to financial difficulties among credit customers
- decisions by other managers within the business to liberalise credit policy in order to stimulate sales
- an increase in competition among suppliers offering credit, which is being exploited by customers
- disputes with customers over the quality of goods, or services, supplied
- problems in the delivery of goods leading to delays.

You may have thought of others.

10.2 The level of inventories held will be affected in the following ways:

(a) An increase in production bottlenecks is likely to result in an increase in raw materials and work in progress being processed within the plant. Therefore, inventories levels should rise.

(b) A rise in the cost of capital will make holding inventories more expensive. This may, in turn, lead to a decision to reduce inventories levels.

(c) The decision to reduce the range of products should result in a lower level of inventories being held. It would no longer be necessary to hold certain items in order to meet customer demand.

(d) Switching to a local supplier may reduce the lead time between ordering an item and receiving it. This should, in turn, reduce the need to carry such high levels of the particular item.

(e) A deterioration in the quality of bought-in items may result in the purchase of higher quantities of inventories to take account of the defective items included. It may also lead to an increase in the inspection time for items received. This too would lead to a rise in inventories levels.

10.3 Inventories are held to:

- meet customer demand
- avoid the problems of running out of inventories
- take advantage of profitable opportunities (for example, buying a product that is expected to rise steeply in price in the future).

The first reason may be described as transactionary, the second precautionary and the third speculative. They are, in essence, the same reasons why a business holds cash.

10.4 Other opportunities that might be exploited by having cash include:

- buying inventories, surplus to immediate requirements, at a particularly advantageous price; perhaps as a result of another business collapsing
- expanding production spontaneously to meet an unexpected increase in demand for the business's output
- buying certain inventories, surplus to immediate requirements but which may experience a steep rise in price in the future.

Chapter 11

11.1 The directors' attitude towards risk may be affected by the availability of share options in different ways. Where, for example, the options are 'out of the money', the directors may engage in risky behaviour in order to increase the price of the shares. Where, however, the directors are holding much of their personal wealth in the form of share options, they may seek to avoid risk. In both examples, the directors' personal interests would prevail over the interests of shareholders.

11.2 Two problems with the use of MVA as a tool for internal management purposes were identified in the chapter. First, MVA depends on establishing a market price for shares and so only businesses listed on the Stock Exchange can use this technique. Second, MVA cannot be used to evaluate

the performance of strategic business units as there is no market share price for each unit. However, there is also a third reason why it is inappropriate for management purposes. Share prices may fluctuate significantly over the short term and this could obscure the performance of managers.

11.3 The problem with taking changes in the market value of the shares as an indicator of shareholder value created (or lost) is that it does not take account of capital required to generate that market value. Let us assume there are two companies, A and B, which each start with £100 million capital invested. After two years, let us assume that the market value of A is £250 million and the market value of B is £300 million. However, B raised £80 million in additional capital to finance the business. Although B has a higher market value after two years, it has been achieved through a much higher level of capital invested. MVA takes the difference between the market value and the capital invested and so avoids this problem.

11.4 If businesses are overcapitalised it is probably because insufficient attention is given to the amount of capital that is required. Management incentive schemes that are geared towards generating a particular level of profits, or achieving a particular market share without specifying the level of capital invested, can help create such a problem. EVA® can help avoid the problem by focusing on the need to obtain a profitable return on capital invested.

Chapter 12

12.1 Diversification may help a business reduce its overall risk. When one industry is flourishing, another may be struggling. By having a presence in more than one industry, therefore, a diversified business can reduce the volatility of its total sales and earnings. It may also be better placed to withstand a downturn in one of the industries in which it operates. Cash and other resources from a flourishing operation may be used to sustain another operation in difficulties.

Diversification may not, however, lead to an increase in shareholder value. It is often the case that a premium must be paid to acquire the shares of another business. This raises the question as to whether diversification by a business can provide any benefits to shareholders that cannot be achieved on their own account. It may be easier and cheaper for individual shareholders to invest in a diversified portfolio of shares.

12.2 Aspects of financial health that may be investigated include the following:

- profit margins and any changes occurring over time
- profit forecasts and the assumptions underpinning them
- level of financial gearing and the debt capacity of the target business
- level of working capital and forecast future requirements
- unusual accounting practices such as those relating to revenue recognition, depreciation and inventories valuation
- settlement periods for trade receivables and payables
- adequacy of financial resources to meet planned operations
- issues raised in the auditors' reports
- capital expenditure plans and existing commitments.

12.3 By becoming smaller and less well resourced, the business may suffer from:

- greater vulnerability to the risk of takeover from larger businesses
- a lower profile and reduced market standing
- a reduced ability to borrow and/or an increase in the cost of borrowing
- fewer opportunities to benefit from economies of scale through bulk buying, shared administration functions and so on.

12.4 Various reasons could be put forward to account for the difference between the two share prices mentioned. They include the following:

- The market does not share the chief financial officer's (CFO) views concerning future risk and returns. Perhaps the CFO is more confident than the market on these matters.

- Limpet plc's current growth prospects are not yet in the public domain. Unless the stock market is strong-form efficient, private information would not be reflected in the share price.
- The market has not processed all information relating to Limpet plc quickly and in an unbiased manner. This implies, however, that the market is inefficient.
- The calculations undertaken by the CFO contain errors.

You may have thought of other reasons.

Chapter 13

13.1 It is claimed that internationalisation has the potential to, simultaneously, increase the quantity of profitable investments and lower the cost of finance.

13.2 By doing nothing a business will avoid the cost of hedging currency transactions. This approach to currency risk may be suitable where the currency remains stable in relation to another over time. Where, however, there is significant volatility in currency movement, it can be a dangerous strategy.

13.3 Both forward exchange contracts and currency futures are binding agreements. Each of the parties involved must exchange the agreed amount of currencies at the date specified in the contract and at the agreed exchange rate. A key difference between the two hedging methods, however, is that currency futures are standardised whereas forward exchange contracts can be customised to the needs of the business. Standardisation means that the contract amounts for currencies are fixed and that a limited number of forward time periods are available. Currency futures are also available in only a limited number of currencies. This results in a lack of flexibility. It means that the contract values, available currencies and maturity dates may not suit the needs of a business. Their standardised nature does, however, result in lower transaction costs than for forward exchange contracts. It has also led to a market developing where futures contracts can be bought and sold. This can be extremely useful as it avoids the need to identify a counterparty to the contract.

13.4 In the chapter, the point was made that, despite the clear benefits of international diversification, the evidence indicates that investors are somewhat reluctant to invest in overseas shares. Hence, international diversification is not at the level that might be expected. Where shareholders have a poorly diversified portfolio, international diversification by the business may therefore be beneficial to them.

Appendix E
SOLUTIONS TO SELECTED EXERCISES

Chapter 2

2.1 *Choice Designs Ltd*

(a) The projected income statement is:

Projected income statement for the year to 31 May Year 9

	£000
Sales revenue	1,400
Cost of sales (70%)	(980)
Gross profit (30%)	420
Admin. expenses	(225)
Selling expenses	(85)
Profit before taxation	110
Tax	(34)
Profit for the year	76

(b) The projected statement of financial position is:

Projected statement of financial position as at 31 May Year 9

	£000	£000
ASSETS		
Non-current assets		
Property	600	
Depreciation	(112)	488
Fixtures and fittings	140	
Depreciation	(118)	22
Motor vehicles	40	
Depreciation	(10)	30
		540
Current assets		
Inventories (240 + (25% × 240))		300
Trade receivables (8/52 × (80% × 1,400))		172
Bank (balancing figure)		42
		514
Total assets		1,054
EQUITY AND LIABILITIES		
Equity		
Ordinary £1 shares		500
Retained earnings		297
		797
Current liabilities		
Trade payables (12/52 × 1,040*)		240
Tax due (50% × 34)		17
		257
Total equity and liabilities		1,054

*Purchases = (Cost of sales + Closing inventories − Opening inventories)
= (980 + 300 − 240) = 1,040

(c) An existing business may find it easier than a new business to prepare accurate projected financial statements for various reasons. These include:

- the availability of past data concerning sales, overheads and so on which may be used for comparison and extrapolation
- close links with customers, suppliers and so on, which will help to identify likely future changes within the industry and future price changes
- a management team that is experienced in producing forecasts and that understands the effects of competition and customer behaviour on the business.

2.4 *Danube Engineering plc*

Projected income statement for the year ended 31 December Year 6

	£m
Sales revenue $(500 + (20\% \times 500))$	600
Cost of sales (70% of sales)	(420)
Gross profit (30% of sales)	180
Selling expenses (6% of sales)	(36)
Distribution expenses (8% of sales)	(48)
Other expenses (5% of sales)	(30)
Profit before taxation (11% of sales)	66
Tax (20% of profit before tax)	(13)
Profit for the year	53

Projected statement of financial position as at 31 December Year 6

	£m
ASSETS	
Non-current assets	700
Current assets	
Inventories (35% of sales)	210
Trade receivables (25% of sales)	150
Cash (8% of sales)	48
	408
Total assets	1,108
EQUITY AND LIABILITIES	
Equity	
Share capital – 50p ordinary shares (balancing figure)	316
Retained earnings $[249 + (53 - 13^*)]$	289
	605
Non-current liabilities	
Loan notes (500 – 250)	250
Current liabilities	
Trade payables (40% of sales)	240
Tax due (Year 7 tax)	13
	253
Total equity and liabilities	1,108

* The dividend is 25 per cent of the profit for the year (as in previous years) and is deducted in deriving the retained profit for the year.

2.5 *Semplice Ltd*

(a) Projected income statement for the year ended 31 May Year 5

	Shares	Loan notes
	£m	£m
Operating profit $(23.2 + 6.0)$	29.2	29.2
Interest payable	(2.4)	(4.4)
Profit before taxation	26.8	24.8
Tax (25%)	(6.7)	(6.2)
Profit for the year	20.1	18.6

(b) The projected capital structure under each option will be:

	Shares £m	Loan notes £m
Equity		
Share capital − £0.25 ordinary shares (Note 1)	17.0	15.0
Share premium (Note 2)	18.0	
Retained earnings (Note 3)	<u>58.8</u>	<u>58.2</u>
	<u>93.8</u>	<u>73.2</u>
Loan capital	<u>20.0</u>	<u>40.0</u>

Notes:

1 The number of shares in issue (25p shares) for the share issue option is 68 million (£17m/£0.25) and for the loan note option is 60 million (£15m/£0.25).

2 The share premium account represents the amount received from the issue of shares that is above the nominal value of the shares. The amount is calculated as follows: 8 million × £2.25 = £18 million.

3 The retained earnings will be £58.8 (46.2 + 20.1 − 7.5 (dividends)) for the shares option and £58.2 (46.2 + 18.6 − 6.6 (dividend)) for the loan notes option.

(c)

	Shares	Loan notes
Earnings per share		
Shares EPS $\dfrac{£20.1m}{68m}$	29.6p	
Loans EPS $\dfrac{£18.6m}{60m}$		31.0p
Degree of financial gearing		
Shares: degree of financial gearing $= \dfrac{£29.2m}{(£29.2m - £2.4m)}$	1.1	
Loans: degree of financial gearing $= \dfrac{£29.2m}{(£29.2m - £4.4m)}$		1.2

(d) The loan notes option provides ordinary shareholders with better returns. We can see the earnings per share is almost 5 per cent higher than under the share option. However, the loan notes option also produces a higher level of financial gearing and, therefore, a higher level of financial risk. Nevertheless, the operating profit comfortably exceeds the interest charges. Furthermore, there is not a substantial difference in the degree of financial gearing between the two options. In both cases, returns to shareholders are not very sensitive to changes in operating profit. Managers may, therefore, decide that the increase in earnings per share is worth the increase in financial gearing.

Chapter 3

3.1 *Three businesses*

A plc operates a supermarket chain. The grocery business is highly competitive and to generate high sales volumes it is usually necessary to accept low operating profit margins. Thus, we can see that the operating profit margin of A plc is the lowest of the three businesses. The inventories turnover period of supermarket chains also tends to be quite low. They are often efficient in managing inventories and most supermarket chains have invested heavily in inventories control and logistical systems over the years. The average settlement period for receivables is very low as most sales are for cash, although where a customer pays by credit card there is usually a small delay before the supermarket receives the amount due. A low inventories turnover period and a low average settlement period for receivables usually mean that the investment in current assets is low. Hence, the current ratio (current assets/current liabilities) is also low.

B plc is the holiday tour operator. We can see that the sales to capital employed ratio is the highest of the three businesses. This is because tour operators do not usually require a large investment of capital: they do not need a large asset base in order to conduct their operations. The inventories turnover period ratio does not apply to B plc. It is a service business, which does not hold inventories for resale. We can see that the average settlement period for receivables is low. This may be because customers are invoiced near to the holiday date for any amounts outstanding and must pay before going on holiday. The lack of inventories held and low average settlement period for receivables leads to a very low current ratio.

C plc is the food manufacturing business. We can see that the sales to capital employed ratio is the lowest of the three businesses. This is because manufacturers tend to invest heavily in both current and non-current assets. The inventories turnover period is the highest of the three businesses. Three different kinds of inventories – raw materials, work-in-progress and finished goods – are held by manufacturers. The average receivables settlement period is also the highest of the three businesses. Manufacturers tend to sell to other businesses rather than to the public and their customers will normally demand credit. A one-month credit period for customers is fairly common for manufacturing businesses, although customers may receive a discount for prompt payment. The relatively high investment in inventories and receivables usually results in a high current ratio.

3.2 *Amsterdam Ltd and Berlin Ltd*

The ratios for Amsterdam Ltd and Berlin Ltd reveal that the trade receivables settlement ratio for Amsterdam Ltd is three times that for Berlin Ltd. Berlin Ltd is therefore much quicker in collecting amounts outstanding from customers. There is not much difference, however, between the two businesses in the time taken to pay trade payables.

It is interesting to compare the difference in the trade receivables and payables settlement periods for each business. As Amsterdam Ltd allows an average of 63 days' credit to its customers, yet pays suppliers within 50 days, it will require greater investment in working capital than Berlin Ltd, which allows an average of only 21 days to its customers but takes 45 days to pay its suppliers.

Amsterdam Ltd has a much higher gross profit margin than Berlin Ltd. However, the operating profit margin for the two businesses is identical. This suggests that Amsterdam Ltd has much higher overheads (as a percentage of sales revenue) than Berlin Ltd. The inventories turnover period for Amsterdam Ltd is more than twice that of Berlin Ltd. This may be due to the fact that Amsterdam Ltd maintains a wider range of inventories in an attempt to meet customer requirements. The evidence therefore suggests that Amsterdam Ltd is the one that prides itself on personal service. The higher average settlement period for trade receivables is consistent with a more relaxed attitude to credit collection (thereby maintaining customer goodwill) and the high overheads are consistent with incurring the additional costs of satisfying customers' requirements. Amsterdam Ltd's high inventories levels are consistent with maintaining a wide range of inventories, with the aim of satisfying a range of customer needs.

Berlin Ltd has the characteristics of a more price-competitive business. Its gross profit margin is much lower than that of Amsterdam Ltd; that is, a much lower gross profit for each £1 of sales revenue. However, overheads have been kept low, the effect being that the operating profit margin is the same as Amsterdam Ltd's. The low inventories turnover period and average settlement period for trade receivables are consistent with a business that wishes to minimise investment in current assets, thereby reducing costs.

3.7 *Clarrods plc*

(a)

	2018	*2019*
ROCE	$\dfrac{310}{1,600} = 19.4\%$	$\dfrac{350}{1,700} = 20.6\%$
ROSF	$\dfrac{155}{1,100} = 14.1\%$	$\dfrac{175}{1,200} = 14.6\%$

	2018	*2019*
Gross profit margin	$\dfrac{1{,}040}{2{,}600} = 40\%$	$\dfrac{1{,}150}{3{,}500} = 32.9\%$
Operating profit margin	$\dfrac{310}{2{,}600} = 11.9\%$	$\dfrac{350}{3{,}500} = 10\%$
Current ratio	$\dfrac{735}{400} = 1.8$	$\dfrac{660}{485} = 1.4$
Acid test ratio	$\dfrac{485}{400} = 1.2$	$\dfrac{260}{485} = 0.5$
Trade receivables settlement period	$\dfrac{105}{2{,}600} \times 365 = 15 \text{ days}$	$\dfrac{145}{3{,}500} \times 365 = 15 \text{ days}$
Trade payables settlement period	$\dfrac{300}{1{,}560}^* \times 365 = 70 \text{ days}$	$\dfrac{375}{2{,}350}^* \times 365 = 58 \text{ days}$
Inventories turnover period	$\dfrac{250}{1{,}560} \times 365 = 58 \text{ days}$	$\dfrac{400}{2{,}350}^* \times 365 = 62 \text{ days}$
Gearing ratio	$\dfrac{500}{1{,}600} = 31.3\%$	$\dfrac{500}{1{,}700} = 29.4\%$

* Used because the credit purchases figure is not available.

(b) There has been a considerable decline in the gross profit margin during 2019. This fact, combined with the increase in sales revenue by more than one-third, suggests that a price-cutting policy has been adopted in an attempt to stimulate sales. However, the resulting increase in sales revenue has led to only a small improvement in ROCE and ROSF.

Despite a large cut in the gross profit margin, the operating profit margin has fallen by less than 2 percentage points. This may suggest that overheads have been tightly controlled during 2019. Certainly, overheads have not risen in proportion to sales revenue.

The current ratio has fallen and the acid test ratio has fallen by more than half. Even though liquidity ratios are lower in retailing than in manufacturing, the liquidity of the business should now be a cause for concern. However, this may be a passing problem. The business is investing heavily in non-current assets and is relying on internal funds to finance this growth. When this investment ends, the liquidity position may improve quickly.

The trade receivables settlement period has remained unchanged over the two years, and there has been no significant change in the inventories turnover period in 2016. The gearing ratio seems quite low and provides no cause for concern given the profitability of the business.

Overall, the business appears to be financially sound. Although there has been rapid growth during 2019, there is no real cause for alarm provided that the liquidity of the business can be improved in the near future. In the absence of information concerning share price, it is not possible to say whether an investment should be made.

Chapter 4

4.1 *Mylo Ltd*

(a) The annual depreciation of the two projects is:

$$\text{Project 1:} \frac{(£100{,}000 - £7{,}000)}{3} = £31{,}000$$

$$\text{Project 2:} \frac{(£60{,}000 - £6{,}000)}{3} = £18{,}000$$

Project 1

(i) *Net present value*

	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000
Operating profit (loss)		29	(1)	2
Depreciation		31	31	31
Capital cost	(100)			
Residual value				7
Net cash flows	(100)	60	30	40
10% discount factor	1.000	0.909	0.826	0.751
Present value	(100.00)	54.54	24.78	30.04
Net present value	9.36			

(ii) *Internal rate of return*

Clearly the IRR lies above 10 per cent; try 15 per cent:

15% discount factor	1.000	0.870	0.756	0.658
Present value	(100.00)	52.20	22.68	26.32
Net present value	1.20			

Thus the IRR lies a little above 15 per cent, perhaps around 16 per cent.

(iii) *Payback period*

To find the payback period, the cumulative cash flows are calculated:

Cumulative cash flows	(100)	(40)	(10)	30

Thus the payback will occur after 3 years if we assume year-end cash flows.

Project 2

(i) *Net present value*

	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000
Operating profit (loss)		18	(2)	4
Depreciation		18	18	18
Capital cost	(60)			
Residual value				6
Net cash flows	(60)	36	16	28
10% discount factor	1.000	0.909	0.826	0.751
Present value	(60.00)	32.72	13.22	21.03
Net present value	6.97			

(ii) *Internal rate of return*

Clearly the IRR lies above 10 per cent; try 15 per cent:

15% discount factor	1.000	0.870	0.756	0.658
Present value	(60.00)	31.32	12.10	18.42
Net present value	1.84			

Thus the IRR lies a little above 15 per cent; perhaps around 17 per cent.

(iii) *Payback period*

The cumulative cash flows are:

Cumulative cash flows	(60)	(24)	(8)	20

Thus, the payback will occur after 3 years (assuming year-end cash flows).

(b) Assuming Mylo Ltd is pursuing a wealth-enhancement objective, Project 1 is preferable since it has the higher NPV. The difference between the two NPVs is not significant, however.

4.5 *Newton Electronics Ltd*

(a) Option 1

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Plant and equipment	(9.0)					1.0
Sales revenue		24.0	30.8	39.6	26.4	10.0
Variable cost		(11.2)	(19.6)	(25.2)	(16.8)	(7.0)
Fixed cost (ex. dep'n)		(0.8)	(0.8)	(0.8)	(0.8)	(0.8)
Working capital	(3.0)					3.0
Marketing cost		(2.0)	(2.0)	(2.0)	(2.0)	(2.0)
Opportunity cost		(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
	(12.0)	9.9	8.3	11.5	6.7	4.1
Discount factor 10%	1.000	0.909	0.826	0.751	0.683	0.621
Present value	(12.0)	9.0	6.9	8.6	4.6	2.5
NPV	19.6					

Option 2

	Year 0 £m	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Royalties	–	4.4	7.7	9.9	6.6	2.8
Discount factor 10%	1.000	0.909	0.826	0.751	0.683	0.621
Present value	–	4.0	6.4	7.4	4.5	1.7
NPV	24.0					

Option 3

	Year 0	Year 2
Instalments	12.0	12.0
Discount factor 10%	1.000	0.826
Present value	12.0	9.9
NPV	21.9	

(b) Before making a final decision, the board should consider the following factors:

(i) The long-term competitiveness of the business may be affected by the sale of the patents.
(ii) At present, the business is not involved in manufacturing and marketing products. Would a change in direction be desirable?
(iii) The business will probably have to buy in the skills necessary to produce the product itself.
(iv) This will involve cost, and problems could arise. Has this been taken into account?
(v) How accurate are the forecasts made and how valid are the assumptions on which they are based?

(c) Option 2 has the highest NPV and is therefore the most attractive to shareholders. However, the accuracy of the forecasts should be checked before a final decision is made.

4.6 *Chesterfield Wanderers*

(a) Player option

Years	0	1	2	3	4	5
	£000	£000	£000	£000	£000	£000
Sale of player	2,200					1,000
Purchase of Bazza	(10,000)					
Sponsorship and so on		1,200	1,200	1,200	1,200	1,200
Gate receipts		2,500	1,300	1,300	1,300	1,300
Salaries paid		(800)	(800)	(800)	(800)	(1,200)
Salaries saved		400	400	400	400	600
	(7,800)	3,300	2,100	2,100	2,100	2,900
Discount factor 10%	1.000	0.909	0.826	0.751	0.683	0.621
Present values	(7,800)	3,000	1,735	1,577	1,434	1,801
NPV	1,747					

Ground improvement option

Years	1	2	3	4	5
	£000	£000	£000	£000	£000
Ground improvements	(10,000)				
Increased gate receipts	(1,800)	4,400	4,400	4,400	4,400
	(11,800)	4,400	4,400	4,400	4,400
Discount factor 10%	0.909	0.826	0.751	0.683	0.621
Present values	(10,726)	3,634	3,304	3,005	2,732
NPV	1,949				

(b) The ground improvement option provides the higher NPV and is therefore the preferable option, based on the objective of shareholder wealth maximisation.

(c) A professional football club may not wish to pursue an objective of shareholder wealth maximisation. It may prefer to invest in quality players in an attempt to enjoy future sporting success. If this is the case, the NPV approach will be less appropriate because the club is not pursuing a strict wealth-related objective.

Chapter 5

5.1 *Lee Caterers Ltd*

The first step is to establish the NPV for each project:

(a) Cook/chill project

	Cash flows	Discount rate	Present value
	£000	10%	£000
Initial outlay	(200)	1.00	(200)
1 year's time	85	0.91	77.4
2 years' time	94	0.83	78.0
3 years' time	86	0.75	64.5
4 years' time	62	0.68	42.2
		NPV	62.1

(b) Cook/freeze project

	Cash flows	Discount rate	Present value
	£000	10%	£000
Initial outlay	(390)	1.00	(390)
1 year's time	88	0.91	80.1
2 years' time	102	0.83	84.7
3 years' time	110	0.75	82.5
4 years' time	110	0.68	74.8
5 years' time	110	0.62	68.2
6 years' time	90	0.56	50.4
7 years' time	85	0.51	43.4
8 years' time	60	0.47	28.2
		NPV	122.3

Eight years is the minimum period over which the two projects can be compared. The cook/chill will provide the following NPV (in £000) over this period:

$$NPV = £62.1 + \frac{£62.1}{(1 + 0.1)^4} = £104.6$$

This NPV of £104,600 is lower than the NPV for the cook/freeze project of £122,300 (see above). Hence, the cook/freeze project should be accepted.

Using the equivalent-annual-annuity approach we derive the following (in £000):

Cook/chill: £62.1 × 0.3155 = £19.59

Cook/freeze: £122.3 × 0.1874 = £22.92

This approach leads to the same conclusion as the earlier approach.

5.3 *Simonson Engineers plc*

(a) The steps in calculating the expected net present value of the proposed plant are as follows:

	(a) Estimated cash flows £m	(b) Probability of occurrence	Expected value £m
Year 2	2.0	0.2	0.4
	3.5	0.6	2.1
	4.0	0.2	0.8
			3.3
Year 3	2.5	0.2	0.5
	3.0	0.4	1.2
	5.0	0.4	2.0
			3.7
Year 4	3.0	0.2	0.6
	4.0	0.7	2.8
	5.0	0.1	0.5
			3.9
Year 5	2.5	0.2	0.5
	3.0	0.5	1.5
	6.0	0.3	1.8
			3.8

Taking into account the expected cash flows for each year:

	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Expected cash flows	(9.0)	3.3	3.7	3.9	3.8
Discount factor	0.909	0.826	0.751	0.683	0.621
Expected present values	(8.18)	2.73	2.78	2.66	2.36
ENPV	**2.35**				

The expected net present value is £2.35 million.

(b) To find the NPV of the worst possible outcome and the probability of its occurrence:

	Year 1 £m	Year 2 £m	Year 3 £m	Year 4 £m	Year 5 £m
Cash flows	(9.0)	2.0	2.5	3.0	2.5
Discount factor	0.909	0.826	0.751	0.683	0.621
Present values	(8.18)	1.65	1.88	2.05	1.55
NPV	**(1.05)**				

Probability of occurrence = $0.2 \times 0.2 \times 0.2 \times 0.2 = \underline{0.0016}$.

(c) The ENPV of the project is positive and so acceptance will increase the wealth of shareholders.

5.4 *Helena Chocolate Products Ltd*

(a) The first step is to calculate expected sales (units) for each year:

	Sales (units)	Probability	Expected sales
Year 1	100,000	0.2	20,000
	120,000	0.4	48,000
	125,000	0.3	37,500
	130,000	0.1	13,000
			118,500
Year 2	140,000	0.3	42,000
	150,000	0.3	45,000
	160,000	0.2	32,000
	200,000	0.2	40,000
			159,000
Year 3	180,000	0.5	90,000
	160,000	0.3	48,000
	120,000	0.1	12,000
	100,000	0.1	10,000
			160,000

Then the expected net present value can be arrived at:

Expected demand (units)	Incremental cash flow per unit £	Total cash flow £	Discount rate 10%	ENPV £
118,500	0.38	45,030	0.909	40,932
159,000	0.38	60,420	0.826	49,907
160,000	0.38	60,800	0.751	45,661
				136,500
Less				
Initial outlay				(30,000)
Opportunity costs				(100,000)
ENPV				6,500

Note: Interest charges should be ignored as the cost of capital is reflected in the discount factor.

The expected net present value is £6,500.

(b) As the ENPV is positive, the wealth of shareholders should be increased as a result of taking on the project. However, the ENPV is quite small and so careful checking of the underlying figures and assumptions is essential. The business has the option to sell the new product for an amount that is certain, but this option may have associated risks. The effect of selling the product on the long-term competitiveness of the business must be carefully considered.

Chapter 6

6.2 *Balliol Ltd*

(a) The effect on profit can be calculated as follows:

	£000	£000	£000
Increase in sales per customer category			
A (20% × £4m)		800.0	
B (30% × £4m)		1,200.0	
C (50% × £4m)		2,000.0	4,000.0
Increase in variable costs			
Materials [(£4m/£50) × £10]	800.0		
Overheads [(£4m/£50) × £5)]	400.0	1,200.0	
Increase in marketing costs		1,500.0	
Increase in bad debts per customer category			
A (1.0% × £800)	8.0		
B (3.0% × £1,200)	36.0		
C (5.0% × £2,000)	100.0	144.0	
*Increase in financing costs per customer category**			
A	6.6		
B	13.2		
C	27.4	47.2	2,891.2
Increase in profit			1,108.8

* The financing costs are calculated as follows:

	Customer category		
	A	B	C
	£000	£000	£000
Increase in sales	800.0	1,200.0	2,000.0
Increase in trade receivables			
(£800 × 30/365)	65.8		
(£1,200 × 40/365)			
(£2,000 × 50/365)		131.5	274.0
Interest (10%)	6.6	13.2	27.4

(b) We can see that the £4m increase in sales revenue results in an increase in profit of £1.1m. Thus, despite the increase in total expenses resulting from the marketing campaign, the profit margin is around 28 per cent (that is, 1.1/4.0).

This healthy profit margin can be ascribed to the fact that most production expenses of the business are fixed. Each device has a £50 selling price and £15 variable costs (that is, £10 + £5), which means that each device sold will make a £35 (that is, £50 – £15) contribution to profit.

6.5 *Cybele Technology Ltd*

(a) Cost of current policies

	£
Cost of financing receivables (60/365 × £4m × 14%)	92,055
Bad debts	20,000
	112,055
Cost of using a factor	
Factor service charge (2% × £4m)	80,000
Finance charges (40/365 × (85% × £4m) × 12%)	44,712
Bank overdraft charges (40/365 × (15% × £4m) × 14%)	9,205
	133,917
Less Administration cost savings	(26,000)
	107,917

The expected increase in profits arising from using a factor is:

$$£112,055 - £107,917 = £4,138$$

Thus, it would be more profitable to employ a factor. However, the difference between the two options is fairly small and other considerations, such as the need for the business to control all aspects of customer relationships, may have a decisive influence on the final outcome.

(b) This topic is dealt with in the chapter. The main benefits include savings in credit management, releasing key individuals for other tasks, cash advances linked to sales activity and greater certainty in cash flows.

6.6 *Telford Engineers plc*

(a) Projected income statements for the year ending 31 December Year 10:

	Loan notes £m		Shares £m
Operating profit	21.00		21.00
Interest payable	(7.80)	((£20m × 14%) + £5m)	(5.00)
Profit before taxation	13.20		16.00
Tax (30%)	(3.96)		(4.80)
Profit for the year	9.24		11.20
Dividends payable	4.00		5.00

Statements of share capital, reserves and loans:

	Loan notes £m	Shares £m	
Equity			
Share capital 25p shares	20.00	25.00	(20m + (20m × 0.25))
Share premium	–	15.00	(20m × (1.00 − 0.25))
Reserves*	48.24	49.20	
	68.24	89.20	
Non-current liabilities	50.00	30.00	
	118.24	119.20	

* The reserves figures are the Year 9 reserves *plus* the Year 10 (after taxation) profit *less* dividend paid. The Year 9 figure for share capital and reserves was 63, of which 20 (that is,) was share capital, leaving 43 as reserves. Add to that the retained profit for Year 10 (that is, 5.24 (loan) or 6.20 (shares)).

(b) The projected earnings per share are:

Loan notes (9.24/80)	11.55p	
Shares (11.20/100)		11.20p

(c) The loan notes option will raise the gearing ratio and lower the interest cover of the business. This should not provide any real problems for the business as long as profits reach the expected level for Year 9 and remain at that level. However, there is an increased financial risk as a result of higher gearing and shareholders must carefully consider the adequacy of the additional returns to compensate for this higher risk. This appears to be a particular problem since profit levels seem to have been variable over recent years. The figures above suggest only a marginal increase in EPS compared with the equity alternative at the expected level of profit for Year 9.

The share alternative will have the effect of reducing the gearing ratio and is less risky. However, there may be a dilution of control by existing shareholders under this alternative and it may, therefore, prove unacceptable to them. An issue of equity shares may, however, provide greater opportunity for flexibility in financing future projects. Information concerning current loan repayment terms and the attitude of shareholders and existing lenders towards the alternative financing methods would be useful.

Chapter 7

7.1 (a) It is not true that the strong form of market efficiency means that investors cannot make a gain from their investment. It does mean, however, that it is not possible to make *abnormal* gains on a consistent basis. Under this form of efficiency, all relevant information is absorbed in share prices. Thus, even those who have 'inside' information concerning a business, such as unpublished reports or confidential management decisions, will be unable to make abnormal gains, on a consistent basis, from using this information.

(b) It is not true to say that private equity firms do not invest in business start-ups. They do however find them challenging for two reasons. First, they are very high-risk: investing in existing businesses with a good track record is a much safer bet. Second, start-ups and early-stage businesses often require fairly small amounts of finance. Unless a significant amount of finance is required, it is difficult to justify the high cost of investigating and monitoring the investment. As a result, relatively few start-ups are funded through private equity.

(c) This statement is true. The value of a share is represented by the future discounted cash flows that it generates. In a stock market where shares are efficiently priced, investors should therefore be concerned with the ability of a business to generate long-term cash flows rather than its ability to meet short-term profit targets. In other words, if a stock market is efficient, a critical mass of investors will not adopt a short-term view when making share investment decisions.

7.2 (a) The weak form of market efficiency is the maximum level of efficiency assumed. When a market shows efficiency beyond this form (that is, semi-strong or strong forms of efficiency) current share prices reflect all publicly available information. There would, therefore, be no point in examining the type of published information mentioned in order to achieve abnormal gains.

(b) There will be no share price reaction. Under the strong form of market efficiency, the share price will rise on 30 July 2019, when the decision to accept the offer is made. All information, whether or not it is formally put into the public domain, will be available to the market.

(c) The maximum level of efficiency assumed is the weak form. Under the semi-strong form of market efficiency, you cannot fool the market. Investors will 'see through' cosmetic changes in accounting policies. Thus, the lengthening of the depreciation period should not provoke a share price reaction.

7.7 *Carpets Direct plc*

  (a) The stages in calculating the theoretical ex-rights price of an ordinary share are as follows:

  (i) Earnings per share

$$\frac{\text{Profit for the year}}{\text{No. of ordinary shares}} = \frac{£4.5m}{120m} = \underline{£0.0375}$$

  (ii) Market value per share

$$\text{Earnings per share} \times \text{P/E ratio} = £0.0375 \times 22 = \underline{£0.825}$$

  (iii) For the theoretical ex-rights price:

	£
Original shares (4 × £0.825)	3.30
Rights share (80% × £0.825)	0.66
Value of five shares following the rights issue	3.96
Value of one share following the rights issue	£3.96
	5
Theoretical ex-rights price	= 79.2p

  (b) The price at which the rights are likely to be traded is derived as below:

Value of one share after rights issue	79.2p
Less Cost of a rights share	(66.0p)
Value of rights to shareholder	13.2p

  (c) Comparing the three options open to the investor:

  (i) *Option 1: Taking up rights issue*

	£
Shareholding following rights issue ((4,000 + 1,000) × 79.2p)	3,960
Less Cost of rights shares (1,000 × 66p)	(660)
Shareholder wealth	3,300

  (ii) *Option 2: Selling the rights*

	£
Shareholding following rights issue (4,000 × 79.2p)	3,168
Add Proceeds from sale of rights (1,000 × 13.2p)	132
Shareholder wealth	3,300

  (iii) *Option 3: Doing nothing*
  As the rights are neither purchased nor sold, the shareholder wealth following the rights issue will be:

	£
Shareholding (4,000 × 79.2p)	3,168

  We can see that the investor will have the same wealth under the first two options. However, if the investor does nothing the rights issue will lapse and so the investor will lose the value of the rights and will be worse off.

Chapter 8

8.2 *Celtor plc*

  (a) The cost of capital is important in the appraisal of investment projects as it represents the return required by investors. Incorrect calculation of the cost of capital can lead to incorrect investment decisions. Too high a cost of capital figure may lead to the rejection of profitable opportunities whereas too low a figure may lead to the acceptance of unprofitable opportunities.

(b) The first step in calculating the weighted average cost of capital is to arrive at the cost of ordinary shares:

$$K_0 = \frac{D_1}{P_0} = \frac{(20 \times 1.04)}{390} + 0.04 = 9.3\%$$

Then the cost of loan capital:

$$K_d = \frac{I(1-t)}{P_d} = \frac{9(1-0.25)}{80} \times 100 = 8.4\%$$

The WACC can now be calculated:

	Cost	Target structure	Proportion (weights)	Contribution to WACC
	%		%	%
Cost of ordinary shares	9.3	100	58.8	5.5
Cost of loan capital	8.4	70	41.2	3.5
WACC				9.0

The weighted average cost of capital to use for future investment decisions is 9 per cent.

8.3 (a) (i) *Plym plc – Cost of equity*

Using CAPM, we must first calculate the risk-free rate (X) based on information for Derwent plc:

$$K_0 = K_{RF} + b(K_m - K_{RF})$$
$$9.0 = X + 0.5(12 - X)$$
$$X = \underline{6.0}\%$$

Now calculate the cost of equity for Plym plc:

$$K_0 = K_{RF} + b(K_m - K_{RF})$$
$$= 6.0 + 1.2(12.0 - 6.0)$$
$$= \underline{13.2}\%$$

(ii) *Johar plc – Cost of equity*

Using CAPM, we can calculate the cost of equity:

$$K_0 = K_{RF} + b(K_m - K_{RF})$$
$$= 5\% + 1.2[8.0\% - 5.0\%]$$
$$= \underline{8.6}\%$$

(iii) *Chamba plc – Cost of equity*

First, find the share price and the dividend per share:

$$P_0 = £150m/100m$$
$$= \underline{£1.50}$$
$$D_1 = (£20m \times 1.25) \times 0.4/100m$$
$$= \underline{£0.10}$$

We can now calculate the cost of equity using Gordon's growth model:

$$K_0 = \frac{D_1}{P_0} + g$$
$$= \frac{10}{150} + 0.05$$
$$= \underline{11.67}\%$$

(b) *Johar plc – Predicted value of a share*

Using the dividend model (assuming a constant dividend), we can calculate the value of a share:

$$P_0 = \frac{D_1}{K_0}$$

$$= \frac{(£0.80 \times 0.25)}{0.086}$$

$$= £2.33$$

8.6 *Averna plc*

(a) Using CAPM, the required returns to ordinary shareholders will be:

$$K_0 = 3\% + 1.4\,(8\% - 3\%)$$
$$= 10\%$$

The cost of loan capital (K_d) is:

$$K_d = (4/80) \times 100\%$$
$$= 5\%$$

The WACC is:

$$\text{WACC} = (80\% \times 10\%) + (20\% \times 5\%)$$
$$= 9\%$$

Forecast sales revenue for the new scooter will be:

	Year 1	Year 2	Year 3	Year 4
Sales (000 units)	2,400	5,300	8,200	8,100
Selling price	£2,300	£2,100	£2,000	£1,800
Total sales (£000)	£5,520	£11,130	£16,400	£14,580

Option (i)

The incremental cash flows will be:

	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000	Year 4 £000
Total sales		5,520	11,130	16,400	14,580
Equipment	(12,400)				3,200
Working capital	(2,800)				2,800
Variable costs		(960)	(2,120)	(3,280)	(3,240)
Redundancy costs					(1,400)
Fixed costs		(3,200)	(3,200)	(3,200)	(3,200)
Cash flows	(15,200)	1,360	5,810	9,920	12,740
Discount rate 9%	1.00	0.92	0.84	0.77	0.71
Present value	(15,200)	1,251.2	4,880.4	7,638.4	9,045.4
NPV	7,615.4				

Option (ii)

Forecast royalty payment for the new scooter will be:

	Year 1	Year 2	Year 3	Year 4
Sales (000 units)	2,160	4,770	7,380	7,290
Annual royalty payment	£250	£250	£250	£250
Total annual royalties (£000)	£540.0	£1,192.5	£1,845.0	£1,822.5

The incremental cash flows will be:

	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000	Year 4 £000
Total annual royalties		540.0	1,192.5	1,845.0	1,822.5
Final royalty					2,500.0
Loan	(2,000.0)				2,000.0
Admin costs		(100.0)	(100.0)	(100.0)	(100.0)
Cash flows	(2,000.0)	440.0	1,092.5	1,745.0	6,222.5
Discount rate 9%	1.00	0.92	0.84	0.77	0.71
Present value	(2,000)	404.8	917.7	1,343.7	4,418.0
NPV	5,084.2				

(b) When considering the above calculations, the following should be taken into account:
- the reliability of the forecast figures
- the calculations ignore taxation – introducing taxation will affect both the discount rate and the net cash flows for each option, which could significantly affect the outcomes
- the use of WACC as the appropriate discount rate assumes that this project is of similar risk to other projects undertaken by the business – this may not be so, particularly if manufacturing operations are established.

(c) Assuming that the objective is to maximise shareholder wealth, Option 1 has the higher NPV and so this option should be selected. However, the business is research based and so this option may not fit with its strategic objectives. Furthermore, it is not clear that manufacturing expertise can be easily acquired to produce the motor scooters.

Chapter 9

9.1 *Scrip dividend*

A scrip dividend can help to maintain the total equity of the business as it simply involves a transfer from reserves to the ordinary share capital account. This means that there will be a change to the gearing ratio as a result of a scrip dividend. Scrip dividends can also help to conserve cash. Some shareholders may, however, wish to receive cash rather than shares and so a business may offer shareholders the choice of a cash dividend or a scrip dividend. For those wishing to reinvest in the business, a scrip dividend offers the opportunity to acquire shares without incurring share transaction costs. Scrip dividends may undermine the prospects of making rights issues as existing shareholders may be reluctant to invest beyond the scrip dividends.

9.2 *Gripton plc*

(i) A share buyback is likely to offer greater flexibility. Dividends are normally distributed at regular intervals and shareholders will develop expectations concerning both the timing and amount of the dividends to be received. Failure to meet these expectations could well provoke an adverse reaction among shareholders. Thus, managers usually feel committed to maintaining a sustainable level of dividend payments. This means they will avoid increasing dividends, which then have to be decreased in subsequent periods.

Share buybacks, however, tend to be regarded by shareholders as 'one off' events and so there is less expectation concerning their amount or the timing. Where a buyback has been announced, but is then postponed, or even abandoned, it does not incur the kind of adverse reaction from shareholders that would normally accompany a cut in dividends.

(ii) A dividend may offer greater equity between shareholders. Where a buyback is carried out when the share price is below its intrinsic value, it will lead to a transfer of wealth from those shareholders that sell to those that hold. A dividend, however, is paid to all shareholders and so does not discriminate between different groups of shareholders.

(iii) Dividends are likely to have a stronger signalling effect. A share buyback announcement can send an ambiguous signal to the market as buybacks may benefit managers rather than shareholders.

9.5 *Fellingham plc*

The dividends over the period indicate a 9 per cent compound growth rate and so the chairman has kept to his commitment made in Year 1. This has meant that there has been a predictable stream of income for shareholders. However, during the period, inflation reached quite high levels and in order to maintain purchasing power the shareholders would have had to receive dividends adjusted in line with the general price index. These dividends would be as follows:

Year 2	$10.00 \times 1.11 = 11.10$p
Year 3	$11.10 \times 1.10 = 12.21$p
Year 4	$12.21 \times 1.08 = 13.19$p

We can see that the actual dividends (Year 2, 10.90p; Year 3, 11.88p; Year 4, 12.95p) have fallen below these figures and so there has been a decline in real terms in the dividend income received by shareholders. Clearly, the 9 per cent growth rate did not achieve the anticipated maintenance of purchasing power plus a growth in real income that was anticipated.

However, the 9 per cent dividend growth rate is already high in relation to the earnings of the business, and a higher level of dividend to reflect changes in the general price index may have been impossible to achieve. The dividend coverage ratio for each year is:

Dividend coverage (EPS/DPS)

Year 1	1.1
Year 2	1.1
Year 3	0.9
Year 4	1.3

We can see that the earnings barely cover the dividend in the first two years and that, in the third year, earnings fail to cover the dividend. The existing policy seems to be causing some difficulties for the business and can be maintained only if earnings grow at a satisfactory rate.

9.7 *Traminer plc*

The dividend payout ratio and dividend per share of the business over the past five years are:

Year	Dividend payout %	Dividend per share £
2015	50.0	0.84
2016	48.7	1.16
2017	23.9	0.43
2018	23.2	0.45
2019	37.9	0.97

We can see from this table that there is no stable dividend policy. The payout ratio fluctuated between 50 per cent and 23.2 per cent. The dividend per share has also fluctuated significantly over the period. This may suggest that dividends are viewed simply as a residual; that is, dividends will be paid only when the business has no profitable opportunities in which to invest its earnings.

A fluctuating dividend policy is unlikely to be popular with shareholders. A policy that is predictable and contains no surprises is likely to be much more welcome. The signalling effect of dividends must also be borne in mind. Sudden changes in payout ratios may produce uncertainty in the minds of shareholders and run the risk that these changes will be incorrectly interpreted.

Chapter 10

10.2 *Hercules Wholesalers Ltd*

(a) The business is probably concerned about its liquidity position because:
- it has a substantial overdraft, which together with its non-current borrowings means that it has borrowed an amount roughly equal to its equity (based on statement of financial position values)
- it has increased its investment in inventories during the past year (as shown by the income statement)
- it has a low current ratio of 1.1:1 (that is, 306/285) and a low acid test ratio of 0.6:1 (that is, 162/285).

(b) The operating cash cycle can be calculated as follows:

Number of days

Average inventories turnover period:

$$\frac{[(\text{Opening inventories} + \text{Closing inventories}) / 2] \times 365}{\text{Cost of inventories}} = \frac{[(125 + 143) / 2 \times 365]}{323} = 151$$

Add Average settlement period for trade receivables:

$$\frac{\text{Trade receivables} \times 365}{\text{Credit sales revenue}} = \frac{163}{452} \times 365 \qquad\qquad = \underline{132}$$

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Less Average settlement period for trade payables:

$$\frac{\text{Trade payables} \times 365}{\text{Credit purchases}} = \frac{145}{341} \times 365 \qquad\qquad = \underline{(155)}$$

Operating cash cycle $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\underline{128}$

(c) The business can reduce the operating cash cycle in a number of ways. The average inventories turnover period seems quite long. At present, average inventories held represent about five months' inventories usage. Reducing the level of inventories held can reduce this period. Similarly, the average settlement period for receivables seems long at more than four months' sales revenue. Imposing tighter credit control, offering discounts, charging interest on overdue accounts and so on may reduce this. However, any policy decisions concerning inventories and receivables must take account of current trading conditions.

Extending the period of credit taken to pay suppliers would also reduce the operating cash cycle. For the reasons mentioned in the chapter, however, this option must be given careful consideration.

10.4 *Plastics Manufacturers Ltd*

Ratio analysis

	Year 1	Year 2	Year 3
ROCE	16.7%	16.9%	(26.1%)
Operating profit margin	12.5%	11.2%	(23.4%)
Current ratio	1.2	1.1	0.9
Acid test ratio	0.5	0.5	0.3
Inventories turnover period*	91 days	82 days	183 days
Average settlement period for trade receivables	64 days	60 days	91 days

* Using sales revenue figure rather than cost of sales, which is unavailable.

The above figures reveal that Year 3 was a disastrous one for Plastic Toys Ltd (PT). Sales revenue and profitability fell dramatically. The fall in sales revenue does not appear to have been anticipated as inventories levels have risen dramatically in Year 3. The fall in profitability and increase in inventories has created a strain on liquidity that should cause acute concern. The liquidity ratios are very low and it seems the business is in a dangerous state. Extreme caution must therefore be exercised in any dealings with the business.

Before considering the proposal to supply, Plastics Manufacturers Ltd (PM) should establish why Plastic Toys Ltd wishes to change its suppliers. In view of the problems that it faces, there may well be problems with current suppliers. If three months' credit were to be granted, PM will be committed to supplying 6,000 kilos before payment is due. At a marginal cost of £7 a kilo, this means an exposure of £42,000. The risks of non-payment seem to be very high unless there is information concerning PT indicating that its fortunes will soon improve. If PM is determined to supply the goods to PT, some kind of security should be demanded in order to minimise the risk.

10.5 *Mayo Computers Ltd*

New proposals from credit control department

	£000	£000
Current level of investment in receivables		
(£20m × (60/365))		3,288
Proposed level of investment in receivables		
((£20m × 60%) × (30/365))	(986)	
((£20m × 40%) × (50/365))	(1,096)	(2,082)
Reduction in level of investment		1,206

The reduction in overdraft interest as a result of the reduction in the level of investment will be £1,206,000 × 14% = £169,000.

	£000	£000
Cost of cash discounts offered (£20m × 60% × 2.5%)		300
Additional cost of credit administration		20
		320
Bad debt savings	(100)	
Interest charge savings (see above)	(169)	(269)
Net cost of policy each year		51

These calculations show that the business would incur additional annual cost if it implemented this proposal. It would therefore be cheaper to stay with the existing credit policy.

10.6 *Boswell Enterprises Ltd*

(a)	Current policy		New policy	
	£000	£000	£000	£000
Trade receivables				
[(£3m × 1/12 × 30%) + (£3m × 2/12 × 70%)]		425.0		
[(£3.15m × 1/12 × 60%) + (£3.15m × 2/12 × 40%)]				367.5
Inventories				
{[£3m − (£3m × 20%)] × 3/12}		600.0		
{[£3.15m − (£3.15m × 20%)] × 3/12}				630.0
Cash (fixed)		140.0		140.0
		1,165.0		1,137.5
Trade payables				
[£3m − (£3m × 20%)] × 2/12]	(400.0)			
{[£3.15m − (£3.15m × 20%)] × 2/12 }			(420.0)	
Accrued variable expenses				
[£3m × 1/12 × 10%]	(25.0)			
[£3.15m × 1/12 × 10%]			(26.3)	
Accrued fixed expenses	(15.0)	(440.0)	(15.0)	(461.3)
Investment in working capital		725.0		676.2

(b) The expected profit for the year

	Current policy		New policy	
	£000	£000	£000	£000
Sales revenue		3,000.0		3,150.0
Cost of goods sold		(2,400.0)		(2,520.0)
Gross profit (20%)		600.0		630.0
Variable expenses (10%)	(300.0)		(315.0)	
Fixed expenses	(180.0)		(180.0)	
Discounts	–	(480.0)	(47.3)	(542.3)
Profit for the year		120.0		87.7

(c) Under the proposed policy, we can see that the investment in working capital will be slightly lower than under the current policy. However, profits will be substantially lower as a result of offering discounts. The increase in sales revenue resulting from the discounts will not be sufficient to offset the additional cost of awarding discounts to customers. It seems that the business should, therefore, stick with its current policy.

Chapter 11

11.2 *Aquarius plc*

There are a number of ways in which the accuracy of the predicted free cash flow figures may be checked. These include:

Internal

- *Past results.* These may be used to see whether the future projections are in line with past achievements.
- *Strategy.* The future free cash flows for the business should reflect the strategies put in place over the planning period.
- *Capacity.* The ability of the business to generate free cash flows from the resources available over the planning period should be considered.
- *Market research.* Evidence from any market research carried out by the business should be consistent with the estimates made.

External

- *Industry forecasts.* Forecasts for the industry as a whole may be examined to see whether the predicted sales and profits for the business are in line with industry forecasts.
- *External commentators.* Stockbrokers and financial journalists may have made predictions about the likely future performance of the business and so may provide an external (and perhaps more objective) view of likely future prospects.
- *Technology.* The likely impact of technological change on free cash flows may be assessed using technology forecasts.
- *Competitor analysis.* The performance of competitors may be used to help assess likely future market share.

This is not an exhaustive list. You may have thought of other ways.

11.4 *Virgo plc*

There is no single correct answer to this problem. The suggestions set out below are based on experiences that some businesses have had in implementing a management bonus system based on EVA® performance.

In order to get the divisional managers to think and act like the owners of the business, it is recommended that divisional performance, as measured by EVA®, should form a significant part of their total rewards. Thus, around 50 per cent of the total rewards paid to managers could be related to the EVA® that has been generated for a period. (In the case of very senior managers it could be more, and for junior managers it could be less.)

The target for managers to achieve could be a particular level of improvement in EVA® for their division over a year. A target bonus can then be set for achievement of the target level of improvement. If this target level of improvement is achieved, 100 per cent of the bonus should be paid. If the target is not achieved, an agreed percentage (below 100 per cent) could be paid according to the amount of shortfall. If, however, the target is exceeded, an agreed percentage (with no upper limits) may be paid.

The timing of the payment of management bonuses is important. In the question it was mentioned that Virgo plc wishes to encourage a longer-term view among its managers. One approach is to use a 'bonus bank' system whereby the bonus for a period is placed in a bank and a certain proportion (usually one-third) can be drawn in the period in which it is earned. If the target for the following period is not met, there can be a charge against the bonus bank and so the total amount available for withdrawal is reduced. This will ensure that the managers try to maintain improvements in EVA® consistently over the years.

In some cases, the amount of bonus is determined by three factors: the performance of the business as a whole (as measured by EVA®), the performance of the division (as measured by EVA®) and the performance of the particular manager (using agreed indicators of performance). Performance for the business as a whole is often given the highest weighting and individual performance the lowest weighting. Thus, 50 per cent of the bonus may be for corporate performance, 30 per cent for divisional performance and 20 per cent for individual performance.

11.6 *Pisces plc*

Adjusted NOPAT

	£m	£m
Operating loss		(20.5)
EVA® adjustments		
R&D costs ($40 - (1/16 \times 80)$) (Note 1)	35.0	
Excess allowance	6.5	41.5
Adjusted NOPAT		21.0

Adjusted net assets (or capital invested)

	£m	£m
Net assets per statement of financial position		196.5
Add		
R&D costs (Note 1)	70.0	
Allowance for trade receivables	6.5	
Restructuring costs		
(Note 2)	6.0	82.5
		279.0
Less Marketable investments		(9.0)
Adjusted net assets		270.0

Notes:

1 The R&D costs represent a writing back of £40 million and a writing off of 1/16 of the total cost of the R&D as the benefits are expected to last 16 years.

2 The restructuring costs are added back to the net assets as they provide benefits over an infinite period.

EVA® can be calculated as follows:

$$\begin{aligned}
\text{EVA}^{\circledR} &= \text{NOPAT} - (R \times C) \\
&= \text{£21m} - (7\% \times \text{£270m}) \\
&= \underline{\text{£2.1m}}
\end{aligned}$$

Thus, the EVA® for the period is positive even though an operating loss was recorded. This means that shareholder wealth increased during the third year.

Chapter 12

12.2 *Dawn Raider plc*

                                                         £m

(a) (i) The bid consideration is ((200m shares/2) × 198p)   198

           The market value of the shares in Sleepy Giant is (£100m × 2 × 72p)   (144)

           The bid premium is therefore   54

      (ii) Sleepy Giant's net assets per share are £446m/200m   = £2.23

     (iii) Dividends from Sleepy Giant before the takeover are 100 × 7p = £7.00

           Dividends from Dawn Raider after takeover are 50 × 2p   = £1.00

     (iv) Earnings per share after takeover:

                                           £m

Expected post-tax profits of Dawn Raider	23
Current post-tax profits of Sleepy Giant	16
Post-tax savings	1
Improvements due to management	5
Total earnings	**45**

               Expected EPS (£45m/(200m + 100m shares))   15p

     (v) Expected share price following takeover will be calculated as follows:

        P/E ratio × Expected EPS

$$P/E \text{ ratio at 31 May Year 8} = \text{Share price/EPS}$$
$$= 198/9.0$$
$$= \underline{22}$$
$$\text{Expected share price} = 22 × 15p$$
$$= \underline{£3.30}$$

(b) (i) The net assets per share of the business is irrelevant. This represents a past investment that is irrelevant to future decisions. The key comparison is between the current market value of the shares of Sleepy Giant and the bid price.

         The dividend received from Dawn Raider will be substantially lower than that received from Sleepy Giant. However, the share value of Dawn Raider has grown much faster than that of Sleepy Giant. The investor must consider the total returns from the investment rather than simply the dividends received.

     (ii) We can see above that by accepting the bid, the shareholders of Sleepy Giant will make an immediate and substantial gain. The bid premium is more than 37 per cent higher than the current market value of the shares in Sleepy Giant. This could provide a sufficient incentive for the shareholders of Sleepy Giant to accept the offer. However, the shareholders of Dawn Raider must consider the bid carefully. Although the expected share price calculated above is much higher following the bid, it is based on the assumption that the P/E ratio of the business will not be affected by the takeover. This may not, however, be the case. Sleepy Giant is a much larger business in terms of sales and net assets than Dawn Raider and has a much lower P/E ratio (nine times). The market would have to be convinced that Sleepy Giant's prospects will be substantially improved following the takeover.

12.4 *Simat plc*

  (a) Calculating the value per share of Stidwell Ltd on a net assets (liquidation) basis gives:

$$P_0 = \frac{\text{Total assets at realisable values} - \text{Total liabilities}}{\text{No. of shares in issue}}$$

$$= \frac{£347,000 \text{ [that is } (285 + 72 + 15 + 157) - (42 + 140)]}{300,000}$$

$$= £1.16$$

(b) The dividend yield method gives:

$$P_0 = \frac{\text{Dividend per share}}{\text{Dividend yield}} \times 100$$

$$= \frac{18,000/300,000}{2.76} \times 100$$

$$= \underline{£2.17}$$

(c) The P/E ratio method gives:

$$P_0 = \text{P/E ratio} \times \text{earnings per share}$$

$$= 11 \times (£48,500/300,000)$$

$$= \underline{£1.78}$$

12.6 *Mojave plc*

(a) *Net assets (net book value method)*

(i) P_0 = Net assets at statement of financial position values/No.of ordinary shares

$$= £(37.9m - 8.0m - 4.3m)/48m$$

$$= £0.53$$

(ii) P_0 = Net assets at realisable values/No. of ordinary shares

$$= [£m (29.8 + 2.0 + 4.1 + 3.5 + 4.7 + 1.3) - (8.0 + 4.3)]/48m$$

$$= £0.69$$

(iii) $P_0 = D_0(1 + g)/(r - g)$

where

D_0 = current dividend

g = expected annual growth in dividends

r = required rate of return

$$= £0.04 (1 + 0.05)/(0.09 - 0.05)$$

$$= £1.05$$

(*Note*: Dividend = 60% $\times$ £0.067 = £0.04)

(iv) P_0 = P/E ratio $\times$ Earnings per share (EPS)

$$= 12.6 \times £0.067$$

$$= £0.84$$

* EPS is calculated as follows:

EPS = £3.2m/48m

$$= £0.067$$

(b) The P/E ratio method, which reflects the market valuations of similar businesses within the same industry as Mojave plc, may produce the most realistic valuation for its shares. This method assumes, however, that Mojave plc has the same risk and growth characteristics as the industry average. Hence, the valuation produced is unlikely to be useful unless this assumption holds.

While the P/E ratio method is not a perfect valuation method, the other methods considered have even greater weaknesses. The net asset (net book value) method is limited by certain accounting conventions, such as historic cost and money measurement. As a result, the asset figures produced may not reflect current values and some valuable resources, such as internally generated goodwill and brands, may be ignored. The net asset (realisation) method is an improvement on the net assets (net book value) method as it provides market-based valuations. These valuations, however, are normally lower than the valuations of assets held when they are in use. In common with the net assets (net book value) method, this method may

ignore certain valuable resources in the valuation process. Thus, both asset-based methods discussed are flawed and may well produce conservative values.

Although theoretically appealing, the dividend growth model depends on the accuracy of forecasts made concerning key variables, in practice it is extremely difficult to predict dividends and growth rates over time. Furthermore, this method cannot be applied where a business does not distribute dividends.

Chapter 13

13.3 *Tetron plc*

In order to buy euros, a call option is required. The option will be exercised as the spot rate prevailing at the time of expiry will be below the strike price. The total cost will be as follows:

	£
(€400,000/€100) × £0.60	2,400
€400,000/1.2226	327,172
Total cost	329,572

13.5 *Farndale plc*

(a) (i) *Forward exchange contract*

The forward rate is 1.2780. The higher forward rate is chosen as the business is selling US$. The amount to be received in sterling will therefore be:

$150,000,000/1.2780 = £117,370,892

(ii) *Currency option*

Calculations for the two spot rates in three months' time are as follows:

	(i)	(ii)
Spot rate	$1.35	$1.20
Exercise price of option	$1.30	$1.30
Option decision	Exercise	Lapse
	£	£
£ *sterling to be received*		
$150,000,000/1.30	115,384,615	
$150,000,000/1.20		125,000,000
Option premium [($150m/$100) × £1.10]	(1,650,000)	(1,650,000)
	113,734,615	123,350,000

Note: The premium is a cost that must be incurred irrespective of whether the option is exercised or allowed to lapse.

(iii) *To do nothing*

The amount to be received in sterling for the two spot rates in three months' time is:

Spot rate	$1.35	$1.20
	£	£
$150,000,000/1.35	111,111,111	
$150,000,000/$1.20		125,000,000

(b) We can see that if the spot rate is £1 = $1.35 in three months' time the forward contract will be the best option. If, however, the spot rate is £1 = $1.20 then doing nothing provides the best option. The currency option would not be chosen whichever of the two spot rates apply.

If the spot rate is £1 = $1.35 in three months' time, both hedging methods would be better than doing nothing. Although there is a premium cost to be incurred, the currency option would provide £2,623,503 more and the forward exchange contract would provide £6,259,981 more.

13.6 The amount to be hedged, using either of the two hedging approaches mentioned, is $3,000,000 (that is, $10,000,000 – $7,000,000). This is because the cheapest hedge is to net the receipts from the US customer with the payments to the sub-contractors, leaving only the balance to be hedged.

Forward market hedge

The forward rate is $1.109 per €. Euros will be received at this forward rate, yielding:

$$\$3,000,000/1.109 = €2,705,140 \text{ (to nearest €)}$$

Currency futures

Euro equivalent of balance due based on futures contract price in September Year 7:

$$= \$3,000,000/1.0950$$
$$= €2,739,726$$

Number of contracts required:

$$= €2,739,726/€125,000$$
$$= \underline{22 \text{ contracts}} \text{ (to nearest whole number)}$$

	$
Purchase of futures at	1.0950
Sale of futures at	1.0640
Loss per contract	0.0310 (that is 3.1 cents)
Total loss $= 22 \times (3.1/0.01) \times \$12.50$	$85,250

	$
Net amount mount due from customer	3,000,000
Less Loss from futures contract hedge	85,250
Net dollar receipts	2,914,750
Euro receipts on sale of dollars	$= \$2,922,500/1.0860$
	$= €2,691,068$ (to nearest €)

(i) The calculations in (b) and (c) above indicate that the forward contract hedge will deliver higher euro receipts than the currency futures hedge. It would, therefore, seem to be the better choice. However, the calculations are carried out before the end of the hedging period. Only then will the business know the actual exchange rate. At the time of the hedging decision, the business must rely on estimates.

Glossary of key terms

ABC system of inventories control   A method of applying different levels of inventories control based on the value of each category of inventories. *p. 451*

accounting rate of return (ARR)   The average profit from an investment, expressed as a percentage of the average investment made. *p. 151*

acid test ratio   A liquidity ratio that relates the current assets (less inventories) to the current liabilities. *p. 112*

ageing schedule of trade receivables   A report dividing receivables into categories, depending on the length of time outstanding. *p. 467*

agency problem   The conflict of interest between shareholders (the principals) and the managers (agents) of a business which arises when the managers seek to maximise their own welfare. *p. 19*

Alternative Investment Market (AIM)   Second-tier market of the London Stock Exchange that specialises in the securities of smaller businesses. *p. 340*

annuity   An investment that pays a constant sum each year over a period of time. *p. 207*

arbitrage transaction   A transaction that exploits differences in price between similar shares (or other assets) and which involves selling the overpriced shares and purchasing the under-priced shares. *p. 383*

asset-based finance   A form of finance where assets are used as security for cash advances to a business. Factoring and invoice discounting, where the security is trade receivables, are examples of asset-based finance. *p. 289*

average inventories turnover period ratio   An efficiency ratio that measures the average period for which inventories are held by a business. *pp. 104, 448*

average settlement period for trade payables ratio   An efficiency ratio that measures the average time taken by a business to pay its payables. *pp. 105, 480*

average settlement period for trade receivables ratio   An efficiency ratio that measures the average time taken for credit customers to pay the amounts owing. *pp. 105, 467*

back-to-back loans   An arrangement between two businesses located in different countries. It involves each business making a loan to the other in its home currency and receiving in return an equivalent loan in a foreign currency as security. *p. 616*

bank overdraft   Amount owing to a bank that is repayable on demand. The amount borrowed and the rate of interest may fluctuate over time. *p. 284*

behavioural finance   An approach to finance that rejects the notion that investors behave in a rational manner but rather make systematic errors when processing information. *p. 319*

beta (coefficient)   A measure of the extent to which the returns on a particular share vary with the market as a whole. *p. 360*

bill of exchange   A written agreement requiring one party to the agreement to pay a particular amount to the other party at some future date. *p. 285*

bonds   See Loan notes. *p. 266*

bonus issue (scrip issue) Transfer of reserves to share capital requiring the issue of new shares to shareholders in proportion to existing shareholdings. *p. 325*

business angels Wealthy individuals willing to invest in businesses that are often at an early stage in their development. *p. 337*

capital asset pricing model (CAPM) A method of establishing the cost of equity share capital that identifies two forms of risk: diversifiable risk and non-diversifiable risk. *p. 358*

capital markets Financial markets for long-term loan capital and shares. *p. 5*

capital rationing Limiting the long-term funds available for investment during a period. Capital rationing may be imposed by managers or by investors. *p. 181*

cash discount A reduction in the amount due for goods or services sold on credit in return for prompt payment. *p. 465*

cash tax rate The percentage of profits that a business pays in cash taxes for a period. *p. 497*

catering effect *p.* The phenomenon where managers of a business try to cater to the needs of shareholders concerning the dividend paid for a period. *p. 412*

clientele effect The phenomenon where investors seek out businesses whose policies, such as those relating to dividends and gearing, match their particular needs. *p. 389*

coefficient of correlation A statistical measure of association that can be used to measure the degree to which the returns from two separate projects are related. The measure ranges from $+1$ to -1. A measure of $+1$ indicates a perfect positive correlation and a measure of -1 indicates a perfect negative correlation. *p. 243*

Competition and Markets Authority (CMA) An independent public body that seeks to protect consumers where a merger is likely to lead to a substantial lessening of competition in particular markets. *p. 564*

conglomerate merger A merger between two businesses engaged in unrelated activities. *p. 538*

convertible loan notes Loan notes that can be converted into ordinary share capital at the option of the holders. *p. 267*

corporate governance Systems for directing and controlling a business. *p. 18*

corporate culture The values, attitudes and behaviour displayed towards the various stakeholders. *p. 22*

cost of capital The rate of return required by investors in the business. The cost of capital is used as the criterion rate of return when evaluating investment proposals using the NPV and IRR methods of appraisal. *p. 167*

creative accounting Adopting accounting policies to achieve a particular view of performance and position that preparers would like users to see rather than what is a true and fair view. *p. 132*

crowdfunding A method of raising finance that involves connecting a business directly to a large pool of potential investors (the crowd). *p. 343*

crown jewels The most valued part of a business (which may be sold to fend off a hostile takeover bid). *p. 562*

cum dividend A term used to describe the price of a share that includes the right to receive a forthcoming dividend. *p. 401*

currency futures A legally binding contract to exchange one currency for another at a specified exchange rate and specified future date. *p. 612*

currency options A contract given the holder the right, but not the obligation, to either buy or sell a particular currency at a specified exchange rate before or at specified future date. *p. 610*

currency swaps An agreement between two parties to exchange interest, and perhaps principal sums, denominated in one currency for the same denominated in a different currency. *p. 617*

current ratio A liquidity ratio that relates the current assets of the business to the current liabilities. *p. 111*

debt factoring A method of raising short-term finance. A financial institution ('factor') will manage the credit sales records of the business and will be prepared to advance sums to the business based on the amount of trade receivables outstanding. *p. 285*

deep discount bonds Redeemable bonds that are issued at a low or zero rate of interest and at a large discount to their redeemable value. *p. 267*

degree of combined gearing A measure of sensitivity of returns to shareholders to changes in sales output. *p. 73*

degree of financial gearing A measure of the sensitivity of returns to shareholders to changes in operating profit (profit before interest and taxation). *p. 65*

degree of operating gearing A measure of sensitivity of operating profit (profit before interest and taxation) to changes in sales output. *p. 72*

demerger (spin-off) The transfer of part of the assets in an existing business to a new business. Shareholders in the existing business will be given shares, usually on a pro rata basis, in the new business. *p. 567*

directors' share options A directors' share option scheme gives directors the right, but not the obligation, to buy equity shares in their business at an agreed price. The conditions of the scheme will usually stipulate that the option to buy must be exercised either on, or after, a specified future date. *p. 529*

discount factor The rate used when making investment decisions to discount future cash flows in order to arrive at their present value. *p. 166*

discounting The act of reducing the value of a cash flow, to take account of the period between the present time and the time that the cash flow is expected. *p. 165*

discriminate function A boundary line, produced by multiple discriminate analysis, that identifies those businesses that are likely to suffer financial distress and those that are not. *p. 129*

diversifiable risk That part of the total risk that is specific to an investment and which can be diversified away through combining the investment with other investments. *p. 246*

diversification The process of reducing risk by investing in a variety of different projects or assets. *p. 242*

divestment The selling off of part of the operations of a business. *p. 566*

dividend A transfer of assets (usually cash) made by a business to its shareholders. *p. 400*

dividend cover ratio The reciprocal of the dividend payout ratio (see below). *p. 117*

dividend payout ratio An investment ratio that divides the dividends announced for the period by the profit generated during the period and available for dividends. *p. 116*

dividend yield ratio An investment ratio that relates the cash return from a share to its current market value. *p. 117*

double-taxation agreement An agreement between governments of different countries that seeks to avoid the levying of taxation on the same profits. *p. 620*

due diligence An investigation of all material information relating to the financial, technical and legal aspects of a business prior to making an investment. *p. 339*

earnings per share (EPS) ratio An investment ratio that divides the earnings (profits) generated by a business, and available to ordinary shareholders, by the number of shares in issue. *p. 118*

economic order quantity (EOQ) The quantity of inventories that should be purchased in order to minimise total inventories costs. *p. 453*

economic value added (EVA®) The difference between the net operating profit after tax and the required returns from investors. *p. 504*

economic risk   The risk that currency movements will affect the future cash flows and market value of a business over the longer term. *p. 615*

efficient stock market   A stock market in which new information is quickly and accurately absorbed by investors, resulting in an appropriate share price adjustment. *p. 311*

enterprise resource planning (ERP) system   A system for automating and integrating business operations. *p. 455*

equivalent-annual-annuity approach   An approach to deciding among competing investment projects with unequal lives which involves converting the NPV of each project into an annual annuity stream over the project's expected life. *p. 207*

eurobonds   Bearer bonds that are issued by listed businesses and other organisations in various countries with the finance being raised on an international basis. *p. 266*

EVA® margin   A ratio that divides EVA for the period by sales revenue for the period and expresses the answer as a percentage. *p. 508*

EVA® momentum   A ratio that divides the change in EVA from the previous period by the sales revenue for the previous period. The answer is expressed as a percentage. *p. 509*

event tree diagram   A diagram that portrays the various events or outcomes associated with a particular course of action and the probabilities associated with each event or outcome. *p. 229*

exchange rate risk   The risk of adverse movements in the home currency against a foreign currency. *p. 605*

ex dividend   A term used to describe the price of a share that excludes any right to a forthcoming dividend. *p. 401*

expected net present value (ENPV)   A method of dealing with risk that involves assigning a probability of occurrence to each possible outcome. The expected net present value of the project represents a weighted average of the possible NPVs where the probabilities are used as weights. *p. 226*

expected value   A weighted average of a range of possible outcomes where the probabilities are used as weights. *p. 226*

expected value–standard deviation rule   A decision rule that can be employed to discriminate among competing investments where the possible outcomes are known and are normally distributed. *p. 238*

factoring   See debt factoring. *p. 285*

finance lease   Agreement that gives the lessee the right to use a particular asset for substantially the whole of its useful life in return for regular fixed payments. It represents an alternative to outright purchase. *p. 278*

financial derivative   Any form of financial instrument, based on share or loan capital, which can be used by investors either to increase their returns or to decrease their exposure to risk. *p. 274*

financial gearing   The existence of fixed-payment-bearing securities (for example, borrowing) in the capital structure of a business. *pp. 58, 113*

five Cs of credit   A checklist of factors to be taken into account when assessing the creditworthiness of a customer. *p. 460*

fixed charge   Where a specific asset is offered as security for a loan. *p. 263*

fixed costs   Costs that stay the same when changes occur to the volume of activity. *p. 67*

fixed interest rate   A rate of return payable to lenders that will remain unchanged with rises and falls in market interest rates. *p. 271*

floating charge   Where the whole of the assets of the business is offered as security for a loan. The charge will 'crystallise' and fix on specific assets in the event of a default in loan obligations. *p. 263*

floating interest rate   A rate of return payable to lenders that will rise and fall with market rates of interest. *p. 271*

forward exchange contract   An agreement between two parties to exchange two currencies at a specified future date. It can be tailored to the needs of each party but cannot be traded on exchanges. *p. 604*

forward rate   The price quoted for buying, or selling, a currency at a specified future date. *p. 601*

free cash flows   Operating cash flows less amounts after any new investments in assets. It represents the amounts available to long-term lenders and shareholders. *p. 496*

FTSE (Footsie) indices   Indices available to help monitor trends in overall share price movements of Stock Exchange listed businesses. *p. 308*

future growth value (FGV®)   Value placed on the future growth potential of a business by investors. It is equal to the market value of the business minus (capital invested plus EVA®/*r*). *p. 524*

gearing ratio (financial gearing ratio)   A ratio that relates the contribution of long-term lenders to the total long-term capital of the business. *p. 113*

golden parachute   Substantial fee payable to a senior manager of a business in the event that the business is taken over. *p. 562*

gross profit margin ratio   A profitability ratio relating the gross profit for the period to the sales for that period. *p. 101*

hedging arrangement   An attempt to reduce or eliminate the risk associated with a particular action by taking some form of counter-action. *p. 272*

hire purchase   A method of acquiring an asset by paying the purchase price by instalments over a period. Normally, control of the asset will pass as soon as the hire purchase contract is signed and the first instalment is paid, whereas ownership will pass on payment of the final instalment. *p. 281*

horizontal merger   A merger between two businesses in the same industry and at the same point in the production/distribution chain. *p. 540*

indifference point (financial gearing)   The level of operating profit (profit before interest and taxation) at which two, or more, different financing schemes provide the same level of return to ordinary shareholders. *p. 63*

indifference point (operating gearing)   The level of sales output at which two, or more, different cost structures provide the same level of operating profit. *p. 63*

inflation   A rise in the general price level. *p. 162*

information asymmetry   Where the availability of relevant information differs between individuals or groups (such as managers and shareholders). *p. 412*

information signalling   Conveying information to shareholders through management actions (for example, increasing dividends to convey management optimism concerning the future). *p. 413*

interest cover ratio   A gearing ratio that divides the profit before interest and taxation by the interest payable for a period. *p. 114*

interest rate swap   An arrangement between two businesses whereby each business assumes responsibility for the other's interest payments. *p. 272*

internal rate of return (IRR)   The discount rate for a project that has the effect of producing zero NPV. *p. 168*

invoice discounting   A form of finance provided by a financial institution based on a proportion of the face value of the credit sales outstanding. *p. 287*

junk (high-yield) bonds   Loan capital with a relatively high level of investment risk for which investors are compensated by relatively high levels of return. *p. 270*

just-in-time (JIT) inventories management   A system of inventories management that aims to have supplies delivered to production just in time for their required use. *p. 456*

key performance indicators   Measures pointing to the degree of success achieved by a business in fulfilling its objectives. *p. 125*

law of one price   The theory that the price of a particular item will be the same everywhere, assuming free markets and after taking account of exchange rates. *p. 603*

lead time   The time lag between placing an order for goods or services and their delivery. *p. 448*

linear programming   A mathematical technique for rationing limited resources in such a way as to optimise the benefits. *p. 203*

loan covenants   Conditions contained within a loan agreement that are designed to protect the lenders. *p. 263*

loan notes   Long-term borrowings made by businesses. *p. 266*

market capitalisation   Total market value of the shares of a business. *p. 308*

market value added (MVA)   The difference between the market value of the business and the total investment that has been made in it. *p. 514*

merger   When two or more businesses combine in order to form a single business. *p. 540*

money market hedge   Borrowing or lending in foreign currencies in order to hedge against exchange rate risk. *p. 609*

mortgage   A loan secured on property. *p. 271*

multiple discriminate analysis   A statistical technique, used to predict financial distress, which involves using an index based on a combination of financial ratios. *p. 129*

MVA spread   A ratio that divides market value added by the invested capital and expresses the result as a percentage. It indicates how effectively invested capital has been in generating wealth. *p. 516*

MVA margin   A ratio that divides market value added by the sales revenue for a period and expresses the result as a percentage. It indicates the effectiveness of sales revenue in generating wealth. *p. 516*

net assets (book value) method   A method of valuing the shares of a business by reference to the value of the net assets as shown in the statement of financial position. *p. 571*

net assets (liquidation) method   A method of valuing the shares of a business by reference to the net realisable values of its net assets. *p. 573*

net assets (replacement cost) method   A method of valuing the shares of a business by reference to the replacement cost of its net assets. *p. 574*

net present value (NPV)   The net cash flows from a project that have been adjusted to take account of the time value of money. The NPV measure is used to evaluate investment projects. *p. 160*

net realisable value   The selling price of an asset, less any costs incurred in selling the asset. *p. 573*

non-diversifiable risk   That part of the total risk that is common to all investments and which cannot be diversified away by combining investments. *p. 246*

normal distribution   The description applied to the distribution of a set of data which, when displayed graphically, forms a symmetrical bell-shaped curve. *p. 237*

objective probabilities   Probabilities based on information gathered from past experience. *p. 241*

offer for sale Method of selling shares to the public through the use of an issuing house which acts as an intermediary. *p. 327*

operating cash cycle (OCC) The time period between the outlay of cash to purchase goods supplied and the ultimate receipt of cash from the sale of the goods. *p. 474*

operating gearing The existence of fixed costs within the operating cost structure of a business. *p. 67*

operating lease A short-term lease of an asset where the rewards and risks of ownership stay with the owner. *p. 279*

operating profit margin ratio A profitability ratio relating the operating profit for the period to the sales for that period. *p. 99*

opportunity cost The value in monetary terms of being deprived of the next best opportunity in order to pursue a particular objective. *p. 174*

optimal capital structure The particular mix of long-term funds employed by a business that minimises the cost of capital. *p. 371*

overtrading The situation arising when a business is operating at a level of activity that cannot be supported by the amount of finance which has been committed. *p. 124*

pac-man defence A means of defending against a hostile takeover bid, which involves launching a bid for the bidding business. *p. 562*

payback period (PP) The time taken for the initial investment in a project to be repaid from the net cash inflows of the project. *p. 156*

performance share plan (PSP) An award of a specified number of free shares in the business to the directors in return for achieving prescribed levels of performance. *p. 527*

per-cent-of-sales method A method of financial planning that first estimates the sales for the planning period and then estimates other financial variables as a percentage of the sales figure. *p. 47*

placing An issue of shares to selected investors, such as financial institutions, rather than to the public. *p. 329*

plug The particular form of finance used to fill a financing gap. *p. 48*

poison pill A defensive measure taken by a business that is designed to make it unattractive to potential acquirers. *p. 562*

post-completion audit A review of the performance of an investment project to see whether actual performance matched planned performance and whether any lessons can be drawn from the way in which the investment was carried out. *p. 185*

price/book value (P/B) ratio A ratio that relates the market price per share to the net assets (book value) per share. *p. 572*

price/earnings (P/E) ratio An investment ratio that relates the market value of a share to the earnings per share. *p. 120*

price/sales (P/S) ratio A valuation ratio that relates the market value of a share to the sales per share. *p. 576*

private equity Equity finance primarily for small and medium-sized businesses wishing to grow but which do not have ready access to stock markets. *p. 332*

profitability index The present value of the future cash flows from a project divided by the present value of the outlay. *p. 201*

projected (forecast) financial statements Financial statements such as the cash flow statement, income statement and statement of financial position that have been prepared on the basis of estimates and which relate to the future. *p. 35*

public issue Method of issuing shares that involves a direct invitation from the business to the public to subscribe for shares. *p. 327*

record date A date that is set by the directors of a business to establish who is eligible to receive dividends. Those shareholders registered with the business on this date will receive any dividends announced for the period. *p. 401*

relevant costs Costs that are relevant to a particular decision. *p. 173*

restricted shares Shares awarded to directors that are not transferred fully until certain conditions are fulfilled. *p. 528*

return on capital employed (ROCE) A profitability ratio expressing the relationship between the operating profit and the long-term capital invested in the business. *p. 97*

return on ordinary shareholders' funds (ROSF) A profitability ratio expressing the relationship between the profit available for ordinary shareholders during the period and the ordinary shareholders' funds invested in the business. *p. 96*

rights issue An issue of shares for cash to existing shareholders on the basis of the number of shares already held. *p. 322*

risk The likelihood that what is estimated to occur will not actually occur. *p. 56*

risk-adjusted discount rate A method of dealing with risk that involves adjusting the discount rate for projects according to the level of risk involved. The rate will be the risk-free rate plus an appropriate risk premium. *p. 224*

risk-averse investors Investors who select the investment with the lowest risk, where the returns from different investments are equal. *p. 221*

risk-neutral investors Investors who are indifferent to the level of risk associated with different investments. *p. 221*

risk premium An extra amount of return required from an investment, owing to a perceived level of risk: the greater the perceived level of risk, the larger the risk premium. *p. 162*

risk-seeking investors Investors who select the investment with the highest risk where the returns from different investments are equal. *p. 221*

rolling cash flow projections The preparation of forecasts to compensate for time that has elapsed during the forecast period so that a complete forecast horizon is restored. *p. 41*

sale and leaseback An agreement to sell an asset (usually property) to another party and simultaneously lease the asset back in order to continue using the asset. *p. 280*

sales revenue per employee ratio An efficiency ratio that relates the sales generated during a period to the average number of employees of the business. *p. 108*

sales revenue to capital employed ratio An efficiency ratio that relates the sales generated during a period to the long-term capital employed. *p. 107*

scenario analysis A method of dealing with risk that involves changing a number of variables simultaneously so as to provide a particular future state of the world for managers to consider. *p. 57*

scrip dividend A dividend to shareholders consisting of additional shares rather than cash. *p. 424*

scrip issue See Bonus issue. *p. 325*

securitisation Bundling together illiquid financial or physical assets of the same type in order to provide backing for issuing interest-bearing securities, such as bonds. *p. 283*

security An asset pledged, or guarantee provided, against a loan. *p. 263*

sensitivity analysis An examination of the key variables affecting a project to see how changes in each variable might influence the outcome. *p. 56*

sensitivity chart A chart that portrays the effect of changes to key variables on the NPV of a project. *p. 216*

share buyback   Where a business buys its own shares and then cancels, or reissues them, at a later date. *p. 426*

share options   See directors' share options. *p. 432*

shareholder value   Increasing shareholder wealth by placing shareholder needs at the heart of management decisions. *p. 492*

shareholder value analysis (SVA)   A method of measuring and managing shareholder value based on the long-term cash flows generated. *p. 496*

shareholder wealth maximisation   The idea that the main purpose of a business is to maximise the wealth of its owners (shareholders). This idea underpins modern financial management. *p. 6*

shortest-common-period-of-time approach   A method of comparing the profitability of projects with unequal lives that establishes the shortest common period of time over which the projects can be compared. *p. 205*

simulation   A method of dealing with risk that involves calculating probability distributions from a range of possible outcomes. *p. 238*

spin-off   see Demerger. *p. 567*

spot rate   The price quoted for immediate settlement for buying, or selling, a currency. *p. 601*

stakeholder approach   The view that each group with a legitimate stake in the business should have its interests reflected in the objectives that the business pursues. Managers then serve the interests of these groups and mediate between them. *p. 11*

standard deviation   A measure of spread that is based on deviations from the mean or expected value. *p. 234*

Stock Exchange   A primary and secondary market for business capital. *p. 306*

subjective probabilities   Probabilities based on opinion rather than past data. *p. 241*

subordinated loan   A loan that is ranked below other loan capital in the order of interest payment and capital repayment. *p. 264*

takeover   Normally used to describe a situation where a larger business acquires control of a smaller business, which is then absorbed by the larger business. *p. 540*

tax exhaustion   The situation arising where a business has insufficient profits to exploit the tax benefits of loan finance. *p. 386*

tender issue   An issue of shares that requires investors to state the amount they are prepared to pay for the shares. *p. 327*

term loan   A loan, usually from a bank, which is tailored specifically to the needs of the borrower. The loan contract usually specifies the repayment date, interest rate and so on. *p. 266*

total shareholder return (TSR)   The change in share value over a period plus any dividends paid during the period. *p. 518*

trade-off theory of capital structure   This theory asserts that when a business is deciding upon an appropriate level of gearing, it will weigh the benefits of taking on debt, in the form of tax benefits, against the costs involved, in the form of higher bankruptcy risk. *p. 386*

trade receivables to sales ratio   Trade receivables outstanding at the end of the period divided by the sales revenue for the period. This ratio is often calculated on a monthly basis to help to detect trends. *p. 467*

transaction risk   The risk that currency movements will have an adverse effect on the amount of to be cash received, or the amount of cash to be paid, in the home currency over the short-term. *p. 606*

translation risk   The risk that currency movements will adversely affect the performance and position of a business, as revealed in its financial statements, over the medium to long-term. *p. 618*

UK Corporate Governance Code   A code of practice for businesses listed on the London Stock Exchange that deals with corporate governance matters. *p. 20*

UK Stewardship Code   A code of practice that aims to improve the quality of engagement between financial institutions and investee businesses. *p. 28*

univariate analysis   A method, used to help predict financial distress, which involves the use of a single ratio as a predictor. *p. 128*

utility function   A chart that portrays the level of satisfaction or pleasure obtained from receiving additional wealth at different levels of existing wealth. *p. 222*

value drivers   Key variables that determine business performance. *p. 498*

variable costs   Costs that vary according to the level of activity. *p. 67*

venture capital   Finance available for investment in start-up and early-stage businesses. *p. 332*

vertical merger   A merger between a supplier of goods or services and its customer. *p. 540*

warrant   A document giving the holder the right, but not the obligation, to acquire shares in a business at an agreed price at some future date. *p. 273*

weighted average cost of capital (WACC)   A weighted average of the post-tax costs of the forms of long-term finance employed within a business where the market value of the particular forms of finance are used as weights. *p. 372*

white knight   A bidder for a business that has been invited by the managers of that business to make a bid. The invitation is made to defend the business against a hostile bid from another business. *p. 561*

white squire   A business that is approached by the managers of another business to purchase a large block of shares (but not a controlling interest) in that business with the object of rescuing the business from a hostile takeover. *p. 561*

working capital   Current assets less current liabilities. *pp. 52, 442*

XYZ inventories management   A system of inventories control that classifies inventories into three categories according to variability of customer demand. *p. 458*

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FINANCIAL MANAGEMENT
FOR DECISION MAKERS

NINTH EDITION

Now in its ninth edition, *Financial Management for Decision Makers* provides students with a unique focus on the practical application of financial management and its role in decision making. Covering topics such as financial planning, making capital investment decisions, and financing a small business, it provides an ideal introduction to the world of financial management.

New to this edition:

- A new chapter on international aspects of financial management, which explores the benefits and problems associated with internationalisation and the management of foreign exchange risk
- Updated explanations throughout including greater coverage of behavioural finance and share valuation methods
- Increased number of activities, giving more opportunities to engage with the key concepts
- Updated Real World examples, which provide connections between the theory and practice of financial decision making

This text is ideal for undergraduates from a non-accounting or non-finance discipline taking an introductory module in financial management. It is also suitable for postgraduate students enrolled on certificate and diploma courses in financial management, as well as those enrolled on Diploma in Management Studies and MBA programmes. The text can also be used by finance and accounting students as a foundation for further study.

Visit www.pearsoned.co.uk/atrill to gain access to a suite of resources which accompany this text:

- For instructors: Solution's manual and PowerPoint slides
- For students: Opportunities to practise and additional support given through a companion website

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