ACCA

Advanced Financial Management Workbook

For exams in September 2019, December 2019, March 2020 and June 2020

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Helping you to pass

BPP Learning Media – ACCA Approved Content Provider

As an ACCA Approved Content Provider, BPP Learning Media gives you the opportunity to use study materials reviewed by the ACCA examining team. By incorporating the examining team's comments and suggestions regarding the depth and breadth of syllabus coverage, the BPP Learning Media Workbook provides excellent, ACCA-approved support for your studies.

These materials are reviewed by the ACCA examining team. The objective of the review is to ensure that the material properly covers the syllabus and study guide outcomes, used by the examining team in setting the exams, in the appropriate breadth and depth. The review does not ensure that every eventuality, combination or application of examinable topics is addressed by the ACCA Approved Content. Nor does the review comprise a detailed technical check of the content as the Approved Content Provider has its own quality assurance processes in place in this respect.

The PER alert

Before you can qualify as an ACCA member, you not only have to pass all your exams but also fulfil a three-year practical experience requirement (PER). To help you to recognise areas of the syllabus that you might be able to apply in the workplace to achieve different performance objectives, we have introduced the 'PER alert' feature (see the section below). You will find this feature throughout the Workbook to remind you that what you are learning to pass your ACCA exams is equally useful to the fulfilment of the PER requirement. Your achievement of the PER should be recorded in your online My Experience record.

Chapter features

Studying can be a daunting prospect, particularly when you have lots of other commitments. This Workbook is full of useful features, explained in the key below, designed to help you to get the most out of your studies and maximise your chances of exam success.

Key to icons

Key term

Key term

Central concepts are highlighted and clearly defined in the Key terms feature. Key terms are also listed in bold in the Index, for quick and easy reference.

Formula to learn

This boxed feature will highlight important formula which you need to learn for your exam.

Formula provided

This will show formula which are important but will be provided in the exam.

PER alert

PER alert

This feature identifies when something you are reading will also be useful for your PER requirement (see 'The PER alert' section above for more details).

Illustration

Illustrations walk through how to apply key knowledge and techniques step by step.

Activity

Activities give you essential practice of techniques covered in the chapter.

Essential reading

Links to the Essential reading are given throughout the chapter. The Essential reading is included in the free eBook, accessed via the Exam Success Site (see inside cover for details on how to access this).

Knowledge diagnostic

Summary of the key learning points from the chapter.

At the end of each chapter you will find a Further study guidance section. This contains suggestions for ways in which you can continue your learning and enhance your understanding. This can include: recommendations for question practice from the Further question practice and solutions, to test your understanding of the topics in the Chapter; suggestions for further reading which can be done, such as technical articles, and ideas for your own research.

Introduction to the Essential reading

The digital eBook version of the Workbook contains additional content, selected to enhance your studies. Consisting of revision materials, activities (including practice questions and solutions) and background reading, it is designed to aid your understanding of key topics which are covered in the main printed chapters of the Workbook. The Essential reading section of the eBook also includes further illustrations of complex areas.

To access the digital eBook version of the BPP Workbook, follow the instructions which can be found on the inside cover; you'll be able to access your eBook, plus download the BPP eBook mobile app on multiple devices, including smartphones and tablets.

A summary of the content of the Essential reading is given below.

Chapter		Summary of Essential reading content
1	Financial strategy: formulation	• Further discussion of dividend policy including brought forward knowledge from the FM exam • Examples of ethical issues in different business functions • Further discussion of integrated reporting and triple bottom line
2	Financial strategy: evaluation	• Recap of the dividend growth model and its use in calculating the cost of equity: brought forward knowledge from the FM exam • Further discussion of the CAPM model • Recap of other techniques for calculating the cost of debt: brought forward knowledge from the FM exam • Recap of basic ratio analysis, brought forward knowledge from the FM exam • Examples of different types of risk and risk mapping
3	Discounted cash flow techniques	• Discussion of post-audits • Recap of the basics of discounting: brought forward knowledge from the FM exam • Further discussion of IRR re-investment assumption • Recap of other techniques for analysing risk and uncertainty: brought forward knowledge from the FM exam • Recap of capital rationing: brought forward knowledge from the FM exam
4	Application of option pricing theory	• Discussion of the factors determining option value for call and put options
5	International investment and financing decisions	• Further discussion of economic risk, exchange controls, purchasing power parity theory and interest rate parity theory • Alternative approaches to international investment appraisal, and alternative strategies for international expansion • Discussion of eurobonds (or international bonds)

Chapter		Summary of Essential reading content
6	Cost of capital and changing risk	• Recap of theories of capital structure: brought forward knowledge from the FM exam • Further discussion of APV looking at the treatment of subsidised loans • Extra example illustrating how to deal with projects that change business risk
7	Financing and credit risk	• Background information on how credit ratings are calculated • Further example to practise calculating the duration of a bond • Recap of sources of finance: brought forward knowledge from the FM exam • Further discussion of the pros and cons of Islamic finance
8	Valuation for acquisition and mergers	• Extra notes on asset and market-based models • Discussion of the use of the Black–Scholes model in valuing start-ups
9	Acquisitions: strategic issues and regulation	• Discussion of different types of mergers and acquisitions • Further detail regulatory issues and defensive tactics
10	Financing acquisitions and mergers	• Discussion of different types of paper issues • Evaluation of the effect of an offer on the acquiring company's financial statements
11	The role of the treasury function	• Discussion of the organisation of the treasury function
12	Managing currency risk	• Recap of internal hedging techniques, forward contracts and money market hedging: brought forward knowledge from the FM exam • Further discussion different approaches to dealing with currency futures
13	Managing interest rate risk	• Recap of basic hedging techniques: brought forward knowledge from the FM exam
14	Financial reconstruction	• Discussion of leveraged buy-outs
15	Business reorganisation	• Further discussion of demergers
16	Planning and trading issues for multinationals	• General issues in international trade • International institutions • Further discussion of transfer pricing issues • Outline of developments in financial markets

Introduction to Advanced Financial Management (AFM)

Overall aim of the syllabus

This exam requires students to apply relevant knowledge and skills and exercise professional judgement as expected of a senior financial adviser in taking or recommending decisions concerning the financial management of the organisation.

The syllabus

The broad syllabus headings are:

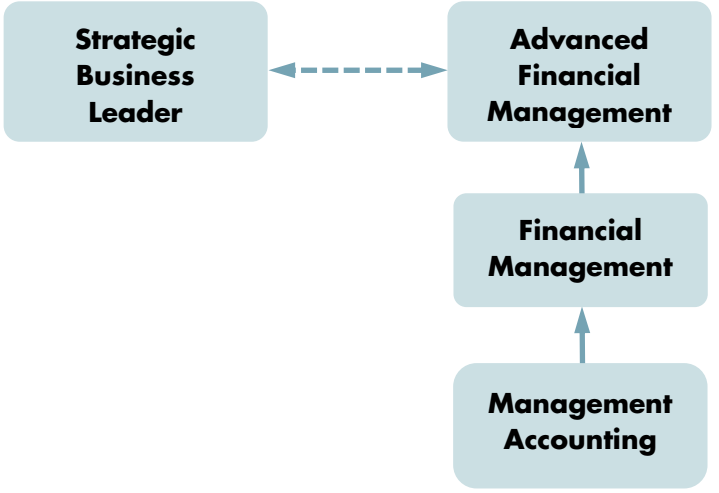
A	Role of the senior financial adviser in the multinational organisation
B	Advanced investment appraisal
C	Acquisition and mergers
D	Corporate re-organisation and reconstruction
E	Treasury and advanced risk management techniques

Main capabilities

On successful completion of this exam, candidates should be able to:

- Explain and evaluate the role and responsibility of the senior financial executive or adviser in meeting conflicting needs of stakeholders and recognise the role of international financial institutions in the financial management of multinationals
- Evaluate potential investment decisions and assessing their financial and strategic consequences, both domestically and internationally
- Assess and plan acquisitions and mergers as an alternative growth strategy
- Evaluate and advise on alternative corporate re-organisation strategies
- Apply and evaluate alternative advanced treasury and risk management techniques

Links with other exams



The diagram shows where direct (solid line arrows) and indirect (dashed line arrows) links exist between this exam and other exams preceding or following it.

Achieving ACCA's Study Guide Learning Outcomes

This BPP Workbook covers all the AFM syllabus learning outcomes. The tables below show in which chapter(s) each area of the syllabus is covered.

A Role of senior financial adviser in the multinational organisation

A1	The role and responsibility of senior financial executive/adviser	**Chapter 1**
A2	Financial strategy formulation	**Chapter 2**
A3	Ethical and governance issues	**Chapter 1**
A4	Management of international trade and finance	**Chapter 16**
A5	Strategic business and financial planning for multinational organisations	**Chapter 16**
A6	Dividend policy in multinationals and transfer pricing	**Chapter 16**

B Advanced investment appraisal

B1	Discounted cash flow techniques	**Chapter 3**
B2	Application of option pricing theory in investment decisions	**Chapter 4**
B3	Impact of financing on investment decisions and adjusted present values	**Chapter 6 & 7**
B4	Valuation and the use of free cash flows	**Chapter 8**
B5	International investment and financing decisions	**Chapter 5**

C Acquisitions and mergers

C1	Acquisitions and mergers versus other growth strategies	**Chapter 9**
C2	Valuation for acquisitions and mergers	**Chapter 8**
C3	Regulatory framework and processes	**Chapter 9**
C4	Financing acquisitions and mergers	**Chapter 10**

D Corporate reconstruction and reorganisation

D1	Financial reconstruction	**Chapter 14**
D2	Business re-organisation	**Chapter 15**

E Treasury and advanced risk management techniques

E1	The role of the treasury function in multinationals	**Chapter 11**
E2	The use of financial derivatives to hedge against forex risk	**Chapter 12**
E3	The use of financial derivatives to hedge against interest rate risk	**Chapter 13**

The complete syllabus and study guide can be found by visiting the exam resource finder on the ACCA website: www.accaglobal.com/gb/en.html.

The Exam

Computer-based exams

With effect from the March 2020 sitting, ACCA have commenced the launch of computer-based exams (CBEs) for this exam with the aim of rolling out into all markets internationally over a short period. Paper-based examinations (PBEs) will be run in parallel while the CBEs are phased in. BPP materials have been designed to support you, whichever exam option you choose. For more information on these changes and when they will be implemented, please visit the ACCA website.

Approach to examining the syllabus

The Advanced Financial Management syllabus is assessed by a 3 hour 15 minute exam. The pass mark is **50%**. All questions in the exam are **compulsory**.

It examines **practical financial management issues** facing a company. You will be examined on your knowledge of the breadth of the AFM syllabus, and on your ability to **apply your knowledge** in a practical way.

The exam will have a significant numerical element, worth up to 50% of the marks, but you will also need to demonstrate your understanding of the **meaning and limitations** of your numerical analysis.

However, the AFM exam is not all about calculations and there will also be a strong emphasis on management issues which will require you to exercise **professional, commercial** and **ethical judgement**.

You will be required to adopt **the role of a senior financial adviser** in answering questions and, as such, will need to make points that are **relevant to the specific scenario** that your company is facing (not to make general 'textbook' style observations).

Format of the exam		Marks
Section A		
Question 1	Compulsory scenario-based question	50
Section B		
Questions 2, 3	2 × 25 mark scenario-based questions	50
		100

All topics and syllabus sections will be examinable in either Section A or Section B of the exam, but (from September 2018) every exam will have questions which have a **focus on syllabus Section B** (advanced investment appraisal, covered in Chapters 3–7) **and syllabus Section E** (treasury and advanced risk management, covered in Chapters 11–13).

Analysis of past exams

The table below provides details of when each element of the syllabus has been examined in the ten most recent sittings and the section in which each element was examined.

Note that in exams before September 2018 there were three questions in Section B (of which two had to be answered).

Covered in Workbook chapter		Dec 2018	Sep 2018	Mar /Jun 2018	Sep /Dec 2017	Mar /Jun 2017	Sep /Dec 2016	Mar /Jun 2016	Sep /Dec 2015	Jun 2015	Dec 2014
	ROLE OF SENIOR FINANCIAL ADVISER										
1, 2	Role of senior financial adviser/ financial strategy formulation		B	B	A		A, B	A		B	B
1	Ethical/ environmental issues							B			
16	Planning and trading issues for multinationals			B				B	B		
	ADVANCED INVESTMENT APPRAISAL										
3	Discounted cash flow techniques				B		B				
4	Application of option pricing theory to investment decisions			A				B			B
6, 7	Impact of financing, adjusted present values/valuation and free cash flows	B		B	A	B	A		B		
5	International investment/ financing		A			B		A		A	

	ACQUISITIONS AND MERGERS										
9, 10	Strategic/ financial/ regulatory issues	A	B	A		A		B	A		A
8	Valuation techniques	A	B	A	B		B	B	A		A
	CORPORATE RECONSTRUCTION AND REORGANISATION										
14	Financial reconstruction				A				B	B	
15	Business reorganisation	A			B	A		B		B	
	TREASURY AND ADVANCED RISK MANAGEMENT TECHNIQUES										
11	Role of the treasury function		A	B	B		A				B
12	Hedging foreign currency risk	B	A	B		B		A	B		
13	Hedging interest rate risk				B		B		B	B	B

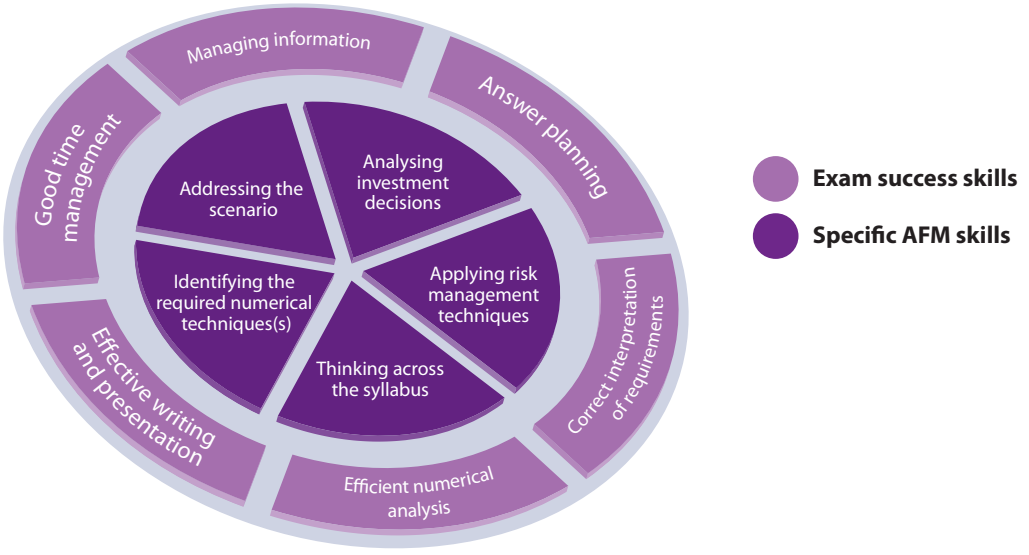
IMPORTANT! The table above gives a broad idea of how frequently major topics in the syllabus are examined. It should **not** be used to question spot and predict, for example, that Topic X will not be examined because it came up two sittings ago. The examining team's reports indicate that they are well aware that some students try to question spot. They avoid predictable patterns and may, for example, examine the same topic two sittings in a row.

Essential skills areas to be successful in Advanced Financial Management

We think there are two areas you should develop in order to achieve exam success in Advanced Financial Management:

(1) Specific AFM skills
(2) Exam success skills

} These are shown in the diagram below.



Specific AFM skills

These are the skills specific to AFM that we think you need to develop in order to pass the exam.

In this Workbook, there are five **Skills Checkpoints** which define each skill and show how it is applied in answering a question. A brief summary of each skill is given below.

Skill 1: Addressing the scenario

All of the questions in your Advanced Financial Management (AFM) exam will be scenario-based.

It is vital to spend time reading and assimilating the scenario as part of your answer planning. Both with your numerical and (especially) discursive points it will be important for you **to address them to** the requirements of the question and the problem as presented in **the scenario**.

A common complaint from the ACCA examining team is that 'Less satisfactory answers tended to give more general responses rather than answers specific to the scenario'. This skill is relevant to all syllabus areas and is likely to be important in every question in your AFM exam.

BPP recommends a step-by-step technique to develop this skill:

STEP 1 Allow about 20% of your allotted time for planning.

STEP 2 Prepare an answer plan using key words from the question's requirements.

STEP 3 Read the scenario; identify specific points from the scenario that are relevant to the question being asked.

STEP 4 Write your answer using short paragraphs, relating each point to the scenario as far as is possible.

Skills Checkpoint 1 covers this technique in detail through application to an exam-standard question.

Skill 2: Analysing investment decisions

Analysing investments to select those which are most likely to benefit shareholders is probably the most important activity for a senior financial adviser.

Section B of the AFM syllabus is 'advanced investment appraisal' and directly focusses on the skill of 'analysing investment decisions'. The AFM exam **will always contain a question** that have a focus on this syllabus area, so this skill is extremely important.

BPP recommends a step-by-step technique to develop this skill:

STEP 1 Spend time analysing the scenario and considering why numerical information has been provided and how long you will have to analyse it.

STEP 2 Plan your answer carefully; check your analysis matches the question's requirements.

STEP 3 Complete your calculations in a time-efficient manner – if necessary, make simplifying assumptions in order to complete the question in the time allowed.

STEP 4 Write your answer using short paragraphs; don't forget to explain the meaning of your numbers.

STEP 5 Write up your answer; do not try to correct errors identified at this late stage.

Skills Checkpoint 2 covers this technique in detail through application to an exam-standard question.

Skill 3: Identifying the required numerical analysis

Some exam questions **will not directly state which numerical techniques should be used** and you may have to use clues in the scenario of the question to select an appropriate technique.

This issue commonly arises in syllabus Section C, acquisitions and mergers. Often you will need to assess from the scenario what type of valuation is required and what techniques can be used given the details that are provided in the scenario.

In syllabus Section B, investment appraisal questions will also sometimes be formulated so that you will have to infer that specific techniques (such as real options or adjusted present value) are required ie the question may not always specifically tell you to use these techniques.

A step-by-step technique for developing this skill is outlined below.

STEP 1 Don't panic if you do not immediately see which technique needs to be used – spend time considering the range of techniques that could potentially be applied in the scenario presented.

STEP 2 Next, carefully analyse the scenario and consider why numerical information has been provided and which of the techniques that you have identified in Step 1 can be used given this information.

STEP 3 Complete your numerical analysis.

Skills Checkpoint 3 covers this technique in detail through application to an exam-standard question.

Skill 4: Applying risk management techniques

Section E of the AFM syllabus covers treasury and advanced risk management techniques and directly focuses on the skill of 'applying risk management techniques'.

The AFM exam will **always contain a question that will have a clear focus on this syllabus area**, so this skill is extremely important.

Successful application of this skill will require a strong technical knowledge of this syllabus area, especially of setting up arrangements to manage risk using futures and options.

Additionally, you will need to be able to forecast the outcome of a technique quickly and efficiently under exam conditions.

Finally, as well as being able to apply the techniques numerically you need to be able to discuss the advantages and disadvantages of using them, the meaning of the numbers and their suitability given the scenario (as discussed in Skills Checkpoint 1).

A step-by-step technique for developing this skill is outlined below.

STEP 1 Spend time analysing the scenario and requirements to ensure that you understand the nature of the risk being faced. Work out how many minutes you have to answer each part of the question.

STEP 2 Plan your answer. Double check that you are applying the correct type of risk management analysis given the nature of the risk that is faced and the techniques mentioned in the scenario. Identify a time-efficient approach.

STEP 3 Complete your numerical analysis. Don't overcomplicate it – aim for a set of clear relevant numbers. Be careful not to overrun on time with your calculations.

STEP 4 Explain the meaning of your numbers – relating your points to the scenario wherever possible.

Skills Checkpoint 4 covers this technique in detail through application to an exam-standard question.

Skill 5: Thinking across the syllabus

A common cause for failure in the AFM exam is that students focus on mastering the key numerical parts of the syllabus (typically investment appraisal, valuation techniques and risk management) but leave gaps in their knowledge, in two senses:

(1) Failing to carefully revise discussion areas within a given syllabus section

(2) Neglecting some syllabus sections entirely; for example, syllabus Sections A and D are often neglected because they do not contain complex numerical techniques

The structure of the AFM exam exposes students that have knowledge gaps because:

- Exams are designed so that question-spotting does not work
- The 50-mark question is structured to test multiple syllabus areas
- The 25-mark questions, although often focusing on a specific syllabus section, normally contain three requirements which often means that a wide variety of topics within this syllabus area are tested
- And, of course, there are no optional questions

It is therefore crucial that you prepare yourself for the exam by revising across the whole syllabus, even if your knowledge is deeper in some areas than others there **must not be any 'gaps'**, and that you practice questions that force you to address a problem from a variety of perspectives. This skill will often involve thinking outside the confines of one specific chapter of the workbook and **thinking across the syllabus.**

A step-by-step technique for developing this skill is outlined below.

Analyse the scenario and requirements. Consider the wording of the requirements carefully to understand the nature of the problem being faced.

Next, plan your answer. Double-check that you are applying the correct knowledge and that you are not neglecting other syllabus areas that would help to support your analysis.

Produce your answer, explaining the meaning of your points – and relating them to the scenario wherever possible.

Skills Checkpoint 5 covers this technique in detail through application to an exam-standard question.

Exam success skills

Passing the AFM exam requires more than applying syllabus knowledge and demonstrating the specific AFM skills; it also requires the development of excellent exam technique through question practice.

We consider the following six skills to be vital for exam success. The Skills Checkpoints show how each of these skills can be applied in the exam.

Exam success skill 1

Managing information

Questions in the exam will present you with a lot of information. The skill is how you handle this information to make the best use of your time. The key is determining how you will approach the exam and then actively reading the questions.

Advice on developing Managing information

Approach

The exam is 3 hours 15 minutes long. There is no designated 'reading' time at the start of the exam, however, one approach that can work well is to start the exam by spending 10–15 minutes carefully reading through all of the questions to familiarise yourself with the exam paper.

Once you feel familiar with the exam consider the order in which you will attempt the questions; always attempt them in your order of preference. For example, you may want to leave to last the question you consider to be the most difficult.

If you do take this approach, remember to adjust the time available for each question appropriately – see Exam success skill 6: Good time management.

If you find that this approach doesn't work for you, don't worry – you can develop your own technique.

Active reading

You must take an active approach to reading each question. Focus on the requirement first, underlining key verbs such as 'prepare', 'comment', 'explain', 'discuss', to ensure you answer the question properly. Then read the rest of the question, underlining and annotating important and relevant information, and making notes of any relevant technical information you think you will need.

Exam success skill 2

Correct interpretation of the requirements

The active verb used often dictates the approach that written answers should take (eg 'explain', 'discuss', 'evaluate'). It is important you identify and use the verb to define your approach. The **correct interpretation of the requirements** skill means correctly producing only what is being asked for by a requirement. Anything not required will not earn marks.

Advice on developing correct interpretation of the requirements

This skill can be developed by analysing question requirements and applying this process:

Step 1 **Read the requirement**

Firstly, read the requirement a couple of times slowly and carefully and highlight the active verbs. Use the active verbs to define what you plan to do. Make sure you identify any sub-requirements.

Step 2 **Read the rest of the question**

By reading the requirement first, you will have an idea of what you are looking out for as you read through the case overview and exhibits. This is a great time saver and means you don't end up having to read the whole question in full twice. You should do this in an active way – see Exam success skill 1: Managing Information.

Step 3 **Read the requirement again**

Read the requirement again to remind yourself of the exact wording before starting your written answer. This will capture any misinterpretation of the requirements or any missed requirements entirely. This should become a habit in your approach and, with repeated practice, you will find the focus, relevance and depth of your answer plan will improve.

Exam success skill 3

Answer planning: Priorities, structure and logic

This skill requires the planning of the key aspects of an answer which accurately and completely responds to the requirement.

Advice on developing Answer planning: Priorities, structure and logic

Everyone will have a preferred style for an answer plan. For example, it may be a mind map, bullet-pointed lists or simply annotating the question paper. Choose the approach that you feel most comfortable with, or, if you are not sure, try out different approaches for different questions until you have found your preferred style.

For a discussion question, annotating the question paper is likely to be insufficient. It would be better to draw up a separate answer plan in the format of your choosing (eg a mind map or bullet-pointed lists).

Exam success skill 4

Efficient numerical analysis

This skill aims to maximise the marks awarded by making clear to the marker the process of arriving at your answer. This is achieved by laying out an answer such that, even if you make a few errors, you can still score subsequent marks for follow-on calculations. It is vital that you do not lose marks purely because the marker cannot follow what you have done.

Advice on developing Efficient numerical analysis

This skill can be developed by applying the following process:

Step 1 **Use a standard proforma working where relevant**

If answers can be laid out in a standard proforma then always plan to do so. This will help the marker to understand your working and allocate the marks easily. It will also help you to work through the figures in a methodical and time-efficient way.

Step 2 **Show your workings**

Keep your workings as clear and simple as possible and ensure they are cross-referenced to the main part of your answer. Where it helps, provide brief narrative explanations to help the marker understand the steps in the calculation. This means that if a mistake is made you do not lose any subsequent marks for follow-on calculations.

Step 3 **Keep moving!**

It is important to remember that, in an exam situation, it is difficult to get every number 100% correct. The key is therefore ensuring you do not spend too long on any single calculation. If you are struggling with a solution then make a sensible assumption, state it and move on.

Exam success skill 5

Effective writing and presentation

Written answers should be presented so that the marker can clearly see the points you are making, presented in the format specified in the question. The skill is to provide efficient written answers with sufficient breadth of points that answer the question, in the right depth, in the time available.

Advice on developing Effective writing and presentation

Step 1 **Use headings**

Using the headings and sub-headings from your answer plan will give your answer structure, order and logic. This will ensure your answer links back to the requirement and is clearly signposted, making it easier for the marker to understand the different points you are making. Underlining your headings will also help the marker.

Step 2 **Write your answer in short, but full, sentences**

Use short, punchy sentences with the aim that every sentence should say something different and generate marks. Write in full sentences, ensuring your style is professional.

Step 3 **Do your calculations first and explanation second**

Questions often ask for an explanation with suitable calculations. The best approach is to prepare the calculation first but present it on the bottom half of the page of your answer, or on the next page. Then add the explanation before the calculation. Performing the calculation first should enable you to explain what you have done.

Exam success skill 6

Good time management

This skill means planning your time across all the requirements so that all tasks have been attempted at the end of the 3 hours 15 minutes available and actively checking on time during your exam. This is so that you can flex your approach and prioritise requirements which, in your judgement, will generate the maximum marks in the available time remaining.

Advice on developing Good time management

The exam is 3 hours 15 minutes long, which translates to 1.95 minutes per mark. Therefore a 10-mark requirement should be allocated a maximum of 20 minutes to complete your answer before you move on to the next task. At the beginning of a question, work out the amount of time you should be spending on each requirement and write the finishing time next to each requirement on your exam paper.

Keep an eye on the clock

Aim to attempt all requirements, but be ready to be ruthless and move on if your answer is not going as planned. The challenge for many is sticking to planned timings. Be aware this is difficult to achieve in the early stages of your studies and be ready to let this skill develop over time.

If you find yourself running short on time and know that a full answer is not possible in the time you have, consider recreating your plan in overview form and then add key terms and details as time allows. Remember, some marks may be available, for example, simply stating a conclusion which you don't have time to justify in full.

Question practice

Question practice is a core part of learning new topic areas. When you practise questions, you should focus on improving the Exam success skills – personal to your needs – by obtaining feedback or through a process of self-assessment.

Financial strategy: formulation

1

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to understand **the role of the senior financial adviser** in the following areas of financial strategy formulation:	
• Develop **strategies** for the achievement of the organisation's goals in line with its agreed policy framework	A1(a)
• Recommend **strategies** for the management of the financial resources of the organisation in an efficient, effective and transparent way	A1(b)
• Advise management in **setting the financial goals of the business** and in its policy development with particular reference to investment selection, minimising the cost of capital, distribution policy, communicating policy and goals to stakeholders, financial planning and control and risk management	A1(c)
• Recommend the optimum capital mix and structure within a specific business context and capital asset structure (also covered in Chapter 6)	A2(b)
• Recommend appropriate distribution and retention policy	A2(c)
• Assess **the ethical dimension within business issues** and decisions and advise on best practice in the financial management of the organisation. Demonstrate an understanding of the interconnectedness of the ethics of good business practice between all functional areas of the organisation	A3(a), A3(b)
• Recommend appropriate strategies for the resolution of stakeholder conflict and advise on alternative approaches that may be adopted	A3(c)
• Recommend an ethical framework for the development of financial policies and a system for the assessment of their impact	A3(d)
• Explore ethical areas which may be undermined by agency effects or stakeholder conflicts and establish strategies for dealing with them	A3(e)
• Establish an ethical framework grounded in good governance, highest standards of probity and aligned with the ethical principles of the Association	A3(f)
• Assess the impact on sustainability and environmental issues arising from alternative business and financial decisions	A3(g)
• Advise on the impact of investment and financing strategies and decisions on stakeholders, from an integrated reporting and governance perspective	A3(h)

Exam context

This chapter we discuss **the role and responsibility of the senior financial adviser** in the context of setting **financial strategy**. This chapter and the next underpin the rest of the syllabus and introduce some of the key concepts of financial management, some of which will be familiar to you from the Financial Management exam.

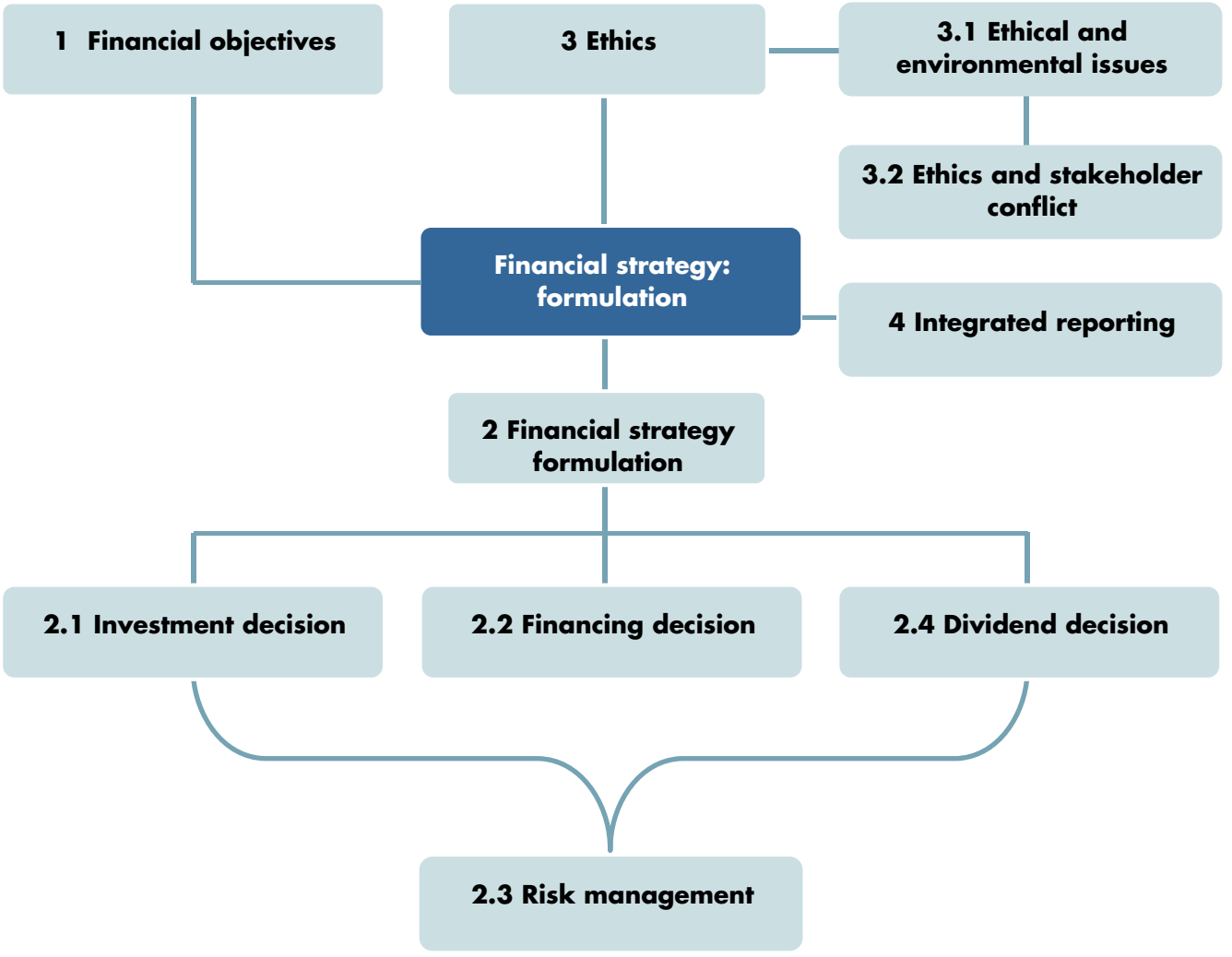
Most of the areas that are introduced here are **developed in later chapters**. However, **dividend policy** is mainly covered in this chapter and should be studied with particular care.

Remember that **non-financial issues** are also important, and ethical and environmental issues are considered here reflecting the responsibility of senior financial managers for meeting the competing needs of a variety of **different stakeholders**.

Exam questions generally test elements of this chapter as **part of** a broader scenario-based question, in either in Section A or B of the exam.

You should already be familiar with the techniques covered here from your earlier studies (of the Financial Management syllabus). However, it is important to revise them here and to make sure that you can **apply them**, as necessary, to the scenario-based questions that you will face in the AFM exam.

Chapter overview



1 Financial objectives

Profit maximisation is often assumed, incorrectly, to be the primary objective of a business.

Reasons why profit is not a sufficient objective

- Investors care about the **future**
- Investors care about the **dividend**
- Investors care about **financing plans**
- Investors care about **risk management**

For a profit-making company, a better financial objective is the **maximisation of shareholder wealth;** this can be measured as **total shareholder return** (dividend yield + capital gain).

Formula to learn

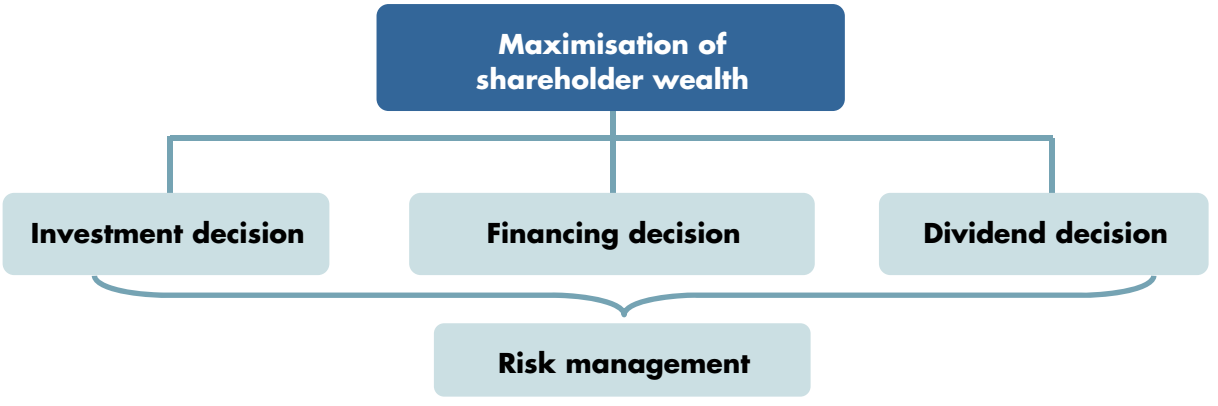
Total shareholder return = dividend yield + capital gain (or loss)

Dividend per share/share price | capital gain (or loss)/share price

Many companies have non-financial objectives that will also be important in assisting a company to achieve its **strategic goals**. For example, a manufacturing company that is aiming to differentiate itself on the basis of quality will require targets for defect rates. This does not negate the importance of financial objectives but emphasises the need for companies to have other targets than the maximisation of shareholders' wealth.

2 Financial strategy formulation

A **financial strategy** should organise an organisation's resources to maximise returns to shareholders by focussing on future cash flows, financing and risk.



2.1 Investment decision

Investment decisions (in projects or by making acquisitions) are often seen as **the key mechanism for creating shareholder wealth,** but they will need to be carefully analysed to ensure that they are likely to be beneficial to the investor.

The techniques for analysing investment decisions are covered in depth in Chapters 3–10.

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2.2 Financing decision

2.2.1 Use of debt finance

One of the main aspects of **financing decisions** is how much debt a firm is planning to use and whether using debt finance can help to reduce a business's weighted average cost of capital. The level of gearing that is appropriate for a business depends on a number of **practical issues**:

Practical issues	Explanation
Life cycle	A new, growing business will find it **difficult to forecast cash flows** with any certainty, so high levels of gearing are unwise.
Operating gearing	If fixed costs are a high proportion of total costs then **cash flows will be volatile**; so high gearing is not sensible.
Stability of revenue	If operating in a highly dynamic business environment then again **cash flows will be volatile**; so high gearing is not sensible.
Security	If unable to offer security, debt will be difficult and expensive to obtain.

2.2.2 Financial planning and control

In order to survive, any business must have an adequate net inflow of cash. Businesses should try to plan for positive net cash flows but at the same time it is unwise to hold too much cash.

When a company is cash-rich the senior financial adviser will have to decide whether to do one (or more) of the following:

(a) **Plan to use the cash**, for example for a project investment or a takeover bid for another company

(b) **Pay out the cash** to shareholders as dividends, and let the shareholders decide how best to use the cash for themselves

(c) **Repurchase its own shares** (share buyback)

Where cash flow has become a problem, a company may choose to sell off some of its assets. However, it is important to recognise the difference between assets that a company can survive without and those that are essential for the company's continued operation.

Assets can be divided into three categories.

(a) Those that are needed to carry out the core activities of the business (eg plant and machinery)

(b) Those that are not essential for carrying out the main activities of the business and can be sold off at fairly short notice (eg short-term marketable investments)

(c) Those that are not essential for carrying out the main activities of the business and can be sold off to raise cash, but may take some time to sell (eg long-term investments, subsidiary companies)

The financing decision is discussed in Chapter 6 and techniques linked to the financing decision are covered in a number of later chapters.

2.3 Risk management decision

Risk management decisions, in the AFM exam, mainly involve management of exchange rate and interest rate risk and project management issues.

Again, the **volatility of an organisation's cash flows** are a powerful influence on its approach to risk management. The more volatile cash flows are, the more important risk

management becomes. **Risk management is discussed in Chapter 2** and risk management **techniques** are **covered later** in Chapters 11–13.

2.4 Dividend decision

The **dividend decision** is related to how much a firm has decided to spend on **investments** and **also** to how much of the finance needed for investments is being raised externally (**financing decision**); this illustrates the **interrelationship** between these key **decisions**.

2.4.1 Influence of the investment decision

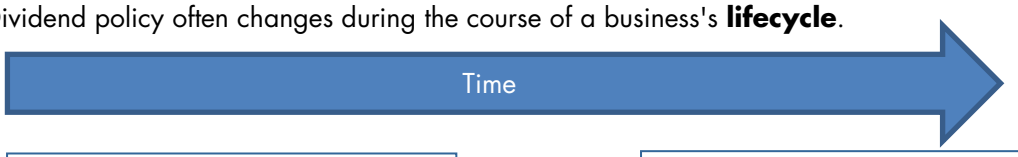
If a company is growing then much of the cash it has will be better used to invest in positive NPV projects, so it will not have the **liquidity** to pay dividends. **Shareholder expectations** will often be for low or even zero dividends in these circumstances.

2.4.2 Influence of the financing decision

However, if a company can borrow to finance its investments, it **can** still pay dividends. There are **legal constraints** over a company's ability to do this; it is only legal if a company has **accumulated** realised profits.

2.4.3 Influence of the lifecycle

Dividend policy often changes during the course of a business's **lifecycle**.



Young company:

Zero or low dividend

High growth/investment needs

Wants to minimise debt, as cash flows are unstable

Mature company:

Higher dividend payouts

Lower growth/investment needs

Debt more suitable as cash flows stabilise

2.4.4 Dividend capacity

Investment and financing issues will impact on an organisation's **capacity** to pay a dividend.

Key term

Dividend capacity: the cash generated in any given year that is **available** to pay to ordinary shareholders (it is also called free cash flow to equity).

You may be asked to calculate dividend capacity.

Dividend capacity
Profits after interest, tax and preference dividends
less
debt repayment, share repurchases, investment in assets
plus
depreciation, any capital raised from new share issues or debt

Activity 1: Dividend capacity

The following projected financial data relates to CX Co.

	$m
Operating profit	400
Depreciation	60
Finance charges paid	30
Preference dividends paid	15
Tax paid	75
Ordinary dividends paid	60

The book value of CX's non-current assets last year were $200 million. This is projected to rise by $40 million.

CX Co is planning to repay $100 million of debt during the next year.

Required

Estimate and comment on the dividend capacity of CX Co.

Solution

2.4.4 Practical dividend policies

Having considered these factors, companies will formulate and communicate their policy to ensure that shareholders have realistic **expectations** regarding the dividends they are likely to receive.

Policy	Explanation
Constant payout ratio	Logical but can create volatile dividend movements if profits are volatile
Stable growth	Set at a level that signals the growth prospects of the company, but may be difficult to maintain if circumstances change
Residual policy	Only pay a dividend after all positive NPV projects have been funded

2.4.5 Scrip dividends

A company will sometimes offer a **scrip dividend** (extra shares) instead of cash. Compared to a cash dividend, a scrip dividend boosts a company's cash flow and may benefit shareholders if the cash is re-invested in positive NPV projects that could not otherwise have been financed.

An **enhanced scrip dividend** involves giving the shareholder a choice over whether to take cash or shares but offering a generous amount of shares so that it is likely that shareholders will choose to take shares instead of cash.

2.4.6 Share buybacks

As an alternative to a cash dividend, a company can choose to return significant amounts of cash to shareholders by means of a **share buyback (or repurchase)**.

Advantages of share buybacks:

- **Avoids increasing expectations** of higher dividends in future (which may be a problem if dividends are increased).
- Provides disaffected shareholders with an **exit route**, in this sense it is a defence against a takeover.
- Taxed as a capital gain which may be advantageous if the **tax** on capital gains is below the rate used to tax dividend income.
- **If shares are under-valued**, the company may be able to buy shares at a low price which will benefit the remaining shareholders. Fewer shares will improve EPS and DPS ratios.

2.4.7 Special dividends

Another way of returning significant amounts of cash to shareholders is by a **special dividend;** a cash payment far in excess of the dividend payments that are normally made. This has a similar effect of returning significant amounts of cash to shareholders, but unlike a share buyback it impacts **all shareholders**.

A special dividend is more attractive than a share buy-back if shares are **over-valued**, and avoids shareholders potentially **diluting their control** by participating in a share buyback.

Essential reading

See Chapter 1 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more background information on dividend policy; this includes subject matter such as Modigliani and Miller's dividend irrelevance theory that should be familiar from your earlier studies.

3 Ethics

For financial strategy to be successful it needs to be communicated and supported by key **stakeholder groups**:

- **Internal** – managers, employees
- **Connected** – shareholders, banks, customers, suppliers
- **External** – government, pressure groups, local communities

Where a strategy creates a **conflict** between the interest of shareholders and those of other stakeholder groups then this can create ethical issues which need to be carefully managed.

3.1 Ethical and environmental issues in financial management

The key financial objective for a business is to create wealth for its shareholders. However, this can create adverse impacts on other stakeholders. You may be required to analyse this as a part of an exam question, which will require you to use your common sense to consider the impacts and how the stakeholders may react.

Activity 2: Ethical considerations in financial management

Required

Complete the following table with ideas of potential issues in key areas of financial management.

Solution

Area of financial management	Ethical considerations
Investment	
Financing	
Dividend policy	
Risk management	

3.2 Ethics and stakeholder conflict

Ethical issues often arise from a **conflict between the needs of different stakeholder groups**. Questions which include ethical considerations are likely to be of a practical nature and are likely to require you to give practical advice on a fair **resolution of stakeholder conflict**. Most commonly this will be a conflict between **shareholder needs** (ie financial gain) and the needs of another stakeholder, but other conflicts may also need to be managed.

3.2.1 Examples of stakeholder conflict

Directors and shareholders

Directors may be more risk averse than shareholders because a greater proportion of their income and wealth is tied up in the company that employs them, whereas many shareholders will hold a diversified portfolio of shares. Also, directors may focus their decision making on benefiting their own division instead of the company as a whole.

The relationship between management and shareholders is sometimes referred to as an **agency relationship**, in which managers act as agents for the shareholders.

The goal of **agency theory** is to find governance structures and control mechanisms (incentives) that minimise the problem caused by the separation of ownership and control.

Between different shareholder groups

Some shareholders might have a preference for short-term dividends, others for long-term capital gain (requiring more cash to be reinvested, and less to be paid as a dividend).

Between shareholders and debt holders

Debt holders may be more risk averse than shareholders, because it is only shareholders who will benefit if risky projects succeed.

Shareholders and staff/customers/suppliers

Pursuit of short-term profits may lead to difficult relationships with other stakeholders. For example, relationships with suppliers and customers may be disrupted by demands for changes to the terms of trade. Employees may be made redundant in a drive to reduce costs. These policies may aid short-term profits, but at the expense of damaging long-term relationships and consequently damaging shareholder value in the long term.

Shareholders and external stakeholders

The impact of a company's activities may impact adversely on its environment, eg noise, pollution.

3.2.2 Ethics and other functional areas of the organisation

Ethics should govern the conduct of corporate policy in all functional areas of a company, such as the company's **treatment of its workers, suppliers and customers**.

The ethical stance of a company is concerned with **the extent that an organisation will exceed its minimum obligations** to its stakeholders.

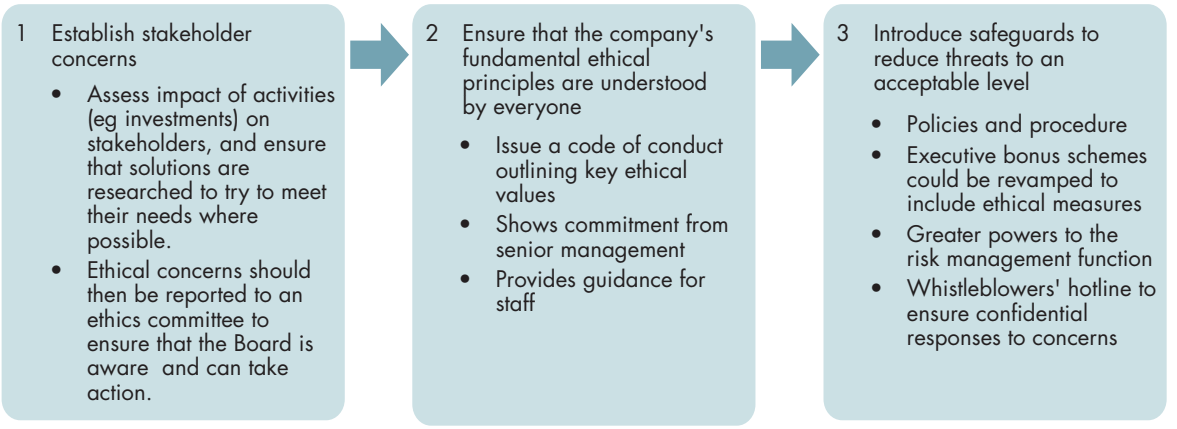
Essential reading

See Chapter 1 Sections 2 and 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more background information on this area.

3.2.3 A framework for developing ethical policies

In principle, an effective framework will help to analyse some ethical issues in exam questions.

It will also be appropriate to apply your common sense to create practical solutions to the ethical problems that appear as part of an exam question.



3.2.4 Governance

Safeguarding against the risk of unethical behaviour may also include the adoption of a **corporate governance** framework of decision making that restricts the power of executive directors and increases the role of independent non-executive directors in the monitoring of their duties.

In some countries this can include a **non-executive supervisory board** with representatives from the company's internal stakeholder groups including the finance providers, employees and the company's management. It ensures that the actions taken by the board are for the benefit of all the stakeholder groups and to the company as a whole.

4 Integrated reporting

The aim of integrated reporting is to explain how an organisation **creates value over time** and **the nature and quality of an organisation's relationships with its stakeholders**.

Integrated reporting will involve reporting, among other things, on sustainability/environmental issues and this may help to enhance the importance with which these issues are treated.

Integrated reporting is designed to make visible the **capitals** (resources and relationships used and affected by the organisation) on which the organisation depends, and how the organisation uses those capitals to create value in the short, medium and long term.

4.1 The capitals

Capitals	
Financial	Funds available, obtained through financing or generated through operations
Intellectual	Intangibles providing competitive advantage (patents, copyrights etc)
Social and relationship	Shared norms, common values and behaviours Key stakeholder relationships, willingness to engage with stakeholders
Human	Support for organisation's governance framework and ethical values
Manufactured	Manufactured physical objects used (buildings, equipment, infrastructure)
Natural	Renewable and non-renewable environmental resources and processes

You can remember the capitals as FISH MN.

Essential reading

See Chapter 1 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more background information on this area.

Chapter summary

1 Financial objectives

Financial strategy: formulation

Profit is **NOT** the key financial goal

- It is **historic**
- It is **not cash**
- **It ignores** other factors, such as **risk**

The key financial objective is **total shareholder return,** measured as dividend yield + capital gain.

2 Financial strategy formulation

2.1 Investment decision – find attractive new projects

2.2 Financing decision – minimise cost of capital

2.3 Risk management

Debt is a cheap source of finance, and can be used to reduce the cost of capital; **the appropriate level of gearing depends on a number of practical factors**.

Practical issues
Life cycle – a new, growing business will find it difficult to forecast cash flows so high levels of gearing are unwise
Operational gearing – if fixed costs are high then contribution (before fixed costs) will be high relative to profits (after fixed costs). High fixed costs mean cash flow is volatile, so high gearing is not sensible
Stability of revenue – if operating in a highly dynamic business environment then high gearing is not sensible
Security – if unable to offer security then debt will be difficult and expensive to obtain

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2.4 Dividend decision – pay out or reinvest?

Investment decision

- Companies with many investment opportunities (young/high growth companies) may find it difficult to pay a dividend.

Financing decision

- Companies that have volatile cash flows (and therefore prefer to minimise their use of debt finance) will often pay lower dividends.

Dividend capacity (free cash flow to equity)

- Cash available for paying a dividend. Calculated as:

Profits after interest, tax and preference dividends

less

debt repayment, share repurchases, investment in assets

plus

depreciation, any capital raised from new share issues or debt.

Possible policies:

- Constant payout
- Stable growth
- Residual
- Scrip dividends
- Special dividends
- Share buybacks

Dividend irrelevance theory (M&M)

- In a tax-free world, shareholders are **indifferent** between dividends and capital gains, and the value of a company is determined solely by the 'earning power' of its assets and investments.
- Ignores impact of tax and practical difficulty and cost of raising finance.

3 Ethics

3.1 Ethical and environmental issues

Unfair impact on stakeholders.

3.2 Ethics and stakeholder conflict

Companies need to understand the ethical issues it faces, resulting from stakeholder conflict. It should state its ethical principles and introduce safeguards (eg to align interests of management to shareholders: agency theory).

4 Integrated reporting

Communication with stakeholders. Reporting financial, manufactured, human, intellectual social & natural capitals.

Knowledge diagnostic

1. Total shareholder return

This is a measure of the change in shareholder wealth over a year. Calculated as dividend yield + capital gain/loss.

2. Financial strategy

Involves key decisions over investment, financing, dividends and risk management. Each decision affects the others.

3. Dividend capacity

Dividend capacity is the cash generated in any given year that is available to pay to ordinary shareholders (it is also called free cash flow to equity).

4. Scrip dividend

A dividend paid in shares.

5. Integrated reporting

Designed to make visible the capitals (resources and relationships used and affected by the organisation) on which the organisation depends, how the organisation uses those capitals and its impact on them. The capitals are financial, manufactured, intellectual, human, natural (remember as FISH MN).

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q1 Mezza

Q2 Stakeholders and ethics

Research exercise

Use an internet search engine to identify the ethical code of conduct for a company and have a look at the types of values and behaviours it contains. Choose any company you have an interest in, if you want a suggestion the BP code of conduct is an interesting document to analyse. This is available here:

https://www.bp.com/content/dam/bp-country/en_au/products-services/procurement/code-of-conduct.pdf

There is no solution to this exercise.

Financial strategy: evaluation

2

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Assess organisational performance using methods such as ratios and trends	A2(a)
• Recommend the optimum capital mix and structure within a specific business context and capital asset structure (covered in Chapters 1 and 6)	A2(b)
• Recommend appropriate distribution and retention policy (Chapter 1)	A2(c)
• Explain the theoretical and practical rationale for the management of risk (also covered in Chapter 11)	A2(d)
• Assess the company's exposure to business and financial risk including operational, reputational, political, economic, regulatory and fiscal risk	A2(e)
• Develop a framework for risk management, comparing and contrasting risk mitigation, hedging and diversification strategies	A2(f)
• Establish capital investment monitoring (see Chapter 3) and risk management systems	A2(g)
• Advise on the impact of behavioural finance (also covered in Chapter 8)	A2(h)
• Apply appropriate models, including term structure of interest rates, the yield curve and credit spreads to value corporate debt	B4(a) in part
• Calculate and evaluate the cost of capital of an organisation, including the cost of equity and the cost of debt	B3(c) in part
• Demonstrate detailed knowledge of business and financial risk and the capital asset pricing model	B3(d) in part

Exam context

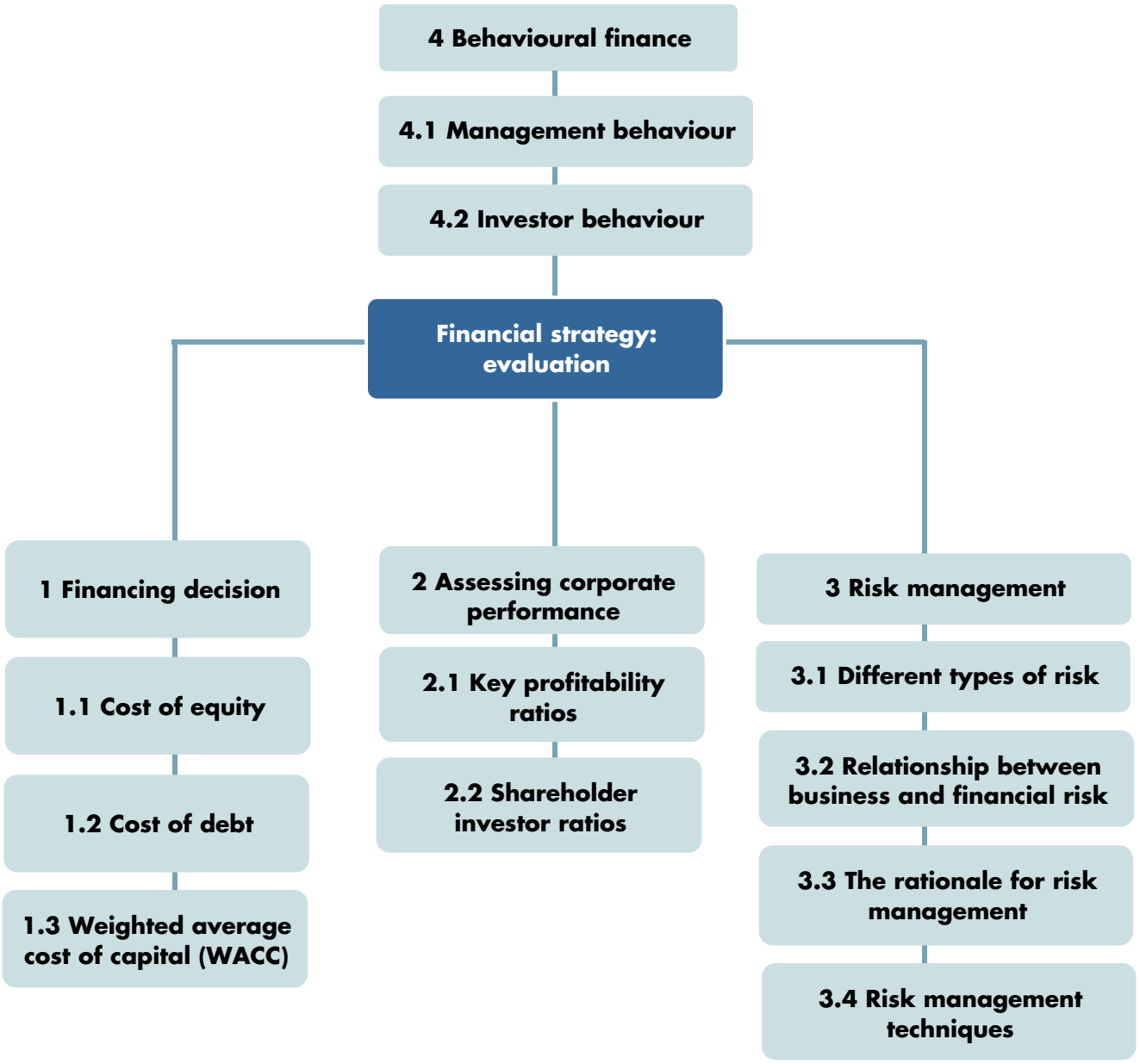
This chapter starts by **examining** the **financing decision,** which is a key aspect of financial strategy. Cost of capital calculations are important in AFM and will be developed in later chapters. A sound knowledge of the capital asset pricing model is especially important for AFM. Basic cost of capital calculations are assumed knowledge from the Financial Management exam but are recapped in the Essential reading (available in Appendix 2 of the digital edition of the Workbook) as indicated in the relevant sections of this chapter.

We then move on to look at how the performance of a **financial strategy** can be **evaluated** using ratio analysis. This topic is frequently examined and must not be neglected.

This chapter also introduces the **important topic** of **risk management**. An understanding of risk is often important in evaluating a financial strategy. However, the main tools of risk management are covered in Chapters 11–13.

Finally, we introduce **behavioural finance** to explain why, when evaluating a financial strategy, we may find that it is not focused on shareholder value. This topic is considered further in Chapter 8.

Chapter overview



1 Financing decision

The primary objective of a profit-making company is normally assumed to be to **maximise shareholder wealth**. Investments will increase shareholder wealth if they **cover the cost of capital** and leave a surplus for the shareholders. The **lower the overall cost of capital** the **greater the wealth** that is created.

In order to be able to minimise the overall cost of finance, it is important initially to be able to **estimate the costs of each finance type.**

The **cost of the different forms of capital will reflect their risk**. Debt is lower risk than equity because debt ranks before equity in the event of a company becoming insolvent, and because interest has to paid. Therefore, debt will be cheaper than equity and the more security attached to the debt the cheaper it should be.

These cost of capital calculations can be performed as part of **an evaluation** of different proposed **financing strategies**, or as part of an evaluation of the **investment decision**.

1.1 Cost of equity – using the capital asset pricing model

Rational investors will create a diversified investment portfolio to reduce their exposure to risk.

Activity 1: Introductory example

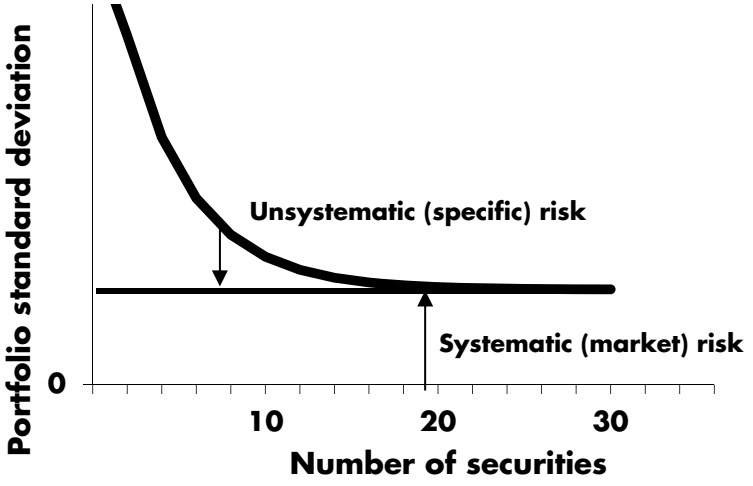
		Annual returns on possible investments		
Oil price	*Likelihood*	*Oil company*	*Airline company*	*50:50 portfolio*
High	25%	25%	–5%	
Average	50%	10%	10%	
Low	25%	–5%	25%	___
Expected return		10%	10%	

Required

Complete the table above and comment on the return and risk of each investment opportunity.

Solution

By continuing to diversify, shareholders can further reduce risk.



1.1.1 Unsystematic (specific) risk

Key term

Unsystematic (or specific) risk: the component of risk that is associated with investing in that particular company. This can be reduced by diversification.

Unsystematic (or specific) risk is gradually eliminated as the investor increases the diversity of their investment portfolio until it is negligible (the 'well-diversified portfolio').

Diversification is important because it enables investors to eliminate virtually all of the risks that are unique to particular industries or types of business. However, diversification does not offer any escape from general market factors (eg a recession) that can affect all companies.

1.1.2 Systematic (market) risk

The risk that remains, for a diversified shareholder, is called systematic (or 'market') risk.

Key term

Systematic (or market) risk: the portion of risk that will still remain even if a diversified portfolio has been created, because it is determined by general market factors.

Market risk is caused by factors which affect all industries and businesses to some extent or other, such as: interest rates, tax legislation, exchange rates and economic boom or recession.

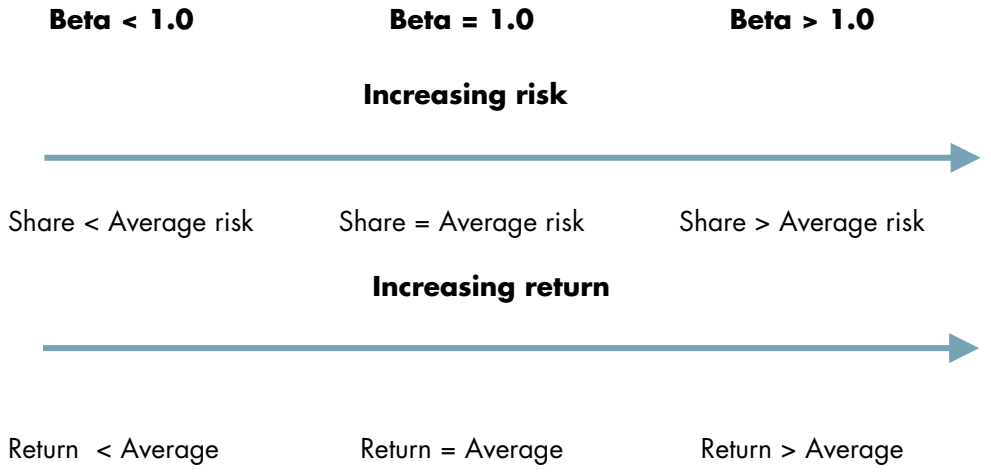
Commercial databases such as Reuters monitor the sensitivity of firms to general market factors by using historic data to calculate the **average change in the return on a share each time there is a change in the stock market as a whole**; this is called **a beta factor**.

1.1.3 Beta factors

Key term

Beta factor: a measure of the sensitivity of a share to movements in the overall market. A beta factor measures market risk.

A **beta factor of 1 is average** because it means that the average change in the return on a share has been the same as the market eg if the market fell by 1% this share also fell by 1% on average.



Beta factors vary because **some shares are very sensitive to stock market downturns** due to:

- The nature of the products or services that are sold (luxuries will have a higher beta)
- The level of financial gearing (higher gearing means higher risk)

1.1.4 Capital asset pricing model

The **Capital Asset Pricing Model (CAPM)** calculates the expected return (or cost) of equity (R_e or K_e) on the assumption that investors have a broad range of investments, and are only worried about market risk, as measured by the beta factor.

The CAPM is shown on your formula sheet as:

Formula provided

$$E(ri) = R_f + \beta (E(R_m) - R_f)$$

Where E(ri) = the expected (target) return on security by the investor

R_m = expected return in the market

β = the beta of the investment

R_f = the risk-free rate of interest

$R_m - R_f$ = market premium

Activity 2: Technique demonstration

Mantra Co has an equity beta of 1.5. Assume there is a market premium for risk of 4%, and the risk-free rate is 2%.

Required

Estimate Mantra Co's cost of equity.

Solution

Limitations of the CAPM	Discussion
Estimating market return	This is estimated by considering movements in the stock market as a whole over time. This will overstate the returns achieved because it **will not pick up the firms that have failed** and have dropped out of the stock market
Estimating the beta factor	Beta values are **historical** and will not give an accurate measure of risk if the firm has recently changed its gearing or its strategy
Other risk factors	It has been argued the CAPM ignores the impact of: • Size of the company (the extra risk of failure for small companies) • The ratio of book value of equity to market value of equity (shares with book values that are close to their market values are more likely to fail)

Essential reading

See Chapter 2 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more on the cost of equity from your earlier studies.

1.2 Cost of debt

There are many sources of debt finance including:

- **Bank loans**

  The cost of a loan will be given: because a company will obtain tax relief on interest paid, the cost will be **multiplied by (1 – t)** to get the post-tax cost of debt.

Illustration

Kay Co has a $1 million loan on which it pays 5% interest.

If the rate of tax on corporate profits is 20% then the interest payment of $50,000 will reduce taxable profit and Kay Co's tax bill will therefore fall by $50,000 × 0.20 = $10,000. The net cost of the loan is therefore $50,000 – tax saving of $10,000 = $40,000 or 4% (on a loan of $1m).

A quick way of calculating this is 5% × (1 – 0.2) = 4%.

- **Bond/debenture/loan note**

IOU $100

Pay interest of 4%
Repay $100 in 10 years' time

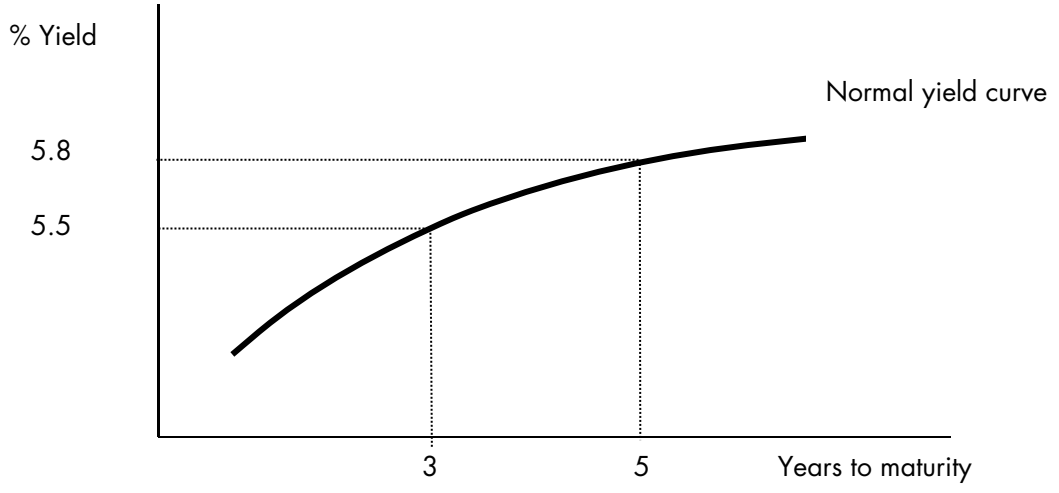
  - A tradeable IOU (ie an acknowledgment of the debt) with a nominal value $100 or $1000, normally maturing in 7–30 years and paying **fixed interest**; protected by **covenants** (eg restrictions on dividend policy; covenants are covered in detail in section 3 of Chapter 14)
  - **Slower and more expensive to organise** than a loan and **less** flexible than a bank loan in the event of default (a bank generally is more flexible in renegotiating a loan if a firm is unable to meet its loan repayments because it will want to maintain an ongoing commercial relationship with that firm)
  - Normally **redeemable** at its nominal value ($100)
  - **Often cheaper interest costs** compared to a loan (because it is a liquid investment, ie can be sold by the investor, so investors are happy to accept a lower rate of return in exchange for this convenience)

The cost of a **bond** can be estimated by considering:

(a) The **risk free rate** derived from the **yield curve** for a bond of that specified duration
(b) The **credit risk premium** – derived from the bond's credit rating

1.2.1 Yield curve

The yield curve shows how the yield on government bonds vary according to the term of the borrowing. The curve shows the yield expected by the investor assuming that the bond pays all of the return as a single payment on maturity. Normally it is upward sloping.



There are a number of explanations of the yield curve; at any one time both may be influencing the shape of the yield curve.

(a) **Expectations theory** – the curve reflects expectations that interest rates will rise in the future, so the government has to offer higher returns on long-term debt.

(b) **Liquidity preference theory** – the curve reflects the compensation that investors require higher annual returns for sacrificing liquidity on long-dated bonds.

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1.2.1 Credit ratings

A bond's credit rating will also affect the return that is required by investors. An example of the ratings used by a major ratings agency are shown below:

Standard & Poor's	Definition
AAA, AA+, AAA–, AA, AA–, A+	• Excellent quality, lowest default risk
A, A–, BBB+	• Good quality, low default risk
BBB, BBB–, BB+	• Medium rating
BB or below	• Junk bonds (speculative, high default risk)

The extra return (or **yield spread**) required by investors on a bond will depend on its credit rating, and its maturity. This is often quoted as an adjustments to the risk free rate (as indicated by the yield curve) in basis points (1 point = 0.01%).

Maturity	3 years
Rating	
AAA	18
A	75

Activity 3: Technique demonstration

Mantra Co has issued AAA rate bonds with three years to maturity.

Tax is 30%.

Required

Complete the following table (using the yield curve in Section 1.2.1 and the yield spread in Section 1.2.2) to estimate Mantra's current cost of debt.

Solution

	%
Credit spread on existing AAA rated bonds	
Yield curve benchmark	
Cost of debt (pre-tax)	
Cost of debt post-tax	

1.3 Weighted average cost of capital

To calculate a project NPV, or to assess a proposed financing plan, you may be required to calculate the weighted average cost of capital for the business (WACC). You will have covered this in your earlier studies of the Financial Management exam, and it is recapped here.

Formula provided

$$WACC = \left(\frac{V_e}{V_e + V_d}\right) K_e + \left(\frac{V_d}{V_e + V_d}\right) K_d (1-T)$$

V_e = total market value (ex-div) of issued shares

V_d = total market value (ex-interest) of debt

K_e = cost of equity in a geared company

K_d = cost of debt

The formula provided assumes that there are two sources of finance – debt and equity. You may have to adapt the formula if there are extra types of finance (for example two different types of debt) by adding in additional terms for the cost and value of these extra types of finance.

1.3.1 Calculating market values of debt and equity

You may need to calculate these market values, if they are not provided in a question.

Chapter 8 deals with the valuation of equity.

To value debt you need to **calculate the present value of its future cash flows, discounted at the required return (pre-tax)**. This is illustrated below.

Activity 4: Technique demonstration

Mantra Co's bonds have a nominal value of £100 and a total nominal value of £0.49 billion. The bonds pay a coupon rate of 6.2% annually. Further information on credit spreads and yield curve spot rates are given below:

Maturity	1 year	2 years	3 years
AAA	8	12	18
Yield curve spot rate	4.5	5.0	5.5
Required return (pre-tax)	4.58%	5.12%	5.68%

Required

Complete the following calculations to estimate the total **market value** of Mantra Co's debt.

Solution

Time	*1*	*2*	*3*	*Total*
Per £100	6.2	6.2	106.2	
DF 4.58%				
DF 5.12%				
DF 5.68%				
PV				

1.3.2 Using the WACC formula

A brief reminder of how to use the basic WACC formula is provided in the next activity.

Activity 5: Calculating the WACC

Mantra has a total market value of £1 billion, split 50% debt and 50% equity.

Mantra has a cost of equity of 8% and a post-tax cost of debt of 3.98%. Tax is 30%.

Required

Calculate Mantra Co's WACC.

Solution

1.3.3 Assumptions made when using WACC for project evaluation

The WACC can only be used for project evaluation if:

(a) In the long term the company will maintain its existing capital structure (ie financial risk is unchanged)

(b) The project has the same risk as the company (ie business risk is unchanged)

If these factors are not in place (ie risk changes) then the company's existing cost of equity will change.

Where the risk of an extra project is different from normal, there is an argument for a cost of capital to be calculated for that particular project; this is a **project-specific cost of capital** and is covered in Chapter 7.

PER alert

One of the optional performance objectives in your PER is to advise on the appropriateness and cost of different sources of finance. Another is to identify and raise an appropriate source of finance for a specific business need. This chapter covers some of the common sources of finance and the linked area of dividend policy.

2 Assessing corporate performance

You may be expected to use **ratio analysis** to evaluate the success of a financial strategy.

Ratios are normally split into four categories: profitability, debt, liquidity and shareholder investor ratios. In the context of assessing performance it is most likely that profitability and shareholder investor ratios will be most relevant. Debt and liquidity ratios are covered later.

You need to **learn these ratios**.

2.1 Key profitability ratios

Profitability ratios: ROCE, profit margin and asset turnover

Formula to learn

$$\text{ROCE} = \frac{\text{PBIT}}{\text{Capital employed}} = \frac{\text{PBIT}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Capital employed}}$$

Profit margin × Asset turnover

ROCE should ideally be increasing. If it is static or reducing it is important to determine whether this is due to a reduced profit margin (which is likely to be bad news) or lower asset turnover (which may simply reflect the impact of a recent investment).

Capital employed = shareholders' funds + long-term debt finance

Alternatively, capital employed can be defined as Total assets less Current liabilities.

If ROCE is calculated **post tax** then it can be compared against the weighted average cost of capital (also post tax) to assess whether the return provided to investors is adequate.

2.2 Shareholder investor ratios

Total shareholder return is often used to measure changes in shareholder wealth.

Formula to learn

Total shareholder return = dividend yield + capital gain/(loss)

dps/share price capital gain (loss)/share price*

*Share price at the **start** of the year

Total shareholder return (or return on equity) can be compared against the cost of equity (K_e) to assess whether the return being provided is adequate.

$$\textbf{Return on equity} = \frac{\text{Earnings}}{\text{Shareholders' funds}}$$

$$\textbf{Earnings per share} = \frac{\text{Profits distributable to ordinary shareholders}}{\text{Number of ordinary shares issued}}$$

$$\textbf{Price-earnings ratio} = \frac{\text{Market price per share}}{\text{EPS}}$$

The value of the P/E ratio reflects the market's appraisal of the share's future prospects – the more highly regarded a company, the higher its share price and its P/E ratio will be.

Activity 6: Ratio analysis

Splinter Co is considering selling its equity stake in Neptune Co.

Neptune Co. operates in a sector that is underperforming. Over the past two years, sales revenue has fallen by an average of 8% per year in the sector.

Given below are extracts from the recent financial statements and other financial information for Neptune Co and the sector.

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Neptune Co year ending 31 May

	20X6	*20X7*
	$m	$m
Equity		
Ordinary shares ($0.25)	150	150
Reserves	410	458
Total equity	560	608
Non-current liabilities		
Bank loans	108	90
Bonds	210	200
Total non-current liabilities	318	290
Sales revenue	2,670	2,390
Profit for the year	288	144

Other financial information (based on annual figures to 31 May of each year)

	20X5	*20X6*	*20X7*
Neptune Co average share price ($)	5.00	4.80	4.00
Neptune Co dividend per share ($)	0.36	0.40	0.30
Sector average capital gain	+16.53%	–1.60%	+12.21%
Sector average P/E	12.29	13.54	13.57
Sector average dividend yield	+7.73%	+6.64%	+7.21%
Neptune Co's equity beta	1.4	1.5	1.6
Sector average equity beta	1.5	1.6	2.0

The risk-free rate and the market return are 4% and 10% respectively.

Required

(a) Evaluate Neptune Co's total shareholder return.

(b) Using your analysis from part (a), and other relevant ratios, analyse whether Splinter Co should dispose of its equity stake in Neptune Co.

Solution

Essential reading

See Chapter 2 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of basic ratio analysis.

3 Risk management

3.1 Different types of risk

3.1.1 Business risk

Business risk arises from the **type of business** an organisation is involved in and relates to uncertainty about the future and the organisation's **business prospects**.

- **Political risk** – the risk of government action which damages shareholder wealth (eg exchange control regulations could be applied that may affect the ability of the subsidiary to remit profits to the parent company).
- **Economic risk** – for example the risk of a downturn in the economy.
- **Fiscal risk** – including changes in tax policies which harm shareholder wealth.
- **Operational risk** – human error, breakdowns in internal procedures and systems.
- **Reputational risk** – damage to an organisation's reputation can result in lost revenues or significant reductions in shareholder value.

Business risk is **a mixture of systematic and unsystematic risk**. The systematic risk comes from such factors as revenue sensitivity to macro-economic factors and the mix of fixed and variable costs within the total cost structure. Unsystematic risk is determined by such company-specific factors as management mistakes, or labour relations issues, or production problems.

Activity 7: Business risk

DX Co is a retailer of sports equipment, with a reputation for selling low price reasonable quality products. The manufacture of its products is completely outsourced to companies operating in low-cost countries. Most of DX's staff are paid low wages and are on zero-hours contracts. Relations between staff and management are poor.

Required

Identify some examples of business risk for DX Co.

Solution

3.1.2 Non-business/financial risk

Non-business risk may arise from an adverse **event** (accident/natural disaster) or to risks arising from financial factors (**financial risk**).

Key term

Financial risk: the volatility of earnings due to the financial policies of a business.

Long-term financial risks are mainly caused by the **structure of finance**; the **mix of equity and debt capital**, the risk of not being able to access funding, and whether the organisation has a sufficient long-term capital base for the amount of trading it is doing (overtrading).

Short-term financial risk also exists and need to be managed.

Examples of short-term financial risk	Explanation
Exchange rate and interest rate risk	Risks arising from unpredictable cash flows due to interest rate or exchange rate movements (covered in later chapters)
Credit risk	Late or non-payment by a customer
Liquidity risk	Inability to obtain cash when needed

3.2 Relationship between business and financial risk

A business with high business risk may be **restricted in the amount of financial risk it can sustain** because, if financial risk is also high, this may push total risk above the level that is acceptable to shareholders.

It will be important for the **financial strategy** of an organisation facing **high business risk** to **minimise debt finance**, and to **hedge a greater proportion of its currency and interest rate exposure**, ie to **minimise financial risk**.

3.3 The rationale for risk management

3.3.1 Arguments against risk management

In order to generate returns for shareholders a company will need to accept a degree of risk. In addition, as we have seen, shareholders can diversify away some of the risk that they face themselves.

If risk management is unnecessary then the time and expense that it involves, it could be argued, reduces shareholder wealth.

3.3.2 Arguments in favour of risk management

The main arguments in favour of risk management (eg hedging) are based on the idea that in reality there is no guarantee that firms will be able to raise funds to finance attractive projects (ie capital markets are imperfect). Hedging should reduce the volatility of a company's earnings, and this can have a number of beneficial effects:

(a) **Attracting investors**: because there is a **lower probability** of the firm encountering **financial distress**.

(b) **Encouraging managers to invest for the future**: especially for highly geared firms, there is often a **risk of underinvestment** because managers are concerned about the risk of not being able to meet interest payments. Risk management reduces the incentive to underinvest, since it reduces uncertainty and the risk of loss.

(c) **Attracting other stakeholders**: for example, suppliers and customers are more likely to look for long-term relationships with firms that have a **lower risk of financial distress**.

3.4 Common risk management techniques

Techniques that relate to the AFM syllabus include:

- **Risk mitigation**
  - The process of **transferring risks out of a business**. This can involve **hedging** (covered in Chapters 12–13) or insurance or even avoiding certain risks completely.

  As already mentioned, a certain level of risk is inevitable and even desirable in business. The process of risk management needs to consider whether the company requires a risk mitigation strategy by considering the costs of such a strategy, the existing level of business and financial risk, and the risk preferences of the company.
- **Risk diversification**
  - Reducing the impact of risk by investing in different business areas. However, the benefits from diversification can normally be gained by shareholders building portfolios of different shares. If this has already been done then diversification by a company may not benefit shareholders unless it involves moving into business areas that shareholders cannot access by themselves (eg new international markets where foreign share ownership is regulated), or if the diversification creates synergy with existing operations (synergy is discussed in Chapter 9).

Essential reading

See Chapter 2 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more detail about practical techniques for managing risk which you have seen in your earlier studies.

4 Behavioural finance

Behavioural finance considers the impact of **psychological factors** on financial strategy. This challenges the idea that managers and investors behave in a rational manner based on sound economic criteria.

4.1 Management behaviour

Some of the main psychological factors affecting managerial decision-making are:

- **Overconfidence** – tendency to overestimate their own abilities. This may help to explain why many acquisitions are overvalued (this aspect is covered further in Chapter 8). This could also help to explain why many boards believe that the stock market undervalues their shares.

  This can lead to managers taking actions that **may** not be in their shareholders' best interests, such as delisting from the stock market or defending against a takeover bid that they believe undervalues their company.

- **Entrapment** – managers are also reluctant to admit that they are wrong (they become trapped by their past decisions, sometimes referred to as cognitive dissonance). This helps to explain why managers persist with financial strategies that are unlikely to succeed.

  For example, in the face of economic logic managers will often delay decisions to terminate projects because the failure of the project will imply that they have failed as managers.

- **Agency issues** – managers may follow their own self-interest, instead of focusing on shareholders.

  Analysis of these types of behavioural factors can help to evaluate possible causes behind a failing financial strategy.

4.2 Investors

Some of the main behavioural factors are:

- **Search for patterns** – investors look for **patterns** which can be used to justify investment decisions. This might involve analysing a company's past returns and using this to extrapolate future performance, or comparing peaks or troughs in the stock market to historical peaks and troughs. This can lead to **herding**.

  This is compounded by a reluctance of investors to admit that they are wrong (sometimes referred to as **cognitive dissonance**).

- **Narrow framing** – many investors fail to see the bigger picture and focus too much on short-term fluctuations in share price movements; this can mean that if a single share in a large portfolio performs badly in a particular week then, according to theories such as CAPM, this should not matter greatly to an investor who is investing in a large portfolio of shares over, say, a 20-year period. However, in reality, it does seem to matter – which indicates that investors show a greater aversion to risk than the CAPM suggests they should.

- **Availability bias** – people will often focus more on information that is **prominent (available)**. Prominent information is often the most **recent information**; this may help to explain why share prices move significantly shortly after financial results are published.

- **Conservatism** – investors may be resistant to changing their opinion so, for example, if a company's profits are better than expected the share price may not react significantly because investors underreact to this news.

If the stock markets are not behaving in a rational way, it may be difficult for managers to influence the share price of their company and the share price may not be a reliable estimate of the company's value.

Chapter summary

4 Behavioural finance

4.1 Management behaviour

4.2 Investor behaviour

Management behaviour affected by:

Overconfidence/entrapment/ agency issues/confirmation bias

Investor behaviour affected by:

Herding/cognitive dissonance/ narrow framing/availability bias/ conservatism

Financial strategy: evaluation

1 Financing decision

1.1 Cost of equity

The **most expensive finance**, (most risky)

$E(r_i) = R_f + b(E(R_m) - R_f)$

Beta measures systematic risk, average beta = 1

Limitations of the CAPM	
Market return	This will be volatile, estimates don't pick up firms that fail.
Beta	Beta values are historic, and become out of date if the firm changes its gearing or strategy.
Size	Ignores impact of size on risk.

Alternatively: dividend growth model:

$K_e = \frac{D_1}{P_0} + g$

1.2 Cost of debt

The **cheapest finance is debt** (especially if secured) – the cost of debt is **K_d** (pre-tax).

Redeemable/convertible debt

Use yield curve rate + yield premium (or IRR calculation)

Preference shares

Use dividend growth model, but g = 0

1.3 WACC

A weighted average of the cost of equity and the cost of debt (and any other sources of finance)

When investing in a new business a marginal cost of capital should be used

2 Assessing corporate performance

2.1 Key profitability ratios

ROCE

Profit margin × Asset turnover

2.2 Shareholder investor ratios

TSR

Dividend yield + capital gain

(compare to K_e)

Return on equity

EPS

P/E ratio

3 Risk management

3.1 Different types of risk

Business risk

Financial risk (gearing/interest and exchange rate)

3.2 Relationship between business and financial risk

High business risk should mean a policy of minimising financial risk and vice versa

3.3 The rationale for risk management

Stabilising earnings

Encouraging investment

Stakeholder relationships

3.4 Risk management techniques

Risk mitigation

Hedging

Diversification

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Knowledge diagnostic

1. **Unsystematic risk**

   This is the component of risk that is associated with investing in that particular company.

2. **Systematic risk**

   The portion of risk that will still remain even if a diversified portfolio has been created, because it is determined by general market factors. Measured by a beta factor.

3. **Credit risk premium**

   The expected return to bond holders can be calculated as the risk free rate (derived from the yield curve for a bond of that specified duration) + the credit risk premium (derived from the bond's credit rating)

4. **Ratio analysis**

   This is an important mechanism for evaluating a financial strategy; make sure you learn the key ratios.

5. **Risk management**

   Failure to manage risk can result in a business being unable to raise finance and having poor stakeholder relationships. Both business and financial risk should be considered in a financial strategy.

6. **Behavioural finance**

   This gives insights into potential reasons for the failure of a financial strategy in terms of meeting shareholder expectations.

Further study guidance

Question practice

Try the question below from the Further question practice bank (available in the digital edition of the Workbook):

Q3 Airline Business

Further reading

There is a Technical Article available on ACCA's website, called 'Patterns of behaviour'. This article examines behavioural finance and is written by a member of the AFM examining team.

Another useful Technical Article available on ACCA's website is called 'Risk Management'. This article examines the potential for risk management to 'add value' and is written by a member of the AFM examining team.

We recommend you read these articles as part of your preparation for the AFM exam.

Research exercise

Use an internet search engine to identify the beta factors for different companies. The Reuters website (reuters.com) is a good location from which to perform this search. Search for any company and you should find its beta factor in the section giving an overview of the company.

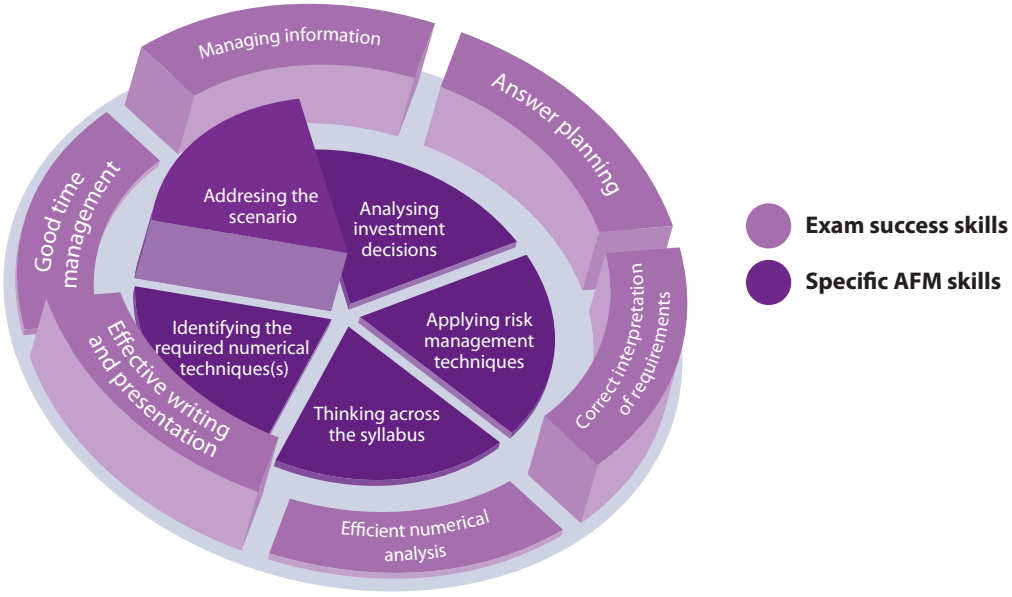
For example Ford's beta factor can be found here:

https://uk.reuters.com/business/stocks/overview/F.N

There is no solution to this exercise.

SKILLS CHECKPOINT 1

Addressing the scenario



Introduction

All of the questions in your Advanced Financial Management (AFM) exam will be scenario-based.

In Section A of the exam (50 marks) you can expect the scenario to be approximately two pages in length, and in the shorter (25 mark) Section B questions they will normally be approximately one page long.

It is vital to spend time reading and assimilating the scenario as part of your answer planning. Often the scenario will contain clues about the appropriate numerical techniques to apply (see Skills Checkpoint 3 in this Workbook), but it is always the case that the scenario will contain information that will be relevant to discussion parts of the question. The discussion parts of the question will account for a significant proportion of the marks, often equalling or even exceeding those awarded for the numerical parts of the question, and will often focus on how an issue or issues need to be 'managed'.

It is important to score well in the discussion parts of a question; to do this you will require a broad syllabus knowledge (see Skills Checkpoint 5 in the Workbook), avoid over-complicating your numerical analysis (see Skills Checkpoint 4 in the Workbook), and the ability to make your points relevant by **addressing the scenario**, ie by applying your points to the scenario. A common complaint from the ACCA examining team is that 'Less satisfactory answers tended to give more general responses rather than answers specific to the scenario'.

This skill is especially important in Section A of the AFM syllabus where we are looking at (management) 'responsibilities of the senior financial adviser', but is relevant to all syllabus areas and is likely to be important in every question in your AFM exam.

Skills Checkpoint 1: Addressing the scenario

AFM Skill: Addressing the scenario

A step-by-step technique for ensuring that your discussion points are relevant to the scenario is outlined below. Each step will be explained in more detail in the following sections as the question 'Kilenc' is answered in stages.

STEP 1:
Allow about 20% of your allotted time for analysing the scenario and requirements – don't rush into starting to write your answer. Assuming 1.95 minutes per mark this means about 20 minutes of analysis and planning for a 50 mark question (1.95 minutes × 50 marks × 20%) and about 10 minutes for a 25 mark question.

STEP 2:
Prepare an answer plan using key words from the requirements as headings (ie a mind map or a bullet-pointed list).

STEP 3:
Complete your answer plan by working through each paragraph of the question identifying specific points that are relevant to the scenario (and requirement) to make sure you generate enough points to score a pass mark – ACCA marking guides typically allocate 1–2 marks per relevant well-explained point.

STEP 4:
As you write your answer, explain what you mean in one (or two) sentence(s) and then in the next sentence explain why it matters here (in the given scenario). This should result in a series of short punchy paragraphs containing points that address the specific content of the scenario.

Write your answer in a time efficient manner. As 20% of your time has been used for planning/analysis this means that the time allocation when writing should be 1.95 × 0.8 = 1.56 minutes per mark.

Exam success skills

The following question is an extract from a past exam question worth 15 marks.

For this question, we will also focus on the following **exam success skills**:

- **Managing information**. It is easy for the amount of information contained in scenario-based questions to feel overwhelming. **Active reading** is a useful technique to use to avoid this. This involves focusing on the requirement first, on the basis that until you have done this the detail in the question will have little meaning and will seem more intimidating as a result.

  Focus on the requirement, underlining key verb or verbs to ensure you answer the question properly. Then read the rest of the question, underlining and annotating important and relevant information, and making notes of any relevant technical information you think you will need.

- **Correct interpretation of requirements**. At first glance, it looks like the following question just contains one requirement. However, on closer examination you will discover that it contains at least two sub-requirements, this is very common in the AFM exam. Focus on the verbs in each sub-requirement and analyse them to determine exactly what your answer should address, and what areas of analysis would not be relevant.

- **Answer planning**. Everyone will have a preferred style for an answer plan. For example, it may be a mind map, bullet-pointed lists or simply annotating the question paper. Choose the approach that you feel most comfortable with or if you are not sure, try out different approaches for different questions until you have found your preferred style.

- **Effective writing and presentation**. It is often helpful to use key words from the requirement as headings in your answer. You may also wish to use sub-headings in your answer – you could use a separate sub-heading for each paragraph from the scenario which contains an issue for discussion. Underline your headings and sub-headings with a ruler and write in full sentences, ensuring your style is professional.

Skill activity

STEP 1 Look at the mark allocation of the following question and work out how many minutes you have to analyse and plan your answer to the question.

Required

Discuss the key risks and issues that Kilenc Co should consider when setting up a subsidiary company in Lanosia, and comment on how these may be mitigated.

(15 marks)

This is a 15-mark question and at 1.95 minutes a mark, it should take 29 minutes.

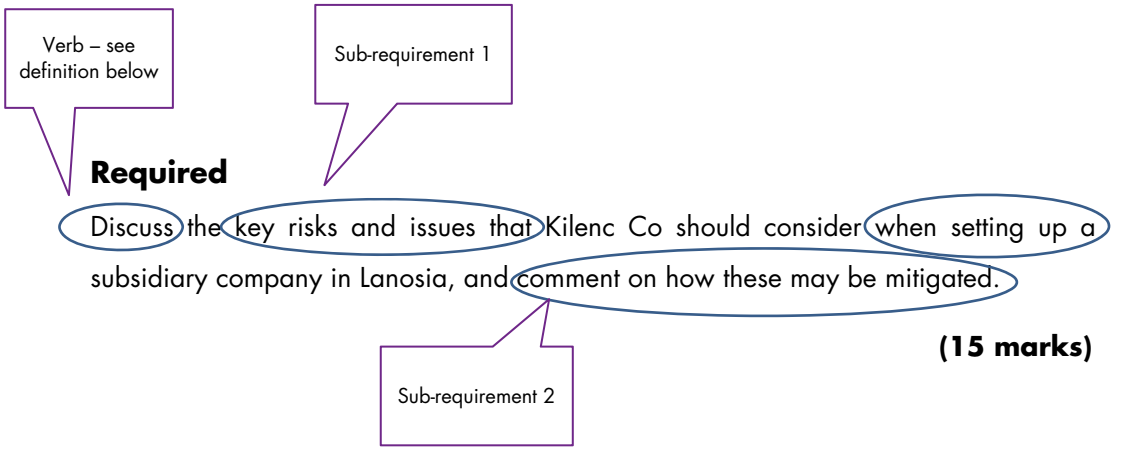
On the basis of spending approximately 20% of your time reading and planning, this time should be split approximately as follows:

- Reading and planning time – 6 minutes
- Writing up your answer – 23 minutes

However, in reality this would have been part of a larger question (this was part of a 25 mark Section B question) and the planning time would take place at the start of the question and would involve planning for all of the question's requirements (so 10 minutes of planning for the whole question).

Also some flexibility is required and if a question contains a substantial number of discussion issues (as here) then more reading and planning time may be needed.

STEP 2 Read the requirement for the following question and analyse it to identify the key words. Highlight each sub-requirement, identify the verb(s) and ask yourself what each sub-requirement means.



The first key action verb is 'discuss'. This is defined by the ACCA as 'Consider and debate/argue about the pros and cons of an issue. Examine in detail by using arguments in favour or against'.

The requirement is to discuss 'risks and issues' in setting up a subsidiary in a foreign country.

In this context, the verb 'discuss' is asking you to examine each of the risks and issues in a critical way, eg debating the nature and extent of the risk.

The verb 'comment' is asking you to remark or express an opinion, in a concise manner, on mitigating the risks/issues that you have discussed.

Points that you make for 'commenting' are likely to be worth less than the points made for discussing (in the first part of the question) because you will be going into less depth.

STEP 3 Now complete the answer plan. Focus initially on identifying the issues because the risk mitigation points should follow logically from this.

Risks and issues

Working through each paragraph of the question, identify specific risks/issues.

Risk mitigation

You will need to draw on your technical knowledge here ie that mitigation involves transferring risk out of the business ie by taking action to reduce, control or avoid the risk. However, your answer needs to be **practical and applied** to the risks and issues that you have identified.

Make sure you generate enough points for the marks available – there are 15 marks available, so assuming 2 marks per relevant well-explained risk **discussed** and perhaps 1 mark for **commenting** how to mitigate this risk, then you should aim to generate sufficient points to score a strong pass mark (eg 10 marks).

Question – Kilenc (15 marks)

Kilenc Co, a large listed company **based in the UK**, produces **pharmaceutical products which are exported around the world**. It is **reviewing a proposal to set up a subsidiary company to manufacture a range of body and facial creams in Lanosia.** These products will be sold to local retailers and to retailers in nearby countries.

Note the company's main business activities – possible **risk** to core business if reputation is damaged from poor quality overseas or downsizing in the UK?

Risk of local skills and expertise and perhaps supplier base not being adequate?

Lanosia has a **small but growing** manufacturing industry in pharmaceutical products, although it remains largely reliant on imports. The Lanosian Government has been keen to promote the pharmaceutical manufacturing industry through purchasing local pharmaceutical products, **providing government grants and reducing the industry's corporate tax rate**. It also imposes **large duties on imported pharmaceutical products** which compete with the ones produced locally.

Risk of these being removed?

Positive factors, assume these will be avoided – use to 'discuss' **risk**

Risk of government incentives being removed confirmed

Although politically stable, the recent worldwide financial crisis has had a significant negative impact on Lanosia. The country's **national debt has grown substantially** following a bailout of its banks and it has had to introduce economic measures which are hampering the country's ability to recover from a **deep recession**. Growth in real wages has been negative over the past three years, the economy

Risk of failing to recover with knock-on impact on sales of luxury products?

has shrunk in the past year and **inflation has remained higher** than normal during this time.

Risk of devaluation of Lanosian currency?

Risk that interest rates have to rise to control inflation?

On the other hand, corporate investment in capital assets, research and development, and education and training has **grown recently** and **interest rates remain low.** This has led some economists to suggest that the economy should start to recover soon. Employment levels remain high in spite of low nominal wage growth.

Points to use to 'discuss' **risk**? ie business confidence seems high

Lanosian corporate governance regulations stipulate that at least **40% of equity share capital must be held by the local population. In addition, at least 50% of members on the board of directors, including the Chairman, must be from Lanosia**. Kilenc Co wants to finance the subsidiary company using a mixture of debt and equity. It wants to raise **additional equity and debt finance in Lanosia** in order to **minimise exchange rate exposure**. The small size of the subsidiary will have minimal impact on Kilenc Co's capital structure. Kilenc Co intends to raise the 40% equity through an initial public offering (IPO) in Lanosia and provide the remaining 60% of the equity funds from its **own cash funds**.

Risk of dilution of control and impaired decision making? Management issues?

Risk that this finance will not be available?

Points to use to 'discuss' **risk**? ie reduces exchange rate risk

Risk of other parts of the business being starved of funds?

Required

Discuss the key risks and issues that Kilenc Co should consider when setting up a subsidiary company in Lanosia, and comment on how these may be mitigated. **(15 marks)**

Completed answer plan

Having worked through each paragraph an answer plan can now be completed. A possible answer plan is shown here, this uses the wording of the requirement and the initial ideas that have been noted in the margins as shown earlier.

Risk/issue	Mitigation ideas
Reputational risk (global sales/skill shortages)	Redeploy staff?
Economic risk (downturn/removal of grants/increase taxes)	Dialogue/negotiation
Impact of higher inflation (exchange rate risk/interest rate risk)	Increase use of debt? Fixed rate finance?

Risk/issue	Mitigation ideas
Financial risk (availability/impact on other parts of the business)	Increase proportion of finance provided locally
Management difficulties (local managers and shareholders, language, culture etc)	Training
Other – natural disasters	Insurance

STEP 4

Write up your answer using key words from the requirements as headings.

Write your answer by explaining what you mean in one (or two) sentence(s) and then in the next sentence explain why it matters here (in the given scenario).

For the **discussion** part remember that this can involve debating the nature and extent of the risk.

When **commenting**, remember to be practical but also concise.

Suggested solution

Use sub-headings from your answer plan

Risks and issues

There could be **adverse effects on Kilenc Co's employees in the UK** because if the subsidiary is set up then Kilenc Co is likely to export less to Lanosia and other countries in the same region. If there are to be redundancies this may damage Kilenc Co's **reputation in the UK** and possibly beyond.

There are many different points that could be made about reputation – the key is that the point is applied to address the scenario

Use short paragraphs to show the marker that a different point is being made.

In addition, Kilenc Co needs to consider how the subsidiary would be perceived and whether the locally produced products will be seen as the **same quality** as the imported ones. This is a concern given the relatively youth of the pharmaceutical industry **in Lanosia**, which may mean that there is a skills shortage in terms of availability of staff and suppliers.

This is explaining why this matters in this scenario – which is the key skill that we are looking at.

The verb 'discuss' in the requirement allows you to suggest that some risks are more or less important than others.

Lanosia is currently in **recession** and this may have a negative impact on the demand for the products, especially as **these products do not appear to be 'necessities'** and therefore could be severely hit if the recession continues. However, the high levels of business investment indicates that there is some **optimism that the recession may be coming to an end.**

This is explaining why this matters in this scenario – which is the key skill that we are looking at.

This is explaining why this matters in this scenario – which is the key skill that we are looking at.

Given the **pressure on the national debt, there may be a risk that government grants and tax breaks are reduced or removed**. **This may significantly increase the costs of setting up a subsidiary**. Kilenc Co may also find it is subject to restrictions if it is felt that the subsidiary is affecting local companies. For example it may impose repatriation restrictions or increase taxes that the subsidiary has to pay. Alternatively given the fact that 40% of the shares will be locally owned and 50% of the board will also be from Lanosia may mean that the subsidiary is viewed as a local company and **the government support will also be available to the subsidiary**.

The verb 'discuss' in the requirement allows you to suggest that some risks are more or less important than others.

Kilenc Co wants to raise **debt finance** in Lanosia. It needs to consider whether this finance will actually be available. Following the bailout of the banks there may be a shortage of funds for borrowing. Also the **high inflation rate may mean that there will be pressure to raise interest rates** which may in turn raise borrowing costs.

Relating different parts of the scenario adds value to the answer.

The **Lanosian IPO** is likely to result in a number of minority shareholders, which combined with the composition of the board may create **agency issues for the subsidiary**. **For example**, the board of the subsidiary may make decisions that are in local interests rather than those of the parent company.

This is explaining why this matters in this scenario – which is the key skill that we are looking at.

Cultural issues also need to be considered, which include issues arising from dealing with people of a different nationality and also issues of culture within the organisation. A good understanding of cultural issues is important, as is the need to get the right balance between autonomy and control by the parent company.

Less detail is appropriate if there is less material in the scenario on these issues.

Other risks including foreign exchange exposure (to a devaluation in the Lanosian currency), health and safety compliance and physical risks all need to be considered and assessed. There are numerous legal requirements from health and safety legislation which must be understood and complied with. The risk of damage from events such as fire, floods or other natural disasters should also be considered.

Use sub-headings from your answer plan

Mitigation of risks and issues

Communication, both external and internal, can be used to minimise any damage to reputation arising from the move to Lanosia. If possible, employees should be **redeployed** within the organisation to reduce any redundancies.

The Lanosian Government should be **negotiated with and communicated with regularly** during the setting up of the subsidiary and on an ongoing basis. This should help to maximise **any government support** and/or minimise any restrictions. This may continue after the establishment of the subsidiary to reduce the chance of new regulations or legislation which could adversely affect the subsidiary.

Links back to the risks identified earlier

Points are briefer now as these are 'comments'

Given the potential risk of rising interest rates, Kilenc Co may want to use fixed-rate debt for its financing or use interest rate swaps to effectively fix their interest charge. The costs of such an activity also need to be considered.

The corporate governance structure needs to be negotiated and agreed in order to get the right balance between autonomy and central control. All major parties should be included in the negotiations and the **structure should be clearly communicated**.

Cultural differences should be considered from the initial setting up of the subsidiary. Staff handbooks and training sessions can be used to communicate the culture of the organisation to employees.

Foreign exchange exposure can be mitigated through a greater use of local debt finance, **depending on its availability and cost**. This will reduce exposure to a devaluation of the Lanosian currency as a reduction in the value of the investment will be offset by a reduction in the value of the loan finance.

Health and safety and physical loss risk can be mitigated through a combination of **insurance**, and legal advice.

No conclusion required given the wording of the requirement

Other points to note:

- This is a comprehensive, detailed answer. You could still have scored a strong pass with a shorter answer as long as it addressed all aspects to the question.
- Both sub-requirements (risk and mitigation) have been addressed, each with their own heading.
- The length of answer for each part is not the same – reflecting that commenting (on mitigation) should be more concise than discussing (risk).
- Write your answer in a time-efficient manner. As 20% of your time has been used for analysis this means that when you are writing the 1.95 minutes per mark becomes 1.95 × 0.8 = 1.56 minutes per mark of writing time. So here this means 15 × 1.56 = 23 minutes should be spent writing your answer.

Exam success skills diagnostic

Every time you complete a question, use the diagnostic below to assess how effectively you demonstrated the exam success skills in answering the question. The table has been completed below for the Kilenc activity to give you an idea of how to complete the diagnostic.

Exam success skills	Your reflections/observations
Managing information	Did you identify the impact on Kilenc's core UK operations? Did you link the banking bail-out to potential problems in raising debt finance?
Correct interpretation of requirements	Did you understand what was meant by the verbs 'discuss' and 'comment'? Did you spot the two sub-requirements? Did you understand what each sub-requirement meant?
Answer planning	Did you draw up an answer plan using your preferred approach (eg mind map, bullet-pointed list)? Did your plan address both the risk identification and mitigation? Did your plan create enough points by analysing each paragraph of the question?
Effective writing and presentation	Did you use headings (key words from requirements)? Did you use full sentences? And most importantly – **did you explain *why* your points related to the scenario?**
Most important action points to apply to your next question	

Summary

In the AFM exam, each question will be scenario based. It is therefore essential that you try to create a practical answer that addresses the issues in the scenario instead of simply repeating rote-learned technical knowledge.

AFM is positioned as a Masters-level exam. It is not easy to relate your points to the scenario, but it is important to realise that this is a fundamental skill that is being tested at this stage in your qualification.

Key skills to focus on throughout your studies will therefore include:

- Assimilating information from a scenario quickly using active reading, accurately understanding the requirements; and
- Creating an answer plan and a final answer that concisely and accurately addresses both the scenario and the requirements.

Discounted cash flow techniques

3

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Evaluate the potential value added to a firm arising from a specified capital investment project or portfolio using the net present value model. Project modelling should include explicit treatment of: – Inflation and specific price variation – Taxation including tax allowable depreciation and tax exhaustion – Single and multi-period capital rationing to include the formulation of programming methods and the interpretation of their output – Probability analysis and sensitivity analysis when adjusting for risk and uncertainty in investment appraisal – Risk-adjusted discount rates (covered in Chapter 7) – Project duration as a measure of risk	B1(a)
• Outline the application of Monte Carlo simulation to investment appraisal. Candidates **will not be expected to undertake simulations in the exam** but will be expected to demonstrate understanding of: – The significance of the simulation output and the assessment of the likelihood of project success – Measurement and interpretation of project value at risk	B1(b)
• Establish the economic return using IRR and modified IRR and advise on a project's return margin. Discuss the relative merits of NPV and IRR.	B1(c)

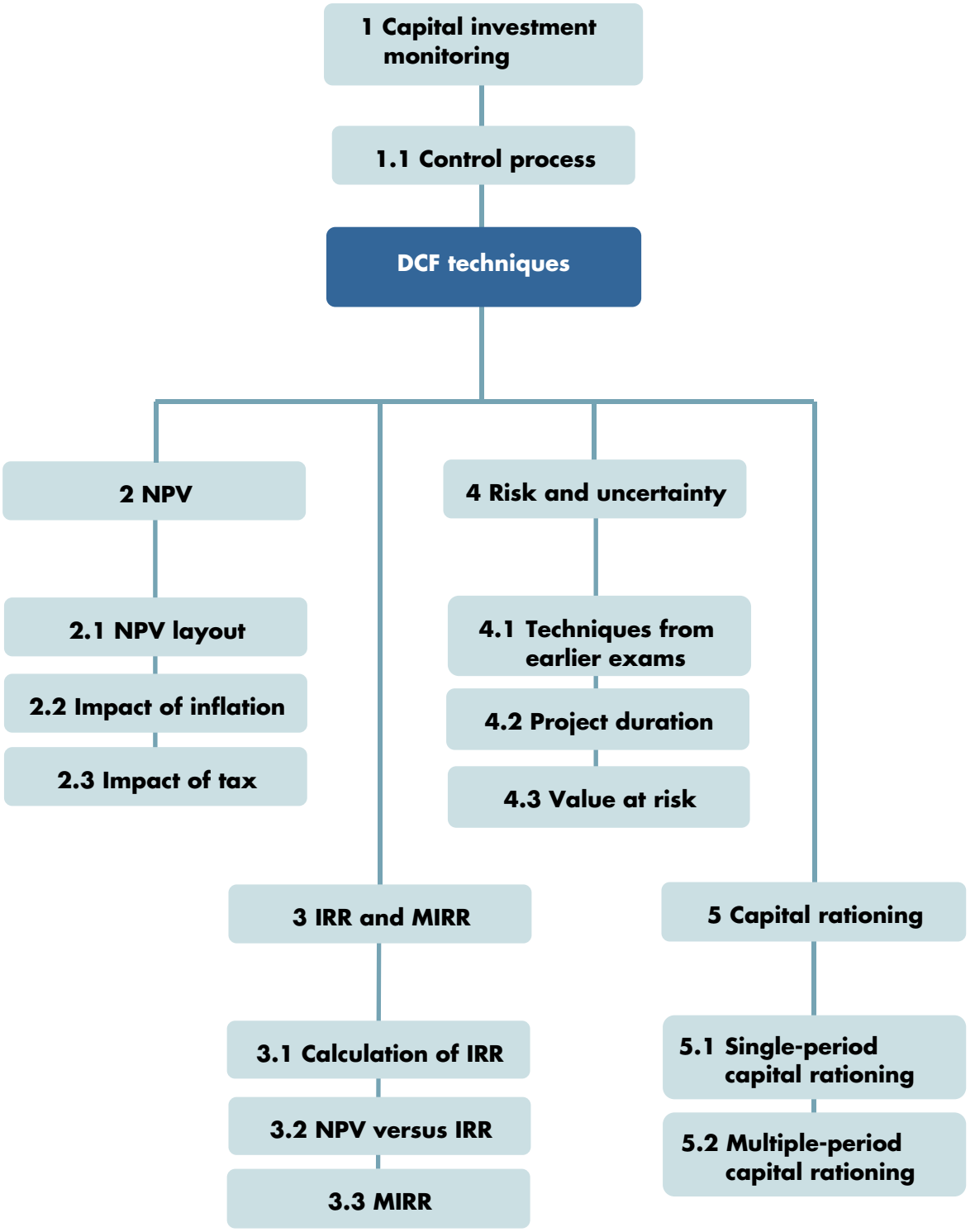
Exam context

This chapter moves in to **Section B** of the syllabus: **'advanced investment appraisal'**; this syllabus section is covered in **Chapters 3–7**.

Every exam (from September 2018) **will have questions that have a focus on syllabus Sections B and E** (treasury and advanced risk management techniques).

This chapter briefly recaps on some of the **key fundamentals of investment appraisal**, which you should be familiar with from the Financial Management (FM) exam. **However, you will also be introduced to new techniques such as project duration, value at risk and modified IRR) and these will need to be studied carefully.**

Chapter overview



1 Capital investment monitoring

Capital investment projects are an important mechanism for creating wealth for shareholders, but they also expose a company to significant risk.

An important aspect of **risk management** (see Chapter 2) is the management of **project risk**; this will involve a set of capital investment controls to reduce the probability of a risk occurring, and is an example of **risk mitigation**.

Financial analysis is an important control, and the **analysis of risk and return** is covered in detail in **this chapter**, but this is only **one part of a broader capital investment monitoring process**.

1.1 Control process

1. Creating an environment encouraging innovation

This may involve using suggestion schemes, creating innovation targets, benchmarking.

2. Preliminary screening

– to remove ideas that do not fit with the company's strategy and resources

This may involve SWOT analysis and an approximate assessment of cash required and payback.

3. Financial analysis

– detailed investigation of risk and return

Involving the techniques covered later in this chapter (and the following two chapters).

4. Authorisation

At central or divisional level, depending on the size of the project.

5. Monitoring and review

This will cover both financial and risk factors. A post-audit is useful to learn from any mistakes.

Essential reading

See Chapter 3 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more background information on the role of post auditing; this should be familiar from your earlier studies.

2 Net present value (NPV)

Net present value should be familiar to you from previous studies.

Key term

The **net present value (NPV)** of a project: the sum of the discounted cash flows less the initial investment.

Illustration 1

Project X requires an immediate investment of $150,000 and will generate net cash inflows of $60,000 for the next 3 years. The project's discount rate is 7%. If NPV is used to appraise the project, should Project X be undertaken?

Solution

Time	*0*	*1*	*2*	*3*
Cash flow $'000	(150)	60	60	60
df 7%	1.000	0.935	0.873	0.816
Present value	**(150)**	**56.1**	**52.4**	**49.0**

Overall NPV ($'000s) = **+7.5**

As the NPV is positive, Project X should be undertaken, as it gives a return of above the cost of capital of 7% and will therefore increase shareholders' wealth.

Generally, only those projects with a **positive** NPV should be accepted, meaning that only those projects that will **increase** shareholders' wealth will be undertaken.

2.1 NPV layout

A neat layout will gain credibility in the exam and will help you make sense of the many different cash flows that you will have to deal with. It makes sense to start with the items that affect taxable profit and then to deal with capital items.

Time	*0*	*1*	*2*	*3*	*4*
Sales receipts		X	X	X	X
Material cost		(X)	(X)	(X)	(X)
Labour cost		(X)	(X)	(X)	(X)
Tax allowable depreciation		(X)	(X)	(X)	(X)
Sales less costs		X	X	X	X
Taxation		(X)	(X)	(X)	(X)
Capital expenditure	(X)				
Scrap value					X
Add back tax allowable depreciation		X	X	X	X
Working capital impact	(X)	(X)	(X)	X	X
Net cash flows	(X)	X	X	X	X
Discount factors @ post-tax cost of capital*	X	X	X	X	X
Present value	(X)	X	X	X	X

*Covered in Chapters 2 and 6

Essential reading

See Chapter 3 Section 2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more background information on the basics of DCF; this should be familiar from your earlier studies.

2.2 Impact of inflation

In exam questions, it will normally be the case that cash flows are forecast to inflate at a variety of different rates. If so, inflation will have an impact on profit margins and therefore **inflation must be included in the cash flows.**

Investors will anticipate inflation, so the **cost of capital** will **normally include inflation**. So there will be no need to adjust the cost of capital for inflation **unless** it is stated to be 'in real terms'. If this happens, which is rare in the AFM exam, the following formula (known as the Fisher formula) is provided and can be used to adjust a cost of capital for inflation.

Formula provided

[1 + real cost of capital] × [1 + general inflation rate] = [1 + inflated cost of capital]

or **(1 + r) (1 + h) = (1 + i)**

2.3 Impact of tax

Corporation tax can have **two impacts** on NPV calculations in the exam:

1 **Tax will need to be paid on the cash profits from the project**
2 **Tax will be saved if tax allowable depreciation can be claimed**

These impacts can be built into project appraisal as **a single cash flow** showing the tax paid **after tax allowable depreciation (TAD)** is taken into account as illustrated in Section 2.1. However, care must be taken to **add back TAD** because it is not in itself a cash flow.

In the final year a **balancing allowance or charge** will be claimed to reduce the written down value of asset to zero (after accounting for any scrap value).

The timing and rates of tax, and of tax allowable depreciation will be **given** in an exam question.

2.3.1 Tax exhaustion

There will be circumstances when TAD in a particular year will equal or exceed before-tax profits.

In most tax systems, **unused TAD can be carried forward** so that it is set off against the tax liability in any one year includes not only TAD for that year but also **any unused TAD from previous years**.

Activity 1: Avanti

Avanti Co is considering a major investment programme which will involve the creation of a chain of retail outlets. The following cash flows are expected.

Time	*0*	*1*	*2*	*3*	*4*
	$'000	$'000	$'000	$'000	$'000
Land and buildings	2,785				
Fittings and equipment	700				
Gross revenue		1,100	2,500	2,800	3,000
Direct costs		750	1,100	1,500	1,600
Marketing		170	250	200	200
Office overheads		125	125	125	125

(a) 60% of office overhead is an allocation of head office operating costs.
(b) The cost of land and buildings includes $80,000 which has been spent on surveyors' fees.
(c) Avanti Co expects to be able to sell the chain at the end of Year 4 for $4,000,000.

Avanti Co is paying corporate tax at 30% and is expected to do so for the foreseeable future. Tax is paid one year in arrears. Tax allowable depreciation is available on fittings and equipment at 25% on a reducing balance basis, any unused tax allowable depreciation can be carried forward. Estimated resale proceeds of $100,000 for the fittings and equipment have been included in the total figure of $4,000,000 given above.

Avanti Co expects the working capital requirements to be 14.42% of revenue during each of the four years of the investment programme.

Avanti's **real** cost of capital is 7.7% p.a.

Inflation at 4% p.a. has been **ignored** in the above information. This inflation will not apply to the resale value of the business which is given in **nominal** terms.

Required

Complete the shaded areas in the partially completed solution to calculate the NPV for Avanti's proposed investment.

Solution (All figures $'000)

Year	*0*	*1*	*2*	*3*	*4*	*5*
Sales		1,100	2,500	2,800	3,000	
Direct costs		(750)	(1,100)	(1,500)	(1,600)	
Marketing		(170)	(250)	(200)	(200)	
Office overheads (40%)		(50)	(50)	(50)	(50)	
Net real operating flows		130	1,100	1,050	1,150	
		× **1.04**	× **1.04^2**	× **1.04^3**	× **1.04^4**	
Inflated at 4% (rounded)		**135**	**1,190**	**1,181**	**1,345**	
Tax allowable depn (TAD) (W1)						
Unused TAD from time 1						
Taxable profit		**0**	**1,019**	**1,082**	**1,150**	

BPP LEARNING MEDIA

Year	*0*	*1*	*2*	*3*	*4*	*5*
Taxation at 30% in arrears						
Land/buildings (–80k sunk cost)	(2,705)					
Fixture and fittings	(700)					
Resale value					4,000	
Add back TAD (used)						
Working capital cash flows (W2)						
Net nominal cash flows	(3,570)	(90)	1,126	823	5,526	(345)
Discount rate (W3)	1.0	0.893	0.797	0.712	0.636	0.567
Present values	(3,570)	(80)	897	586	3,515	(196)
NPV						**1,152**

Workings

1 *Tax-allowable depreciation*

Time	*0*	*1*	*2*	*3*	*4*	*5*

2 *Working capital*

Time	*0*	*1*	*2*	*3*	*4*	*5*

3 *Nominal discount rate* (1.077) × (1.04) = 1.12

A 12% cost of capital should be used.

3 IRR and MIRR

Internal rate of return (IRR) should be familiar to you from previous studies.

Key term

Internal rate of return (IRR) of any investment: the discount rate at which the NPV is equal to zero. Alternatively, the IRR can be thought of as the return that is delivered by a project.

A project will be accepted if its IRR is higher than the required return as shown by the cost of capital.

3.1 Calculation of IRR

If calculating IRR manually, it can be estimated as follows:

Step 1 Calculate the NPV of the project at any (reasonable) rate (eg the cost of capital)

Step 2 Calculate the project NPV at any other (reasonable) rate

Step 3 Calculate the internal rate of return using the formula

Formula to learn

$$IRR = a + \frac{NPV_a}{NPV_a - NPV_b} (b - a)$$

a = the lower of the two rates of return used

b = the higher of the two rates used

Activity 2: IRR

Net present value working at **12% = +1,152**

This analysis has been re-performed using a 20% required return as shown below:

Time	*0*	*1*	*2*	*3*	*4*	*5*
$'000	(3,570)	(90)	1,126	823	5,527	(345)
DF @20%	1.000	0.833	0.694	0.579	0.482	0.402
PV	(3,570)	(75)	781	477	2,664	(139)

NPV at 20% = +138

Required

Using the above information, calculate the IRR of Avanti's proposed investment.

Solution

IRR =

3.2 NPV versus IRR

IRR, as a percentage, is potentially an easier concept to explain to management.

However **NPV is theoretically superior** because IRR it has a number of drawbacks when used to make decisions between competing projects (mutually exclusive projects).

- IRR ignores the size of a project, and may result in a small project with a better IRR being chosen over a bigger project even though the larger project is estimated to generate more wealth for shareholders (as measured by NPV).

- For projects with **non-normal cash flows**, eg flows where the present value each year changes from positive to negative or negative to positive more than once, **there may be more than one IRR.**
- **IRR** assumes **that the cash flows after the investment phase (here time 0) are reinvested at the project's IRR; this may not be realistic.**

3.3 Modified IRR (MIRR)

IRR **assumes that the cash flows after the investment phase (here time 0) are reinvested at the project's IRR**. A better assumption is that the funds **are reinvested at the investors' minimum required return (WACC)**, here 12%. If we use this re-investment assumption we can calculate an alternative, modified version of IRR.

Formula provided

$$\left(\frac{\text{PV return phase}}{\text{PV investment phase}}\right)^{1/n} \times (1+r_e) - 1$$

r_e = cost of capital

n = number of time periods

In the formula, the return phase is the phase during which the project is operational.

The extent to which the MIRR exceeds the cost of capital is called the **return margin** and indicates the extent to which a new project is generating value.

Activity 3: MIRR

Required

Using the formula, calculate the **modified IRR** of Avanti's proposed investment.

Solution

Essential reading

See Chapter 3 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more on the logic of the MIRR approach; this is for your interest only.

3.3.1 Advantages of MIRR

MIRR makes a **more realistic assumption about the reinvestment rate**, and **does not give the multiple answers** that can sometimes arise with the conventional IRR.

PER alert

One of the optional performance objectives in your PER is the evaluation of the financial viability of a potential investment. This chapter covers some of the most popular methods of investment appraisal – NPV, IRR and MIRR – which you can regularly put into practice in the real world.

4 Risk and uncertainty

Before deciding to spend money on a project, managers will want to be able to make a judgement on the **possibility of receiving a return below the projected NPV**, ie the risk or uncertainty of the project.

Technically there is a difference between risk and uncertainty; **risk means that specific probabilities can be assigned** to a set of possible outcomes, while uncertainty applies when it is either not possible to identify all the possible outcomes or assign probabilities to them. In reality the two terms are often used **interchangeably**.

An analysis of risk or uncertainty may involve the use of **a number of** the following techniques.

4.1 Techniques from earlier exams

The techniques briefly described here should be familiar from your earlier exams.

Techniques	Description
Risk adjusted discount factor	Using a higher cost of capital if the project is high risk; this idea is revisited in **Chapter 7**.
Expected values	Using probabilities to calculate average expected NPV. Probabilities may be highly subjective.
Payback period	The period of time taken before the initial outlay is repaid. The quicker the payback, the less reliant a project is on the later, more uncertain, cash flows. Ignores timing of cash flows within the payback period and also the cash flows that arise after the payback period.
Discounted payback period	As above but uses the discounted cash flows and is a better method since it adjusts for time value.
Sensitivity analysis	An analysis of the percentage change in **one variable** (eg sales) that would be needed for the NPV of a project to fall to zero. Normally calculated as the NPV of the project divided by the NPV of the cash flows relating to the risky variable (eg sales).
Simulation	An analysis of how changes in **more than one variable** may affect the NPV of a project. The risk of a project can be measured by simulating the possible NPVs and weighting the outcomes by probabilities determined by management. This could be used to assess the probability, for example, of a project's NPV exceeding zero.

Essential reading

See Chapter 3 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a reminder on the basics of managing risk and uncertainty, if required.

4.2 Advanced techniques (1) – project duration

Key term

Project duration: a measure of the average time over which a project delivers its value.

Project duration shows the reliance of a project on its later cash flows, which are less certain than earlier cash flows; it does this by weighting each year of the project by the **% of the present value of the cash inflows** received in that year.

Unlike payback (or discounted payback), this measure of uncertainty looks at **all of a project's life**.

Illustration 2

A project with a three-year life, with all of the inflows being generated in the third year would have a three-year duration as follows:

Time	*1*	*2*	*3*
Present value of cash inflows ($'000)	0	0	2,400
% cash inflows received in each year	0	0	100%
Time period × % cash inflows	1 × 0	2 × 0	3 × 1

Project duration = 0 + 0 + 3 = **3 years**

4.2.1 Duration and project life

Although duration can (rarely) be the same as the project life (as in the above example), it will normally be different.

Illustration 3

For example, if the above three-year project had an even spread of present value of cash inflows across the three years then duration would be:

Time	*1*	*2*	*3*
Present value of cash inflows ($'000)	800	800	800
% cash inflows received in each year	33.3%	33.3%	33.3%
Time period × % cash inflows	1 × 0.333	2 × 0.333	3 × 0.333

Project duration = 0.333 + 0.666 + 0.999 = approx **2 years**

4.2.2 Analysis of duration

Comparing the two examples above, the **second scenario** (duration two years) is preferable because there is less uncertainty attached to cash that is received sooner than there is to cash flows that are received later.

The **project duration** of the second scenario of two years is a measure of the **average time over which this project delivers its value,** ie it has the same duration as a project that delivers 100% of its (present value) cash inflows in two years' time.

The lower the project duration the lower the risk/uncertainty of the project.

4.2.3 Quick approach to calculating duration

A quicker approach to calculating duration is shown below, this avoids the need to work out the percentage **cash inflows** received each year:

Time	*1*	*2*	*3*	*Total*
Present value of cash inflows ($'000)	800	800	800	2,400
Time period × PV	1 × 800	2 × 800	3 × 800	

Project duration = (800 + 1,600 + 2,400)/PV of inflows of 2,400 = **2 years**

Activity 4: Project duration

Required

Calculate the project duration for Avanti, basing your calculations on the **operational phase** of the project (ie time 1 onwards).

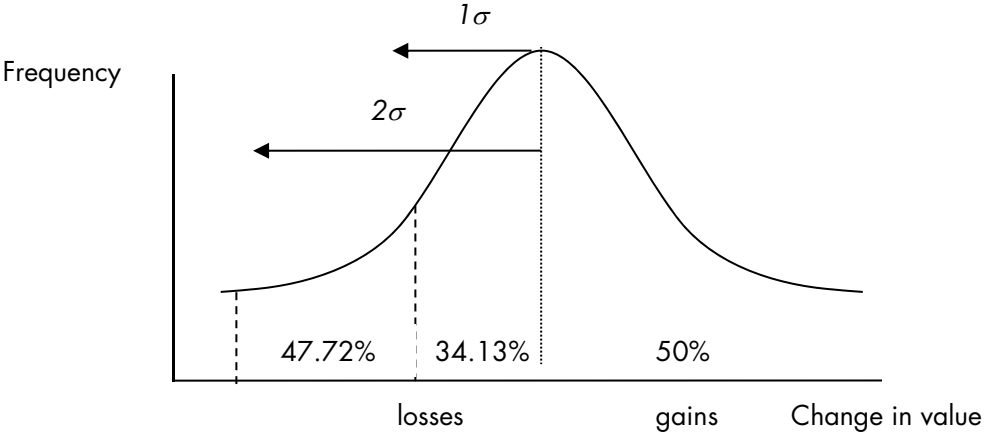
Solution

Project duration

Time	*1*	*2*	*3*	*4*	*5*	*Total PV of inflows*
PV ($'000)	(80)	897	586	3515	(196)	4,722

4.3 Advanced techniques (2) – value at risk (VaR)

A modern approach to quantifying risk involves estimating the likely change in the value of an investment by using the concept of a normal distribution. Some of the properties of a normal distribution are shown below (σ = standard deviation):

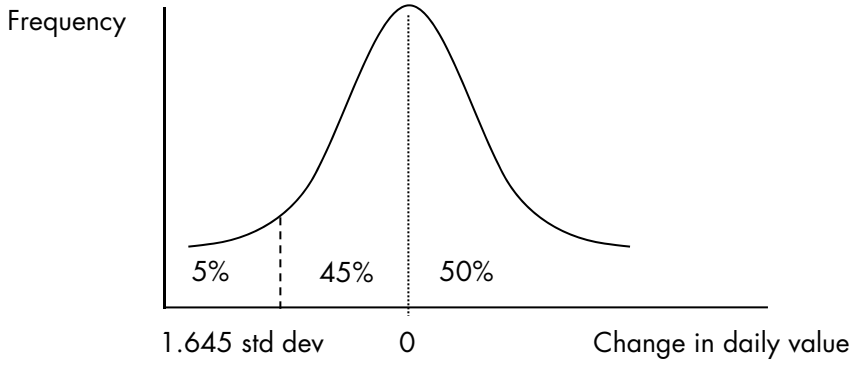


4.3.1 Value at risk

Value at risk is **the maximum likely loss over a set period** (with only an x% chance of being exceeded.

Illustration 4

5% value at risk can be illustrated as follows:



Using the extract from the normal distribution table shown (the full table is given in the exam and is available at the back of the Workbook), the number of standard deviations associated with 5% value at risk can be calculated by looking for the figure 0.45 (representing the 45% area in the diagram above).

Standard normal distribution table

$Z = \frac{(x-\mu)}{\sigma}$	**0.00**	**0.01**	**0.02**	**0.03**	**0.04**	**0.05**	**0.06**	**0.07**	**0.08**	**0.09**
$Z = \frac{(x-\mu)}{\sigma}$										
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545

The figures 0.4495 and 0.4505 are the closest we have to this and they represent 1.64 and 1.65 standard deviations respectively. So, for a figure of 0.45 we can say that half way between 1.64 and 1.65, ie 1.645 standard deviations, is the correct answer.

So, the maximum reduction in value – which would only be exceeded 5% of the time – is 1.645 standard deviations.

4.3.2 Value at risk and time

Value at risk can be quantified for a project using a project's standard deviation.

Standard deviation relates to a period of time (eg a year), but the value at risk may be over a different time period (eg the life of a project).

In this context, the standard deviation may need to **be adjusted by multiplying by the square root of the time period**, ie

Formula to learn

95% value at risk = 1.645 × standard deviation of project × √**time period of the project**

Illustration 5

For a five year project 5% value at risk is calculated as 1.645 × annual standard deviation × √5.

Activity 5: Value at risk

A four-year project has an NPV of $2 million and a standard deviation of $1 million per annum.

Required

(a) Analyse the project's value at risk at a 95% confidence level.
(b) Analyse the project's value at risk at a 99% confidence level.

Solution

Drawbacks of value at risk

Value at risk is based on a normal distribution, which assumes that virtually all possible outcomes will be within three standard deviations of the mean and that success and failure are equally likely.

Neither is likely to be true for a one-off project.

Value at risk is also based around the calculation of a standard deviation and again this is hard to estimate in reality since it is based on forecasting the possible spread of the results of a project around an average.

5 Capital rationing

Capital rationing problems exist when there are insufficient funds available to finance all available positive NPV projects.

5.1 Single-period capital rationing

For **single-period** capital rationing problems, divisible projects are ranked according to the **profitability index**.

Formula to learn

$$\textbf{Profitability index} = \frac{\text{NPV of project}}{\text{Initial cash outflow}}$$

This gives the shadow price of capital or the maximum extra a company should be prepared to pay to obtain short-term funds in a single year.

Essential reading

See Chapter 3 Section 5 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a reminder on the basics of capital rationing, if required.

5.2 Multiple-period capital rationing

Where capital rationing exists over a number of years, mathematical models are used to find the optimal combination of divisible or indivisible projects to invest in.

For this exam you only need to be able to **formulate** the problem and to **interpret** the solution.

Illustration 6

The board of Bazza Inc has approved the following investment expenditure over the **next three years**.

Year 1	*Year 2*	*Year 3*
$16,000	$14,000	$17,000

You have identified four investment opportunities which require different amounts of investment each year, details of which are given below.

	Required investment			*Project*
Project	*Year 1*	*Year 2*	*Year 3*	*NPV*
Project 1	7,000	10,000	4,000	8,000
Project 2	9,000	0	12,000	11,000
Project 3	0	6,000	8,000	6,000
Project 4	5,000	6,000	7,000	4,000

Which combination of projects will result in the highest overall NPV while remaining within the annual investment constraints?

The problem can be formulated as a linear programming problem as follows:

Let Y_1 be investment in project 1
Y_2 be investment in project 2
Y_3 be investment in project 3
Y_4 be investment in project 4

Objective function

Maximise $Y_1 \times 8{,}000 + Y_2 \times 11{,}000 + Y_3 \times 6{,}000 + Y_4 \times 4{,}000$

Subject to the three annual investment constraints:

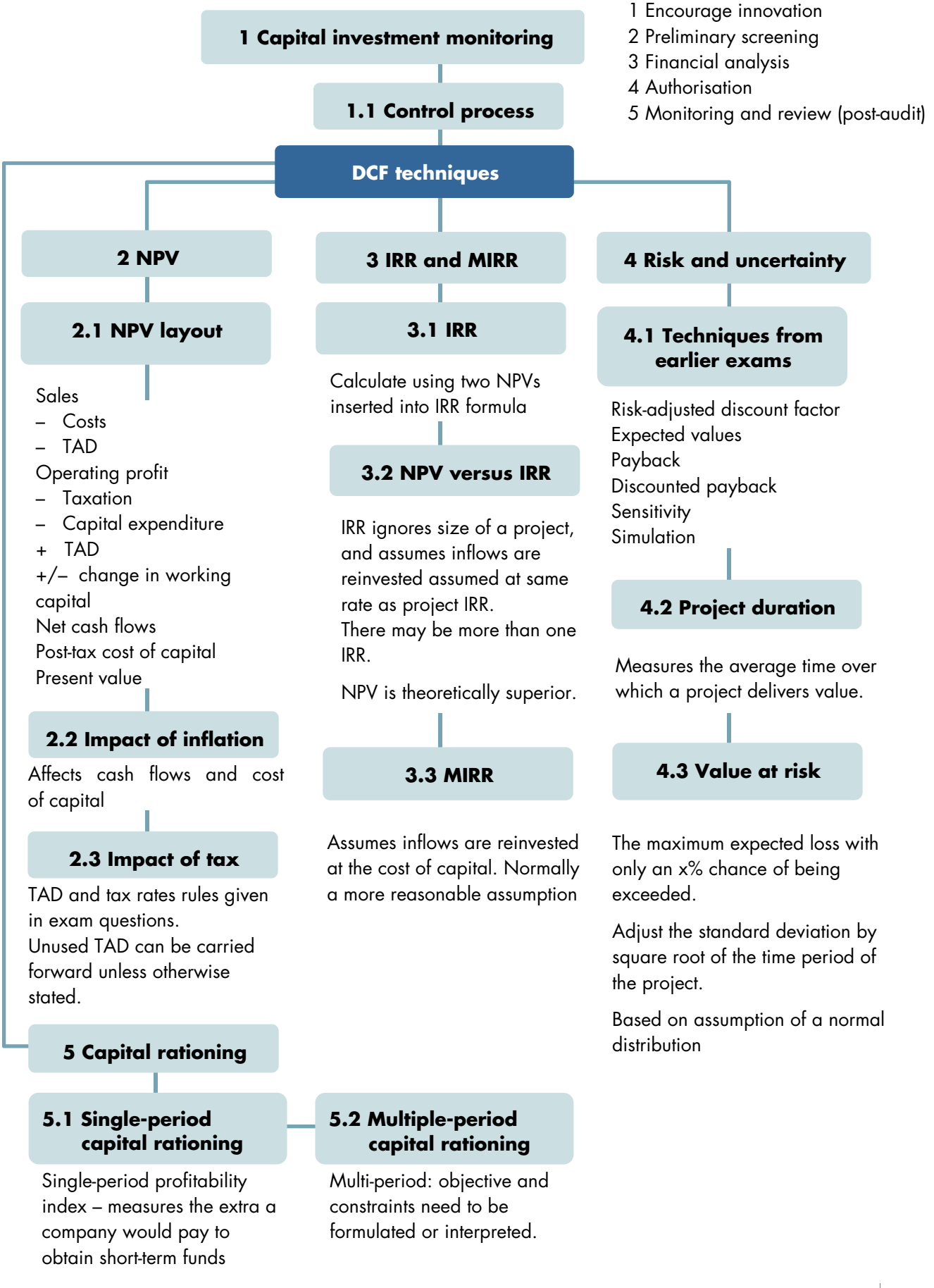
$Y_1 \times 7{,}000 + Y_2 \times 9{,}000 + Y_3 \times 0 + Y_4 \times 5{,}000 \leq 16{,}000$ (Year 1 constraint)
$Y_1 \times 10{,}000 + Y_2 \times 0 + Y_3 \times 6{,}000 + Y_4 \times 6{,}000 \leq 14{,}000$ (Year 2 constraint)
$Y_1 \times 4{,}000 + Y_2 \times 12{,}000 + Y_3 \times 8{,}000 + Y_4 \times 7{,}000 \leq 17{,}000$ (Year 3 constraint)

When the objective function and constraints are fed into a computer program, the results are:

$Y_1 = 1, Y_2 = 1, Y_3 = 0, Y_4 = 0$

This means that project 1 and project 2 will be selected and project 3 and project 4 will not. The NPV of the investment scheme will be equal to $19,000.

Chapter summary



Knowledge diagnostic

1. **Inflation**

   The formula for inflating the cost of capital only needs to be used if the cost of capital is given in 'real' terms; otherwise inflation can be assumed to be included in the cost of capital automatically.

2. **Tax**

   Tax allowable depreciation should be included as a cost for the purposes of calculating the tax due; then it should be added back to the cash flows because it is not in itself a cash flow cost.

3. **MIRR**

   Differs from IRR because of the assumption that cash inflows are reinvest at the cost of capital.

4. **Project duration**

   A way of looking at the reliance of a project on later cash flows, unlike payback it looks at all years of a project.

5. **Value at risk**

   A statistically complex technique that makes a crucial assumption that the normal distribution is valid to use; this may not be true.

6. **Profitability index**

   Only valid for single-period capital rationing where projects are divisible.

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q4 CD

Q5 Bournelorth

Further reading

There is a Technical Article available on ACCA's website, called 'Conditional Probability'.

We recommend you read this article as part of your preparation for the AFM exam.

Application of option pricing theory to investment decisions

4

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Apply the Black–Scholes option pricing model (BSOP) to financial product/asset valuation: – Determine and discuss, using published data, the five principal drivers of option value (value of the underlying, exercise price, time to expiry, volatility and the risk-free rate) – Discuss the underlying assumptions, structure, application and limitations of the BSOP model	B2(a)
• Evaluate embedded real options within a project, classifying them into one of the real option archetypes	B2(b)
• Assess, calculate and advise on the value of options to delay, expand, redeploy and withdraw using the BSOP model	B2(c)

Exam context

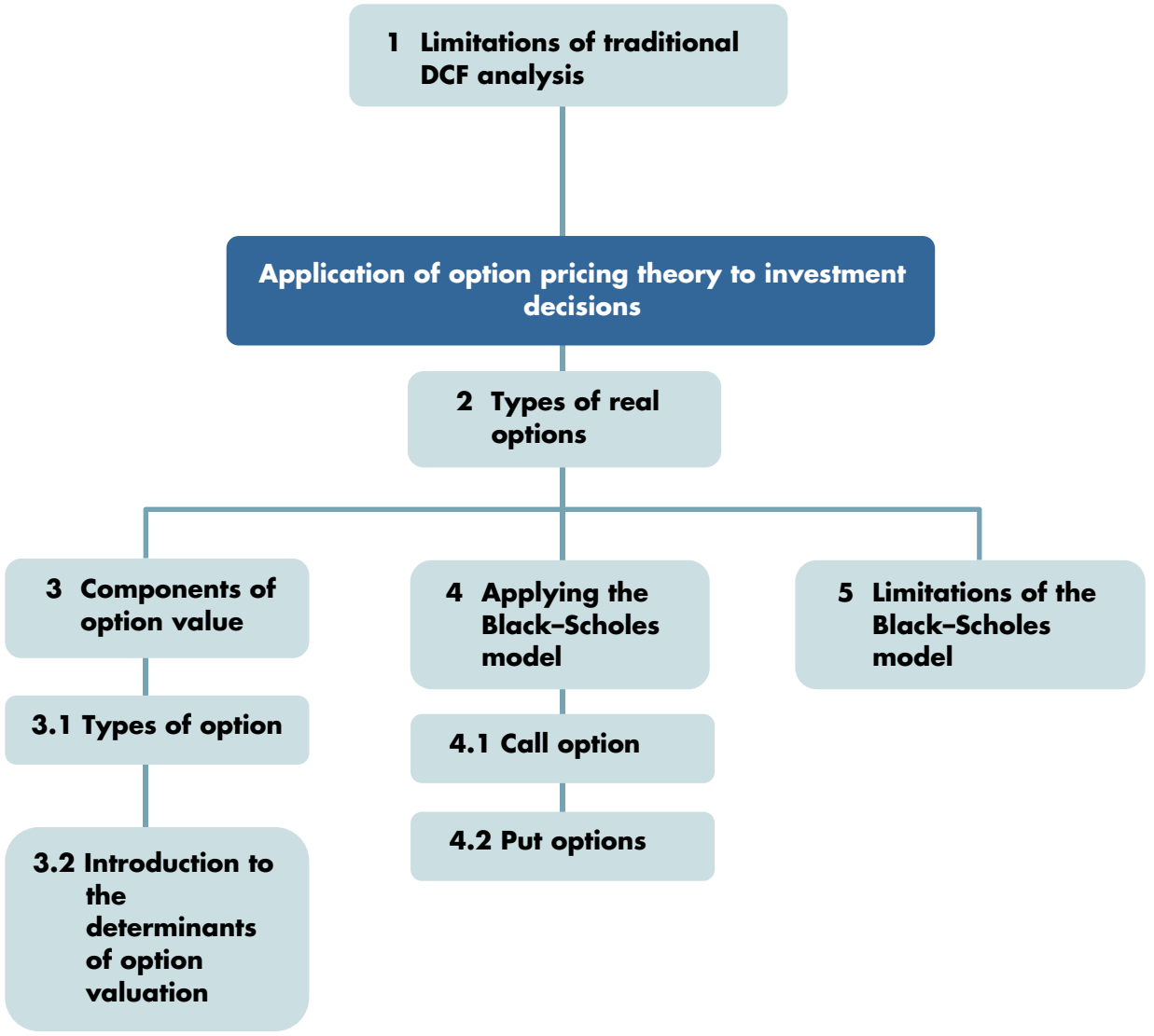
This chapter continues to cover **Section B** of the syllabus: **'advanced investment appraisal'**; this syllabus section is covered in **Chapters 3–7**. Remember that **every exam will have questions that have a focus on syllabus Sections B and E**.

The formulae used in this chapter will initially look daunting but should, with practice, become manageable because they are given in the exam and have a **clear, specific use**.

In fact it is the **identification of the variables that are input to the formulae** that is the real challenge when you are applying this theory in the AFM exam.

Also, **the discussion areas** of the chapter (types of real options and the limitations of the theory) are **also important** because they very likely to be examined with the formulae. Don't only over-focus on the mathematical content of this chapter; the discussion areas are also important.

Chapter overview



1 Limitations of traditional DCF analysis

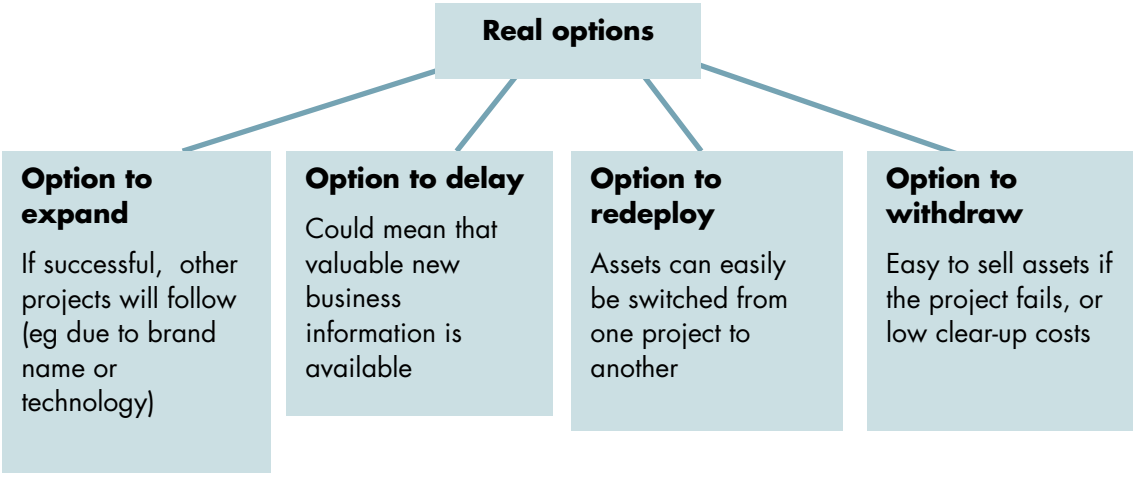
Some investments have an added attraction because they offer **real options/strategic flexibility**, the value of which is ignored in traditional DCF analysis – this can lead to potentially lucrative investments being rejected.

Real options can be **valued using** the Black–Scholes option valuation model (**BSOP**).

The value of an option can then be added to the traditional NPV to give a revised and (arguably) more accurate assessment of the value created by a project.

2 Types of real options

Investment decisions need to be assessed to identify whether they contain 'real options'.



Activity 1: Idea generation

Entraq Co is considering two proposals to invest in the manufacture of solar panels:

Proposal 1 – to build a customised plant with specialist staff in a low-cost area with few other industrial employers, which can only be used to construct solar panels. This proposal would significantly build Entraq's profile in the solar panel industry.

Proposal 2 – to use more expensive machinery in Entraq's existing premises in a highly industrialised area that could be adapted to produce components for the wind power industry.

A political election is expected next year that could result in a change in government. This will affect the likely growth of the solar panel industry.

Required

Identify if any real options are present in these investments.

Solution

	Option type			
	To expand	**To delay**	**To redeploy**	**To withdraw**
Proposal 1				
Proposal 2				

PER alert

One of the optional performance objectives in your PER is to review the financial and strategic consequences of undertaking a particular investment decision. This chapter covers the concept of real options which attempts to quantify the strategic characteristics of investments.

3 Components of option value

3.1 Types of option

An option gives the holder the right (but not the obligation) to buy or sell an asset at a pre-agreed price; there are two main types of option.

Call option	**Put option**
Right to buy	**Right to sell**
(money is spent)	(money is received)

3.2 Introduction to the determinants of option valuation

There are two main components to the value of an option, intrinsic value and time value.

Illustration 1

Consider a **call option** giving the holder the right to buy a share for $4 in three years' time; the share price today is $5. In recent years the share price has been highly variable. Interest rates are currently high.

Intrinsic value is the difference between the **current** value of the asset and the exercise price of the option.

In this example the intrinsic value is the difference between the current share price of $5 and the exercise price of $4; so the intrinsic value is $1. This is also referred to as the option being 'in-the-money'.

However, this option will be worth more than the intrinsic value because it will have a **time value**.

Time value reflects the possibility of an increase in intrinsic value between now and the expiry of the option; it is influenced by the variability in the value of the asset, the time until the option expires and interest rates.

In the case of the call option, relevant factors are:

(a) Variability **adds to the value** of an option: this is because if the share price rises this will result in a gain for the option holder but if the share price falls below the exercise price of $4 the option holder does not make losses (because the option does not have to exercised).

(b) Time until expiry of the option is three years, this gives considerable scope for variability as above. If this was longer the option would be **more valuable** because there would greater potential for variability.

(c) Interest rates; if interest rates are high then it will less attractive to buy the share itself (because funds are earning an attractive rate of interest), so demand for options will be higher. So the higher interest rates are then the higher the value of a call option.

Essential reading

See Chapter 4 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for more reflections on this issue.

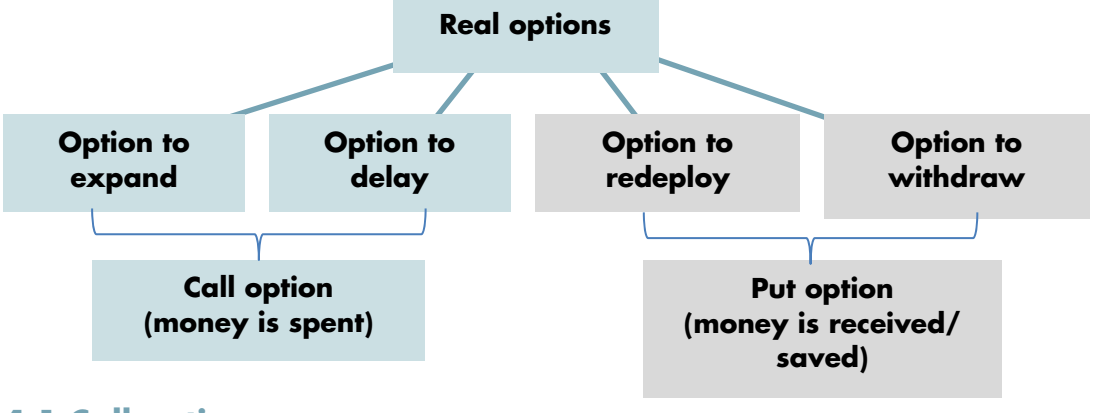
Chapter 11 also returns to this concept for a more detailed examination of the underlying determinants of option value.

3.2.1 Black–Scholes option pricing model (BSOP)

The full mechanics of the calculation of the value of options are covered below, using the BSOP model.

This model **incorporates the determinants of option value that have been discussed here** and is frequently examined.

4 Applying the Black–Scholes model



4.1 Call options

In the exam, you are provided with the following formulae to help to value **a call option**.

Formula provided

Value of a **call option** at time 0

$$C_0 = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

$N(d_x)$ is the cumulative value from the **normal distribution tables** for the value d_x

$$d_1 = \frac{\ln(P_a / P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

$$d_2 = d_1 - s\sqrt{T}$$

P_a	=	PV of the cash inflows	P_e	=	Cost of the investment
r	=	Risk-free rate of return	t	=	Time to expiry of option in years
s	=	Standard deviation of the project			

A few points to note before we begin to apply these formulae:

- P_a is shown in present value terms but P_e is **not discounted back to a present value** (this is because in the first formula shown it is multiplied to e^{-rt} which is a form of discount factor)
- r is the **risk-free rate not the cost of capital** of the company
- t is the **time to expiry of the option, not of the project**
- **s is standard deviation,** you may have to **calculate this as the square root of the variance**

4.1.1 Option to expand

An option to expand involves spending money, so it is a call option.

Activity 2: Valuing a call option

Project 1 has an NPV of –$10,000; it will **also** develop expertise so that Entraq would be ready to penetrate the European market with an improved product in four years' time. The expected cost at time 4 of the investment is $600,000.

Currently the European project is valued at 0 NPV but management believe that economic conditions in four years' time may change and the NPV could be positive.

The standard deviation is 30%, the risk-free rate is 4% and the cost of capital is 10%.

Required

Evaluate the value of this option to expand.

Solution

1 **First identify the basic variables that are needed to complete the call option formula**

$$C_0 = P_aN(d_1) - P_eN(d_2)e^{-rt}$$

P_a =		r =	
P_e =		t =	
		e^{-rt} =	

2 **Next complete the workings for d_1 and d_2, starting with d_1**

$$d_1 = \frac{\ln(P_a / P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

$\ln(P_a/P_e)$ =		$(r+0.5s^2)t$ =	
s =		$s\sqrt{t}$ =	
d_1 =			

$$d_2 = d_1 - s\sqrt{T}$$

d_2 =	

3 **Then use the normal distribution tables to calculate $N(d_1)$ and $N(d_2)$**

This will involve inputting the values of d_1 and d_2 to the normal distribution tables in the same way as in the previous chapter. As this is the first activity on this area this step is shown below

Standard normal distribution table

$Z = \frac{(x-\mu)}{\sigma}$	*0.00*	*0.01*	*0.02*	*0.03*	*0.04*	*0.05*	*0.06*	*0.07*
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486

The normal distribution tables tell you that where the values of d1 and d2 are positive they should be added to 0.5, where they are negative they are subtracted from 0.5. Here we are dealing with negative numbers.

$N(d_1)$ from tables = 0.5 – 0.0279 (see above) = 0.4721

$N(d_2)$ from tables = 0.5 – 0.2486 (see above) = 0.2514

4 **Finally value the call option**

$$C_0 = P_a N(d_1) - P_e N(d_2)e^{-rt}$$

C_0 =	

Impact on valuation of **Project 1 =**

4.1.2 Option to delay

An option to delay is also a call option and will be valued in the same way.

4.2 Put options

In the exam, you are provided with the following formula to help value **a put option.**

Formula provided

$P = C - P_a + P_e e^{-rt}$

C = value of a call option P = value of a put option

As you can see, **a call option has to be valued before valuing a put**.

4.2.1 Option to withdraw

An option to withdraw involves receiving money, so it is a put option.

In the option pricing formula, the value of P_a is the present value of the estimated net cash inflows from the project **AFTER the exercise of the option to withdraw**.

Activity 3: Valuing a put option

Company X is a considering an investment in a joint venture to develop high quality office blocks to be let out to blue chip corporate clients. This project has a 30-year life, and is expected to cost Company X $90 million and to generate an NPV of $10 million for Company X.

The project manager has argued that this understates the true value of the project because the NPV of $10 million ignores the option to sell Company X's share in the project back to its partner for $40 million at any time during the first ten years of the project.

The standard deviation is 45% p.a. and the risk-free rate is 5% p.a.

Required

Complete the evaluation of this option.

Solution

1 First identify the basic variables that are needed to complete the call option formula

$$C_0 = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

P_a =		r =	
P_e =		t =	
		e^{-rt} =	

2 Completed calculations for d_1 and d_2, starting with d_1 (check that you can replicate these as a homework exercise)

s =	0.45	$s\sqrt{t}$ =	1.423
d_1 =	1.42		

$$d_2 = d_1 - s\sqrt{T}$$

d_2 =	0

3 Completed calculations for $N(d_1)$ and $N(d_2)$ (check that you can replicate these as a homework exercise)

$N(d_1)$ = 0.9222

$N(d_2)$ = 0.5

4 Value the call option (check that you can replicate these as a homework exercise)

$$C_0 = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

C_0 =	**$49.38m**

5 Now value the put option

$$P = C - P_a + P_e e^{-rt}$$

P =	

Impact on project =

4.2.2 Option to redeploy

An option to redeploy is also a put option and will be valued in the same way.

5 Limitations of the Black–Scholes model

The most significant limitation of the Black–Scholes model is the **estimation of the standard deviation** of the asset. Historical deviation is often a poor guide to expected deviation in the future, so in reality the standard deviation is based on judgement.

The formulae also **assume that the options are 'European'**, ie exercisable on a fixed date. An alternative model (the binomial model) can be used to value 'American' style options which are exercisable over a range of dates; this model is beyond the scope of this syllabus. If using the BSOP model to value an American style option in the exam then you should note that the BSOP model will **undervalue American style options** because it does not take into account this time flexibility (this is the case in the preceding activity).

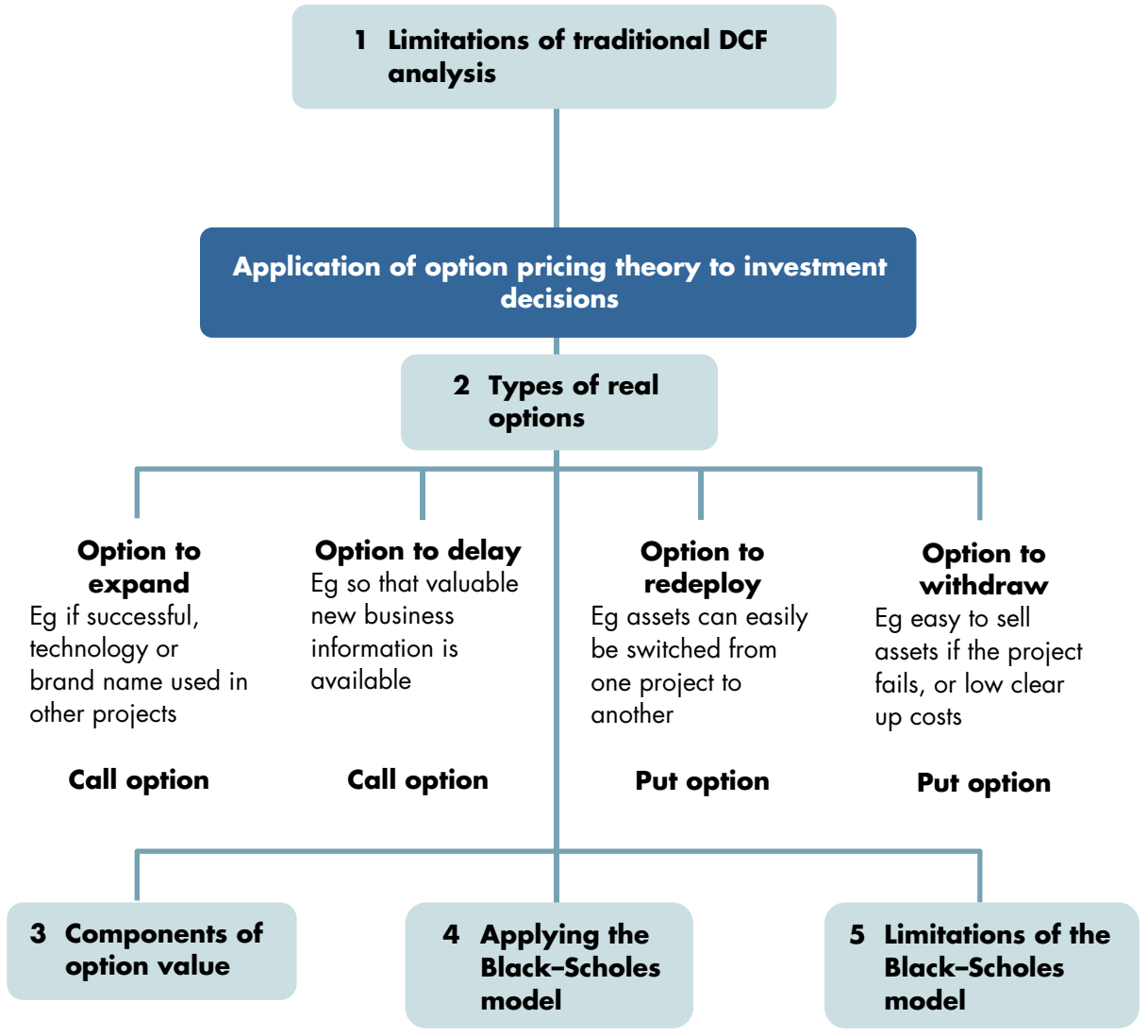
Other assumptions include:

(a) The risk-free interest rate is assumed to be constant and known.

(b) The model assumes that the return on the underlying asset follows a normal distribution.

(c) The model assumes that the volatility of the project is known and remains constant throughout its life.

Chapter summary



Intrinsic value

- Current asset price *versus* exercise price

Time value

- Variability
- Time to expiry
- Interest rates

P_e is not discounted
r is the risk-free rate
t is the time to expiry of option
Standard deviation is the square root of the variance

Steps in valuing a call option:

1 Identify input variables
2 Calculate d_1 then d_2
3 Use normal distribution tables to calculate $N(d_1)$ and $N(d_2)$
4 Complete the call option formula

A call option needs to be valued before a put option can be valued.

Estimation of standard deviation

Assumed to be exercised on a fixed date (European style).

Knowledge diagnostic

1. **Call option**

   This is an option to buy; options to expand and options to delay are call options.

2. **Put option**

   This is an option to sell; options to redeploy and options to withdraw are put options.

3. **Impact of high volatility**

   Higher volatility normally decreases value, but in the context of option valuation it increases the value of both put and call options.

4. **Standard deviation**

   You may have to calculate this as the square root of the variance.

5. **Drawbacks of BSOP**

   Assumes that options are exercised on a fixed date, and that standard deviation can be estimated.

Further study guidance

Question practice

Now complete steps 2 to 4 in Activity 3 for further practice on using the BSOP formulae. Also try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q6 Four Seasons

Q7 Pandy

Further reading

There is a Technical Article available on ACCA's website, called 'Investment appraisal and real options'.

We recommend you read this article as part of your preparation for the AFM exam.

International investment and financing decisions

5

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Assess the impact upon the value of a project of alternative exchange rate assumptions	B5(a)
• Forecast project or company free cash flows in any specified currency and determine the project's net present value or firm value under differing exchange rate, fiscal and transaction cost assumptions	B5(b)
• Evaluate the significance of exchange controls for a given investment decision and strategies for dealing with restricted remittance	B5(c)
• Assess the impact of a project on a firm's exposure to translation, transaction (covered in Chapter 11) and economic risk	B5(d)
• Assess and advise upon the costs of alternative sources of finance available within the international equity and bond markets	B5(e)

Exam context

This chapter continues to cover **Section B** of the syllabus: **'advanced investment appraisal'**; this syllabus section is covered in **Chapters 3–7**.

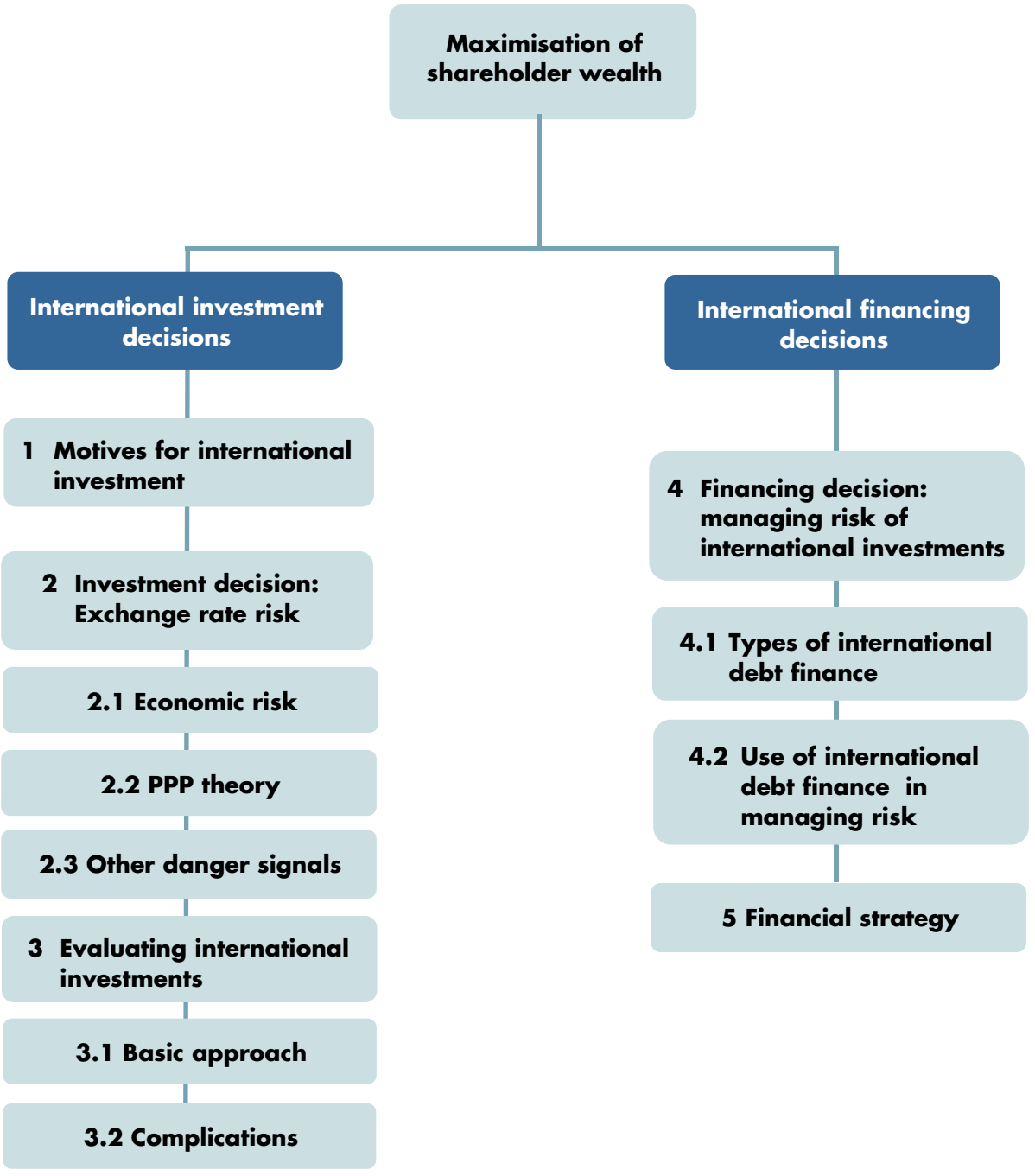
Every exam will have questions that have a focus on syllabus Sections B and E.

This chapter builds on Chapter 4 and places **investment appraisal in an international context**, which is how investment appraisal is often examined.

Companies that undertake overseas projects are exposed to exchange rate risks as well as other risks, such as exchange control, taxation and political risks. In this chapter we look at capital budgeting techniques for multinational companies that incorporate these additional complexities in the decision-making process. **International investment questions are commonly examined**.

The availability of a variety of international financing sources to multinational companies is also considered.

Chapter overview



1 Motives for international investment

There are many possible motives for investing outside a company's domestic market, including:

	Explanation
Company	Expansion strategy may create economies of scale.
Country	Access cheap labour and government grants. Local investment may be needed to overcome trade barriers.
Customer	Locate close to international customers so that shorter lead times can be offered.
Competition	Some international markets may have weaker competition.

2 Investment decision: exchange rate risk

As with any investment, international investments will need to be carefully scrutinised to identify relevant **business risks** (and potentially financial risks) and to put in place appropriate risk management strategies (as discussed in Chapter 2). International investments will create a variety of transactions (eg purchases or sales) that are denominated in a foreign currency. It is often necessary for the parent company to convert the home currency in order to provide the necessary currency to meet foreign obligations. This necessity gives rise to **transaction risk**. The cost of foreign obligations could rise as a result of a weaker domestic currency or the domestic value of foreign revenues could depreciate as a result of a stronger home currency. Even when foreign subsidiaries operate independently of the parent company, without relying on the parent company as a source of cash, they will ultimately remit dividends to the parent in the home currency. Once again, this will require a conversion from foreign to home currency. Chapter 12 covers the management of transaction risk.

Some risks that are especially important for **international investments** are considered here, starting with **long-term exchange rate risk or economic risk**.

2.1 Economic risk

Key term

Economic risk: the risk that the present value of a company's future cash flows might be reduced by adverse exchange rate movements.

In this chapter we will normally assume that the **domestic currency is $s** and that the domestic country is the USA, and the foreign currency is the peso and the foreign country is country Z.

If there is a **long-term decline** in the **value of the foreign currency** after an international investment has been made then the **net present value of the project** in the domestic currency ($s) **may fall**. This is an aspect of **economic risk.**

So, before an international investment proceeds, **the risk of the foreign currency falling in value should be carefully assessed.**

2.2 Purchasing power parity (PPP) theory

One of the causes of a long-term decline in the value of a foreign currency is if the rate of inflation in the foreign country, Country Z, is higher than it is in the USA.

PPP theory suggests that the impact of higher inflation is to **decrease the purchasing power of the foreign currency (peso)** which over time will **reduce its value** on foreign currency markets.

PPP is often used in exams to forecast exchange rate movements, based on predicted future inflation rates; the forecast exchange rates are then used to appraise international investment decisions.

Formula provided

$$s_1 = s_0 \times \frac{(1+h_c)}{(1+h_b)}$$

s_1 = exchange rate in 1 year, s_0 = exchange rate today

h_c = inflation in foreign currency, h_b = inflation in **base currency**

Activity 1: PPP theory

The exchange rate in 20X7 is 1.5 peso to the $. Inflation for the next two years is forecast at 2.1% in the USA and 2.5% in Country Z, and then for the following two years inflation is forecast at 1% in the USA and 3% in Country Z.

Required

What is the forecast spot rate in each of the next three years for the peso to the $?
(work to three decimal places)

Solution

2.2.1 PPP and the international Fisher effect

If an exam question provides interest rates instead of inflation rates, the PPP formula can still be used (inserting interest rates instead of inflation rates) on the assumption that interest rate differentials between economies of similar risk are simply a reflection of different expectations of inflation. The idea that if long-term $ interest rates are higher this is an indication that $ inflation will be higher is **the international Fisher effect** because it is an extension of the Fisher formula (introduced in Chapter 3 Section 2.2).

2.2.2 PPP and base currency

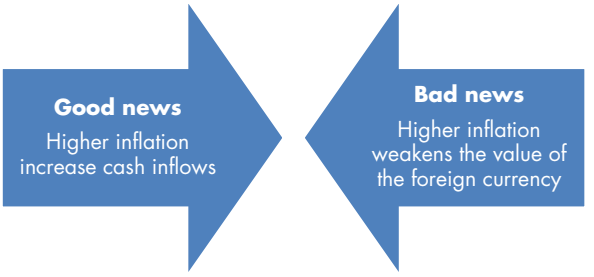
Care must be taken in using PPP theory because the formula requires you to specify which country is the base country or base currency (h_b = inflation in base currency).

The **base currency is the currency that is quoted to 1 unit**, ie in the previous activity the base currency is the $ because exchange rates are quoted in terms of the value of $1.

2.2.3 PPP and economic risk

In the previous activity, the peso was weakening because of **higher inflation** in Country Z. This means that cash inflows in pesos will be worth less in $s and will result in a lower project NPV in $s.

It is also possible that **higher inflation will increase the cash inflows in pesos** from an investment in Country Z. If so, there is a possibility that there will be no impact on the overall $NPV as the higher cash inflows **compensate** for the worsening exchange rate.



So, if cash inflows are affected by inflation in **exactly the same way** as the exchange rate a weaker exchange rate due to higher foreign inflation **may not matter**.

In reality project cash flows from an international (or domestic) project are likely to inflate at different rates so some overall impact on the project NPV from inflation is likely.

2.3 Other danger signals

Apart from inflation, there are other **danger signals** in a country that is being considered for an international investment, that indicate that a **fall in the value of the foreign currency** (here the peso) is likely.

Danger signals	Explanation
Weak economic growth	This will reduce investment inflows into the foreign country (Country Z), and reduce the demand for the foreign currency (peso).
High balance of payments deficit	If imports exceed exports for a long period in the foreign country, this will increase the supply of the foreign currency (peso) on the foreign exchange markets (as a result of paying for imported goods and services) and can decrease its value.
High government deficit	Debt repayments increase the supply of the foreign currency (peso) on the foreign exchange markets. Again this can decrease its value.

Essential reading

See Chapter 5 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a broader discussion of economic risk. In addition Section 2 gives more background on Purchasing Power Parity theory.

3 Evaluating international investments

3.1 Evaluating projects – basic approach

International investment appraisal questions will normally require you to estimate the **overseas cash flows** of a project and then to use a **forecast exchange rate** to convert these into the domestic currency before discounting at a **suitable (domestic) cost of capital**.

Forecast foreign (peso) cash flows including inflation

Forecast exchange rates and convert into domestic currency ($s)

Finally include any other domestic ($) cash flows and discount at a **domestic cost of capital**.

Activity 2: Technique demonstration

KStat Co, an accountancy services company based in the USA, is evaluating an investment project overseas – in Country Z, a politically stable country. The project will cost an initial 2.5 million peso and it is expected to earn **nominal** (ie already inflated) cash flows as follows.

Year	*1*	*2*	*3*	*4*
Cash flow (peso '000)	*750*	950	1,250	1,350

(a) The expected inflation rate in Country Z is 3% a year, and 5% in the USA
(b) The current spot rate is 2 peso per $1.
(c) The company requires a return from this project of 16%.

Ignore tax.

Required

Calculate the $ net present value of the project.

Solution

Time	*0*	*1*	*2*	*3*	*4*
Cash flow (peso '000)	(2,500)	*750*	950	1,250	1,350
Exchange rate (see workings)					
Cash flow ($'000)					
Discount at 16%	1.000	0.862	0.743	0.641	0.552
Present value					

Total NPV =

BPP LEARNING MEDIA

Workings

3.2 Evaluating projects – complications

In **international** investment appraisal questions, in addition to exchange rate forecasting and the issues covered in Chapter 3, you may also have to deal with:

(a) Overseas tax issues
(b) Intercompany transactions
(c) Exchange controls

This will mean that the proforma we developed in Chapter 3 for NPV questions will have to be adapted to deal with the extra complications of international NPV.

In the following proforma, the overseas currency is the peso and is denoted by P, and $s are the domestic currency.

Time	*0*	*1*	*2*	*3*	*4*
Revenue less all operating costs and TADs in pesos		X	X	X	X
Taxation in pesos		(X)	(X)	(X)	(X)
Capital expenditure in pesos	(X)				
Add back TAD	–	X	X	X	X
Net cash flows in pesos	(X)	X	X	X	X
Forecast exchange rate	X	X	X	X	X
Net cash flows in $s	(X)	X	X	X	X
Extra domestic tax in $s		(X)	(X)	(X)	(X)
Profits on intercompany transactions		X	X	X	X
Other local $ cash flows		(X)	(X)	(X)	(X)
Tax paid or saved on local $ cash flows	–	X	X	X	X
Net cash flows in $s	(X)	X	X	X	X
Discount factors @ post-tax cost of capital	X	X	X	X	X
Present value in $s	(X)	X	X	X	X

3.2.1 Taxation

To prevent 'double taxation', most governments give a tax credit for foreign tax paid on overseas profits (this is double tax relief, or DTR).

The home country will only charge the company the **difference between the tax paid overseas and the tax due in the home country**. This extra tax will appear as an extra cash flow in the project NPV.

3.2.2 Intercompany transactions

Companies may charge their overseas subsidiaries for royalties and components supplied. These charges will affect the taxable profit, and therefore the tax paid, in the foreign country. Domestic tax may also be payable on the **profits from these transactions**.

Activity 3: Extra complications

This builds on the data from Activity 2, but introduces some new information.

Tax in Country Z is 20%, and in the USA it is 30%. Tax is payable in the same year that profits are earned.

Tax allowable depreciation of 100,000 peso per year (straight-line) are available.

KStat Co will charge its overseas subsidiary 25,000 peso per year for the provision of internal services.

$15,000 per year in extra administration costs will be incurred to support the new subsidiary.

Required

Complete the table to calculate the revised **$ net present value** of the project.

Solution

	0	*1*	*2*	*3*	*4*
Time	'000s peso	'000s peso	'000s peso	'000s peso	'000s peso
Operating cash flows		750	950	1,250	1,350
Tax allowable depreciation		(100)	(100)	(100)	(100)
Intercompany transactions					
Taxable profit in pesos		625	825	1,125	1,225
Taxation in pesos (20%)					
Capital expenditure in pesos	(2,500)				
Add back TAD					
Net cash flows in pesos	(2,500)	600	760	1,000	1,080
Forecast exchange rate	2.000	1.9619	1.9245	1.8878	1.8518
Net cash flows in $'000	(1,250)	306	395	530	583
Extra tax in US in $'000 (extra 10%)					

	0	*1*	*2*	*3*	*4*
Time	'000s peso	'000s peso	'000s peso	'000s peso	'000s peso
Intercompany transactions					
Other US cash flows					
Taxable profit in $'000					
Tax paid or saved on US cash flows					
Net cash flows in $'000	(1,250)	273	351	469	516
DF @ US rate 16%	1.0	0.862	0.743	0.641	0.552
Present value in $'000	(1,250)	235	261	301	285

Net present value = $(168) in '000

Workings

3.2.3 Exchange controls

Another potential problem is that some countries impose delays on the payment of a dividend from an overseas investment. These exchange controls create liquidity problems and add to exchange rate risk because the exchange rate may have worsened by the time that dividends are permitted.

The impact of the delay in the timing of remittances may have to be incorporated into the international project appraisal.

Multinational companies have used many different strategies to overcome exchange controls, the most common of which are:

Strategies for dealing with exchange controls	Explanation
Transfer pricing	A higher transfer price may be imposed for internally supplied goods and services.
Other charges	A parent company can charge a royalty for granting a subsidiary the right to make goods protected by patents. Management charges may be levied by the parent company for costs incurred.
Loans	If the parent company makes a loan to a subsidiary, a higher rate of interest on a loan may be charged.

Essential reading

See Chapter 5 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of basic approaches to international investment appraisal. Section 4 also provides a numerical illustration to reinforce the impact of exchange controls, if required.

PER alert

One of the optional performance objectives in your PER is to evaluate projects and to advise on their costs and benefits. This chapter covers how to evaluate **international** project appraisal decisions.

4 Financing decision: managing risk of international investments

The question of **how much debt** a company should employ in its capital structure is one of the themes of the next chapter. However, here we note that the use of **international debt finance** in the context of international investment decisions.

4.1 Types of international debt finance

Types of international debt finance	Discussion
Loan from a foreign bank	Depending on the profile of the company in the foreign currency this may be slow to organise and potentially expensive.
Eurobond	Large companies with excellent credit ratings use **the euromarkets**, to borrow in any foreign currency using unregulated markets organised by merchant banks. The eurobond (or international bond) market **is much bigger than the market for domestic bonds**.
Syndicated loan	A syndicated loan is a loan put together by a group of lenders (a 'syndicate') for a single borrower. Banks may be unwilling (due to risk) or unable to provide the total loan individually but may be willing to work as part of a syndicate to supply the requested funds. The efficiency of the syndicated loans market means that large loans can be put together very quickly.

4.2 Use of international debt finance in managing risk

International debt finance may be helpful in managing some of the risks associated with international investments.

Type of risk	Impact of the use of international debt finance
Economic risk	As discussed a foreign subsidiary can be financed with a loan in the currency of the country in which the subsidiary operates (subject to thin capitalisation rules as discussed in Chapter 16 Section 4). This creates a matching effect.
Political risk	Reduces taxable profit, reducing exposure to increases in corporation tax.

Type of risk	Impact of the use of international debt finance
Translation risk exchange rate change causing a fall in the book value of foreign assets or an increase in the book value of liabilities	Translation risk does not involve cash flows, so there is doubt as to whether it matters. However, if write-offs result in changes to gearing (using book values) that affect a borrowing covenant there may be real economic consequences from translation risk. Also, if it affects reported profits it may cause a change in the share price. It could also signal a direction of movement in exchange rates and therefore indicate cash problems in future. Using international debt finance reduces the net assets in foreign currency resulting from an overseas investment and reduces translation risk.

Activity 4: Translation risk

It is now November 20X7; QWE is a public listed company supermarket based in France. Its forecast statement of financial position for 31 December 20X7 is given below.

	€m
Assets	14,000
Equity	5,650
Floating rate debt	2,000
Current liabilities	6,350
	14,000

This does not take into account an investment of $1,000m which is about to be made. The current exchange rate is 1 euro = $1.1, but this could rise by to 1 euro = $1.40 by the end of the year.

Required

(a) Prepare a revised forecast statement of financial position, assuming that the project is funded using long-term debt finance in euros under both exchange rate forecasts.

(b) Prepare the same calculations assuming that the project is funded using $ debt.

Solution

(a)

Exchange rate	**1 euro = $1.1**	**Exchange rate**	**1 euro = $1.4**
	€m		€m
Assets		Assets	
Equity (balance)		Equity	
Floating rate debt		Floating rate debt	
Current liabilities		Current liabilities	

(b)

Exchange rate	**1 euro = $1.1**	**Exchange rate**	**1 euro = $1.4**
	€m		€m
Assets		Assets	
Equity (balance)		Equity	
Floating rate debt		Floating rate debt	
Current liabilities		Current liabilities	

Essential reading

See Chapter 5 Section 5 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of IRP theory. Section 6 also gives some further background on eurobonds.

PER alert

As part of the fulfilment of the performance objective 'evaluate potential business/investment opportunities and the required finance options' you are expected to be able to identify and apply different finance options to single and combined entities in domestic and multinational business markets. This section has looked at the financing options available to multinationals which you can put to good use if you work in such an environment.

5 Financial strategy

A firm that is planning a strategy of international expansion, does not only have to consider **new 'direct' investments**, for example in manufacturing facilities. This may be a sensible approach because it does allow a firm to retain control over its value chain, but it may be slow to achieve, expensive to maintain and slow to yield satisfactory results. So other forms of expansion may be preferable.

(a) A firm might **take over or merge** with established firms abroad. This provides a means of **purchasing market information**, **market share** and **distribution channels**. If speed of entry into the overseas market is a high priority, then acquisition may be preferred to a start-up. However, the better acquisitions may only be available at a **premium**.

(b) **A joint venture with a local overseas partner** might be entered into. This will allow resources and competences to be shared. Depending on government regulations, joint ventures may be the **only**, or the preferred, means of access to a particular market.

Essential reading

See Chapter 5 Section 7 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of alternatives to international investment.

Chapter summary

Maximisation of shareholder wealth

International investment decisions

1 Motives for international investment

Company – eg economies of scale
Country – eg cheap labour/grants
Customer – eg shorter lead times
Competition – eg weaker rivals

2 Investment decision: exchange rate risk

The risk that the present value of a company's future cash flows might be reduced by exchange rate movements, eg a **long-term decline** in the **value of the foreign currency** after an investment has been made

2.1 Economic risk

Foreign currency may decline in value if foreign inflation is higher. Impact offset by impact on cash flow.

2.2 PPP theory

2.3 Other danger signals

Weak economic growth, government deficit, balance of payments deficit.

International financing decisions

4 Financing decision: managing risk of international investments

4.1 Types of international debt finance

Foreign bank loan, eurobond, syndicated loan.

4.2 Use of international debt finance in managing risk

Economic risk
- Matching cash flows

Political risk
- Reduce exposure to tax rises

Translation risk
- Matching assets and liabilities

5 Financial strategy

Direct investment
or Acquisition
or Joint venture

3 Evaluating international investments

3.1 Basic approach

1 Forecast foreign cash flows

2 Forecast exchange rate

3 Adjust for local cash flows and discount at local cost of capital

3.2 Complications

Foreign tax

The home country will usually only charge the company the **differential between the tax paid overseas and the tax due in the home country**.

Intercompany transactions

Companies may charge their overseas subsidiaries for royalties and components supplied. Domestic tax may also be payable on the **profits from these transactions**.

Exchange controls

Manage via transfer pricing, other charges and loans.

Knowledge diagnostic

1. **Purchasing power parity theory**

   Explains exchange rate movements by looking at inflation rate differentials.

2. **Economic risk**

   Damage to market (present value created by long-term exchange rate movements. In the context of international investment this means a weakening of the value of the foreign currency.

3. **Eurobond (or international bond)**

   A bond issued in a currency outside the currency of origin.

4. **Translation risk**

   Damage to book value of equity created by exchange rate movements. In the context of international investment this means a weakening of the value of the foreign currency.

5. **Syndicated loan**

   A loan put together by a group of lenders (a 'syndicate') for a single borrower.

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q8 Novoroast

Q9 PMU

Further reading

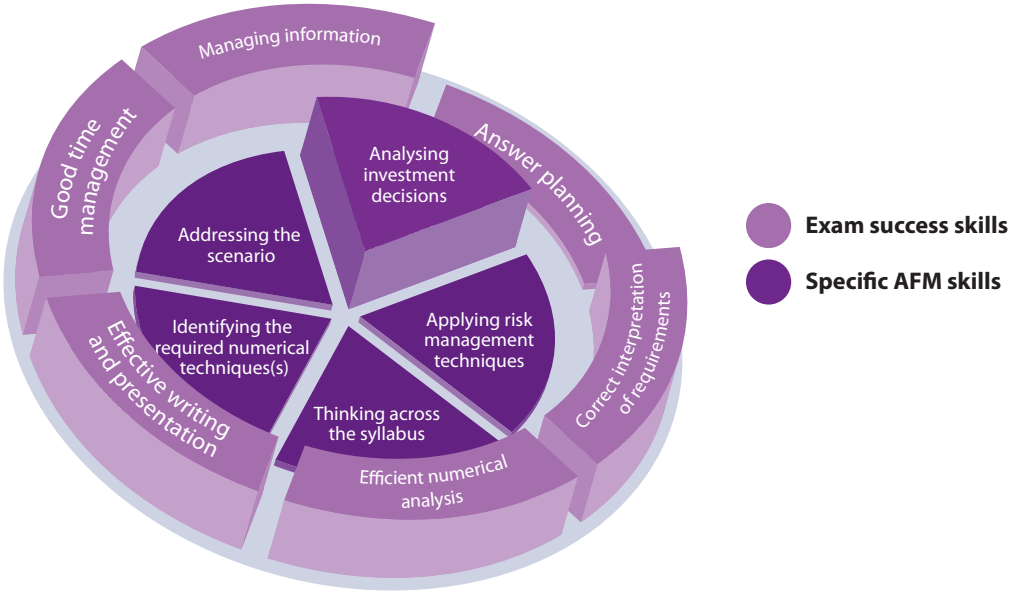
A practical, and amusing, example of purchasing power parity is the Big Mac index (Economist, 2018). Under purchasing power parity, movements in countries' exchange rates should in the long term mean that the prices of an identical basket of goods or services are equalised. The McDonald's Big Mac represents this basket. The index compares local Big Mac prices with the price of Big Macs in America. This comparison is used to forecast what exchange rates should be, and this is then compared with the actual exchange rates to decide which currencies are over- and undervalued.

This index can be found here:

https://www.economist.com/news/2018/07/11/the-big-mac-index

SKILLS CHECKPOINT 2

Analysing investment decisions



Introduction

Analysing investments to select those which are most likely to benefit shareholders is probably the most important activity for a senior financial adviser.

Section B of the AFM syllabus is 'advanced investment appraisal' and directly focusses on the skill of '**analysing investment decisions**'. The AFM exam will always contain a question that have a focus on this syllabus area, so this skill is extremely important.

Analysis of investment decisions requires a sound knowledge of the techniques of investment appraisal. This means that as well as being able to apply techniques numerically you need to be able to discuss the reasons for applying them, the meaning of the numbers, its relevance to the scenario (as discussed in Skills Checkpoint 1), and the limitations of the techniques.

It is also important to apply the relevant investment appraisal techniques in a practical, time-efficient way in the exam, without attempting to achieve absolute 100% perfection. Not only is this sensible exam technique but it also reflects that in reality, as well as in the exam, quantitative techniques are expected to form part of a broader strategic analysis of investments rather than (as was the case in exams earlier in your studies) providing an absolute answer concerning the acceptability or otherwise of a proposed investment.

It is important to be aware that sometimes exam questions will not directly state which investment appraisal techniques should be applied and you may have to use clues in the scenario of the question to select an appropriate numerical technique; this issue is addressed in Skills Checkpoint 3 in the Workbook.

The skill of 'analysing investment decisions' is also relevant when considering the acquisition of another company; this will be covered later in the Workbook in syllabus Section D 'Acquisitions and Mergers'.

Skills Checkpoint 2: Analysing investment decisions

AFM Skill: Analysing investment decisions

The key steps in applying this skill are outlined below, and will be explained in more detail in the following sections as the question 'Your Company' is answered. The points already covered in Skills Checkpoint 1 are also relevant here.

STEP 1:

- Analyse the scenario and requirements.
- Consider why numerical information has been provided.
- Make notes in the margins of the question, especially of any areas of uncertainty.
- Work out how many minutes you have to answer each part of the question.
- Do not perform any detailed calculations at this stage.

STEP 2:

- Plan your answer.
- Check that you are applying the correct type of investment analysis.

STEP 3:

- Complete your numerical analysis.
- Once a number has been analysed, make a note on the exam paper (eg by ticking it) that the number has been dealt with.
- This will help to make it clear if you have forgotten to analyse a section of the question.
- Be careful not to overrun on time with your calculations (if you come to a calculation that you can't do, you may need to make a simplifying assumption and move on).

STEP 4:

- Explain your points using short punchy paragraphs, and don't forget to conclude on the meaning of your numerical analysis.

STEP 5:

- Write up your answer in a time efficient manner.
- It is unlikely that you will have time to correct errors at this stage.

Tutorial note

These five general steps apply to all AFM questions, but here will be focused on the skill of answering advanced investment appraisal questions, which normally have a high level of numerical content.

Exam success skills

The following question is an extract from a past exam question; this extract was worth approximately 15 marks.

For this question, we will also focus on the following **exam success skills**:

- **Managing information**. It is easy for the amount of information contained in scenario-based questions to feel over-whelming. **Active reading** is a useful technique to use to avoid this. This involves focusing on the requirement first, on the basis that until you have done this the detail in the question will have little meaning.

  This is especially important in investment appraisal questions where there is likely to be a high level of numerical content and questions can be very confusing to read through unless you first have a clear idea of the nature of the required analysis.

- **Correct interpretation of requirements**. At first glance, it looks like the following question just contains one requirement. However, on closer examination you will discover that it contains three.

- **Efficient numerical analysis**. The key to success here is applying a sensible proforma for typical investment appraisal calculations, backed up by clear, referenced, workings wherever needed.

- **Effective writing and presentation**. Underline key numbers. Make sure that your numerical analysis is supported by an appropriate level of written narrative. It is often helpful to use key words from the requirement as headings in your answer as you do this.

- **Good time management**. Complete all tasks in the time available.

Skill activity

STEP 1

Look at the mark allocation of the following question and work out how many minutes you have to analyse and plan your answer to the question. Before you start your calculations it is important to realise that the numbers that have been provided are flawed and therefore do not need to be accepted as being correct (although some will be). Do not perform any calculations until you have carefully read the scenario in full.

Make notes in the margins of the question, especially of any areas of uncertainty. Work out how many minutes you have to answer each part of the question.

Requirement

Prepare a corrected project evaluation using the net present value technique supported by a separate assessment of the sensitivity of the project to a $1 million change in the initial capital expenditure. Recommend whether the project should be accepted.

(15 marks)

This is a 15-mark question and at 1.95 minutes a mark, it should take 29 minutes.

On the basis of spending approximately 20% of your time reading and planning, this time should be split approximately as follows:

- Reading and planning time – 6 minutes
- Performing the calculations and writing up your answer – 23 minutes

You can now see from the requirement that there are errors in the scenario and you can look for them (noting any possible errors or areas of uncertainty in the margin to the question).

Question – Your Company (15 marks)

You have been conducting a detailed review of an investment project proposed by one of the divisions of your business. Your review has two aims: first to correct the proposal for any errors of principle, and second, to recommend whether or not the project should proceed when it is presented to the company's board of directors for approval.

The company's current weighted average cost of capital is 10% per annum.

The initial capital investment is for $150 million followed by $50 million one year later. The other post-tax cash flows, for this project, in $ million, including the estimated tax benefit from tax allowable depreciation for tax purposes, are as follows:

Year	*0*	*1*	*2*	*3*	*4*	*5*	*6*
Capital investment (plant and machinery): First phase	–127.50						
Second phase		–36.88					
Project post-tax cash flow ($ million)			44.00	68.00	60.00	35.00	20.00

Unusually there are two phases of capital investment, which impacts on tax allowable depreciation

Company tax is charged at 30% and is paid/recovered in the year in which the liability is incurred. The company has sufficient profits elsewhere to recover tax allowable depreciation on this project, in full, in the year they are incurred. All the capital investment is eligible for a first year allowance for tax purposes of 50% **followed by tax allowable depreciation of 25% per annum on a reducing balance basis**.

TAD calculations assumed to be correct already?

You notice the following points when conducting your review:

1 An interest charge of 8% per annum on a proposed $50 million **loan has been included** in the project's post-tax cash flow before tax has been calculated.

2 **Depreciation** for the use of company shared assets of $4 million per annum has been charged in calculating the project post-tax cash flow.

3 Activity based allocations of company **indirect costs** of $8 million have been included in the project's post-tax cash flow. However, additional corporate infrastructure costs of $4 million per annum have been ignored which you discover would only be incurred if the project proceeds.

4 It is expected that the capital equipment will be written off and disposed of at the end of Year 6. The proceeds of the sale of the capital equipment are expected to be $7 million which have been included in the forecast of the project's post-tax cash flow. You also notice that an estimate for site clearance of $5 million has not been included nor any tax saving recognised on the **unclaimed tax allowable depreciation on the disposal** of the capital equipment.

Treatment of interest and depreciation looks wrong

Are these cash flows or not – not clear, state assumption?

Only the unclaimed TAD to be calculated?

STEP 2 Read the requirement again. Highlight each sub-requirement, check that you are applying the correct type of investment analysis.

Required

Verb – see ACCA definition below

Verb – see ACCA definition below

Required technique 1

Prepare a corrected project evaluation using the net present value technique supported by a separate assessment of the sensitivity of the project to a $1 million change in the initial capital expenditure. Recommend whether the project should be accepted.

(15 marks)

Required technique 2

Third part to the requirement

The first key action verb is 'prepare'. This requires a synthesis of the issues to create a corrected analysis.

Here, you need to produce a revised NPV and a sensitivity analysis.

The second action verb is 'recommend'. This is asking you to express an opinion, explaining and justifying the basis for this opinion.

Here, this should draw on your previous analysis of NPV and sensitivity for your justification.

STEP 3

Now complete your workings and numerical analysis. Be careful not to overrun on time with your calculations.

Note that this may mean accepting that it may not be possible to complete a perfect analysis in the time, as discussed below.

As already noted, performing the calculations and writing up your answer should take 23 minutes

Workings

(1) *Calculation of unclaimed balancing allowance in time 6*

Time	*0*	*1*	*2*	*3*	*4*	*5*	*6*
	$m	$m	$m	$m	$m	$m	$m
New investment	150.00	50.00					
First-year allowance (50%)	(75.00)	(25.00)					
Written-down value (start of year)		75.00	81.25	60.94	45.70	34.27	25.70
TAD (25%)		(18.75)	(20.31)	(15.24)	(11.43)	(8.57)	(6.43)
Written-down value (end year)	75.00	81.25	60.94	45.70	34.27	25.70	19.27
Scrap							(7.00)
Balancing allowance							12.27
Tax saved 30%							**3.68**

(2) *Impact of extra $1m capital expenditure on the tax saved on TAD.*

Time	*0*	*1*	*2*	*3*	*4*	*5*	*6*
	$m	$m	$m	$m	$m	$m	$m
Written-down value (start year)	1.00	0.50	0.37	0.28	0.21	0.16	0.12
FYA (50%)	(0.50)						
TAD (25%)		(0.13)	(0.09)	(0.07)	(0.05)	(0.04)	(0.03)
Balance	0.05	0.37	0.28	0.21	0.16	0.12	0.09
Scrap							0.00
Balancing allowance							**0.09**
Tax saved on TAD at 30%	**0.150**	**0.039**	**0.027**	**0.021**	**0.015**	**0.012**	**0.009**
Tax saved on balancing allowance							**0.027**
Investment	(1.000)						
Impact on cash flow	**(0.850)**	**0.039**	**0.027**	**0.021**	**0.015**	**0.012**	**0.036**

You may run out of time – in which case these relatively immaterial calculations may need to be sacrificed (they will only be worth a couple of marks)

Simple calculations can be referred to in a notes column if you prefer not to have a separate working. Alternatively they can be mentioned as narrative points (see later)

Also assumptions and workings can be referred to here.

Corrected project evaluation

Year	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*Notes*
	$m	$m	$m	$m	$m	$m	$m	
Project	(127.50)	(36.88)	44.00	68.00	60.00	35.00	20.00	
net interest			2.80	2.80	2.80	2.80	2.80	50m × 8%×(1–t)
Depreciation net of tax			2.80	2.80	2.80	2.80	2.80	4m ×(1–t)
Indirect costs			5.60	5.60	5.60	5.60	5.60	8m × (1–t) assumed not cash flows
Add benefit from balancing allowance (W1)							3.68	Working 1
Site clearance costs							(3.50)	
Infrastructure costs			(2.80)	(2.80)	(2.80)	(2.80)	(2.80)	4m ×(1–t)
Revised cash flows	(127.50)	(36.88)	52.40	76.40	68.40	43.40	28.58	
Discount factor 10%	1.000	0.909	0.826	0.751	0.683	0.621	0.564	
DCF	(127.500)	(33.520)	43.280	57.380	46.710	26.950	16.120	

NPV = $29.42m

Sensitivity analysis of project to a $1m increase in initial capital expenditure

Extra capital expenditure will affect not only the cash outflow of the project but also the tax allowable depreciation.

Year	*0* $m	*1* $m	*2* $m	*3* $m	*4* $m	*5* $m	*6* $m	*Notes*
Impact on cash flow	(0.85)	0.039	0.027	0.021	0.015	0.012	0.036	Working 2
DCF at 10%	(0.85)	0.0355	0.0223	0.0158	0.0102	0.0075	0.0203	

Net impact on NPV = $(0.738)m

STEP 4 Write up your answer using key words from the requirements as headings.

Explain the meaning of your numbers and ensure that your recommendations **are justified**.

Narrative element to the solution

Use sub-headings from the requirement

Corrected project evaluation

Explain your approach where relevant.

Errors of principle:

(a) Interest should not be included as this is already accounted for in the discount rate. The annual interest charge of $4 million (less tax of 30%) should be added back to the cash flow in each year.

(b) Depreciation is **not** a cash flow and should be ignored in NPV calculations. The annual charge of $4 million (less tax at 30%) should be added back to the cash flow in each year.

(c) Indirect allocated costs are assumed not to be incremental cash flows and are therefore not relevant. These should be added back to the annual cash flows (net of tax). However, corporate infrastructure costs are relevant to the project and should have been included. These costs should be deducted from annual cash flow figures (net of tax), as should the estimates for site clearance.

(iv) Balancing allowances in Year 6 should be included.

Sensitivity analysis

This is explaining why this matters in this scenario – which is the key skill that we are looking at.

The net impact shown of $(0.738)m shows the impact of spending an extra $1m on this project. This means that for the project NPV of $29.42m to fall to zero the investment would have to increase by 29.42/0.738 = approximately $40m. This is a large increase on the initial forecast spending of $150m and indicates that the project is not sensitive to this assumption.

Recommendation on capital investment project

Use short paragraphs, explain the meaning of your numbers

On the basis that the project NPV is positive the project achieves a return in excess of the required return of 10%. The positive NPV, combined with the lack of sensitivity to the forecast initial expenditure, means that the project can be recommended for acceptance on financial grounds.

Recommendations need a justification

Other points to note:

- This is a comprehensive, detailed answer. You could still have scored a strong pass with a shorter answer as long as it addressed all aspects to the question.
- All sub-requirements have been addressed, each with their own heading.

STEP 5

Write your answer in a time-efficient manner. As 20% of your time has been used for analysis this means that when you are writing the 1.95 minutes per mark becomes 1.95 × 0.8 = 1.56 minutes per mark of writing time.

As you write your answer you are likely to identify errors. When this happens, it is generally advisable to move on and accept that your answer is not perfect. This is because the AFM exam is extremely time pressured and the time you spend on correcting your errors can put you under exam time pressure later in the exam.

It is best to briefly identify any drawbacks in your answer as part of your narrative in your answer, but you should keep this brief.

Exam success skills diagnostic

Every time you complete a question, use the diagnostic below to assess how effectively you demonstrated the exam success skills in answering the question. The table has been completed below for the 'Your Company' activity to give you an idea of how to complete the diagnostic.

Exam success skills	Your reflections/observations
Managing information	Did you read the requirements first so that you understood that the numbers provide in the question were incorrect, before reading the scenario?
Correct interpretation of requirements	Did you understand what was meant by the verb 'recommend'? Did you spot the three aspects to the requirements?
Efficient numerical analysis	Did you spend too much time on relatively unimportant parts of the question? Did your answer present a neat NPV in a proforma that would have been easy for a marker to follow?

Exam success skills	Your reflections/observations
Effective writing and presentation	Did you use headings (key words from requirements)? Did you use full sentences? Did you explain the meaning of the numbers?
Good time management	Did you allow yourself time to address all sub-requirements?
Most important action points to apply to your next question	

Summary

Each AFM exam will contain a question that focuses on investment appraisal.

This is an important area to revise and to ensure that you understand the variety of techniques available (including their limitations). It is important that you can apply techniques such as duration, modified internal rate of return and value at risk.

It is also important to be aware that in the exam, as in the real world,100% precision is not expected in what is, after all, a forecasting exercise. In the exam you are dealing with complicated calculations under timed exam conditions and time management is absolutely crucial. You therefore need to ensure that you:

- Show clear workings and score well on the easier parts of the question
- Make a reasonable attempt at the harder calculations while accepting that your answer is unlikely to be perfect

Remember that there are no optional questions in the AFM exam and that this syllabus section (investment appraisal) will definitely be tested!

Cost of capital and changing risk

6

Learning objectives

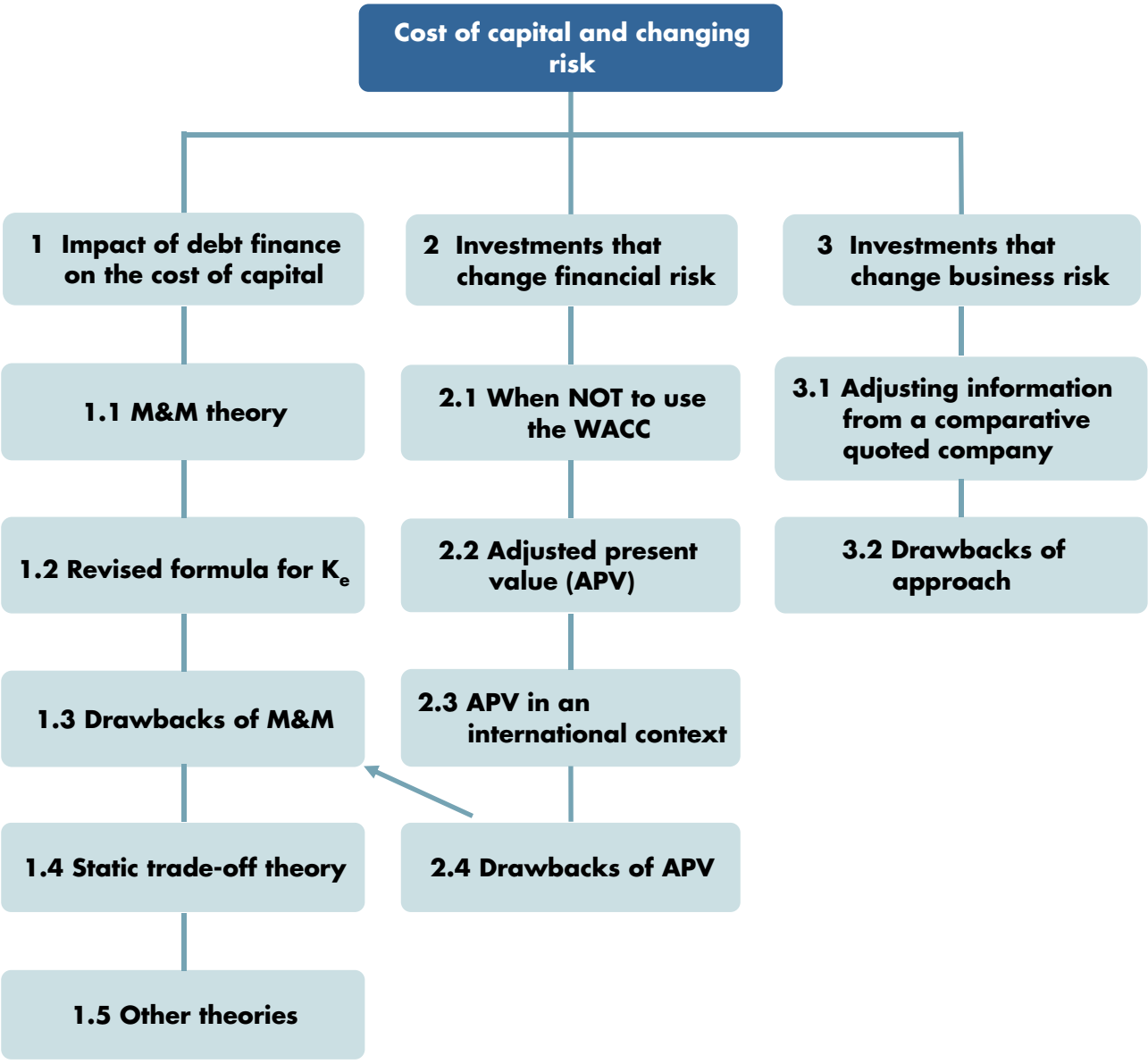
	Syllabus reference no.
Having studied this chapter you will be able to:	
• Calculate the cost of capital of a firm, including the cost of equity and debt. Discuss the appropriateness of using the cost of capital (see Chapter 2) and discuss its relationship to value	B3(c)
• Calculate and evaluate **project-specific cost of equity and debt**. Show detailed knowledge of business and financial risk, CAPM and relationship between equity and asset betas	B3(d)
• Assess the impact of financing and capital structure on a firm with respect to: pecking order theory, static trade-off theory and agency effects and M&M theory	B3(h)
• Apply the **APV** technique to the appraisal of investment decisions that entail significant alterations in the financial structure of the firm, including their fiscal and transaction costs implications	B3(i)
• Assess the impact of a significant capital investment project on the reported financial position and performance of a firm, taking into account alternative financial strategies (see Chapter 14)	B3(j)

Exam context

This chapter continues **Section B** of the syllabus: **'advanced investment appraisal'**. Remember, every exam will have questions that have a focus on syllabus sections B and E.

This chapter builds on Chapter 1 (which looked at practical factors affecting gearing) and Chapter 2 (which introduced cost of capital calculations). Here we look at the theories concerning capital structure, and use these to consider the implication of the changing financial risk and changing business risk on project evaluation. This links to the previous chapter, because international investment appraisal often involves a significant amount of debt finance.

Chapter overview



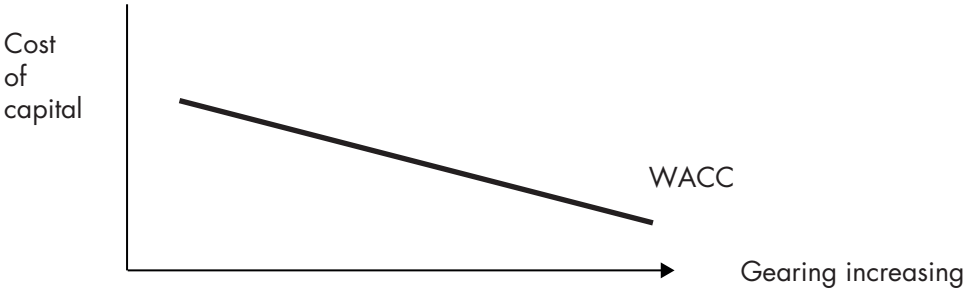
1 The impact of debt finance on the cost of capital

As noted earlier, the cost of debt is cheaper than the cost of equity because debtholders face less risk, so it is sensible for companies with stable cash flows to use some debt finance. Here we review **key theories** that address the issue of how much debt should be used.

1.1 Modigliani and Miller (M&M) theory

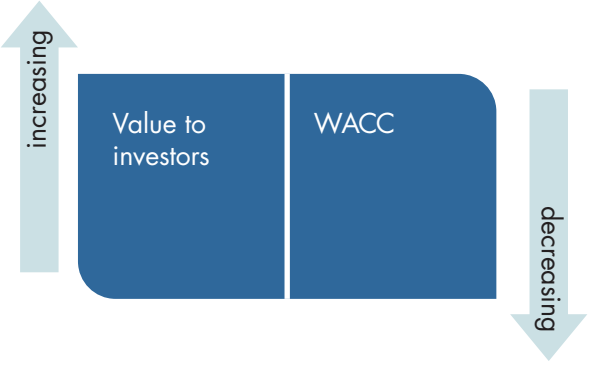
M&M demonstrated that, ignoring tax, the use of debt simply transfers more risk to shareholders, and that this **makes equity more expensive** so that the use of **debt does not reduce finance costs, ie does not reduce the WACC**.

M&M then introduced the effect of corporation tax to demonstrate that if debt **also** saves corporation tax (as discussed in Chapter 2), then this **extra effect** means that **the WACC will fall.** This suggests that a company should use as much debt finance as it can.



1.1.1 Relationship between WACC and value

As you would expect, a fall in the WACC benefits shareholders. This is because the **present value** of the cash flows generated by a company to its investors (shareholders and debtholders) will be **higher if it is discounted at a lower rate**. In an efficient market this would imply that the market value of equity plus debt will rise as the WACC falls.



Activity 1: Idea generation

Required

(a) Discuss the implication of M&M theory (with tax) for the use of a company's existing WACC to evaluate a project that will be financed mainly by debt.

(b) Discuss what will happen to the cost of equity (K_e) as the level of debt rises.

Solution

(a)

(b)

1.2 Revised formula for K_e

M&M's formula for the K_e of a geared company reflects the effects of using debt finance ie the benefit of the tax relief and the extra financial risk that it brings.

Formula provided

$$K_e = K_e^{\,i} + (1-T)(K_e^{\,i} - K_d)\frac{V_d}{V_e} \qquad \text{(Formula is given)}$$

K_e = cost of equity of a geared company, $K_e^{\,i}$ = cost of equity in an ungeared company

K_d = cost of debt (pre-tax) V_d, V_e = market value of debt and equity

Activity 2: M&M cost of equity demonstration

An ungeared company with a cost of equity of 12% is considering adjusting its gearing by taking out a loan at 6% and using it to buy back equity. After the buyback the ratio of the market value of debt to the market value of equity will be 1:1. Corporation tax is 30%.

Required

(a) Calculate the new K_e, after the buyback.

(b) Calculate and comment on the WACC after the buyback

$$WACC = \left(\frac{V_e}{V_e + V_d}\right) K_e + \left(\frac{V_d}{V_e + V_d}\right) K_d\,(1-T)$$

Solution

(a)

(b)

1.3 Drawbacks of M&M

A key assumption of M&M theory is that capital markets are perfect, ie a company will always be able to raise finance to fund good projects. In reality this is not true.

Capital market imperfections	Discussion
Direct financial distress costs	The legal and administrative costs associated with the bankruptcy or reorganisation of the firm.
Indirect financial distress costs	(a) A **higher cost of debt** due to a firm's high risk of default. (b) **Lost sales** due to customers having concerns that a firm with high gearing may be at risk of failure and so will not be able to provide after sales service or to honour product guarantees. (c) Managers and employees will try **drastic actions** to save the firm that might result in some long-term problems eg closing down plants, downsizing, drastic cost cuts and selling off valuable assets; these actions will ultimately damage the value of the firm. (d) **Higher prices** or shorter payment terms **from suppliers** who will have concerns about the risk that a firm with high gearing may not be able to pay its suppliers.

1.4 Static trade-off theory

Myers (Ryan 2007, p.208) argues that these imperfections (static) mean that the level of gearing that is appropriate for a business depends on its **specific business context**.

This suggests that a company should gear up to take advantage of any tax benefits available, but only to the extent that the **marginal benefits exceed** the **marginal costs** of **financial distress**.

After this point, the market value of the firm will start to fall and its WACC will start to rise.

Mature, asset intensive, industries tend to have high gearing because they are at low risk of default and so financial distress costs are likely to be outweighed by the value of tax saved from interest payments

Companies with **fewer tangible assets** or facing **more volatile cash flows** (young, high tech, high fixed costs) tend to have lower gearing because financial distress costs are likely to be higher than the present value of tax saved from interest payments.

This theory supports the idea outlined in Chapter 1 that the level of gearing that is appropriate for a business depends on the type of industry that it is in and the stage of its life cycle.

1.5 Other theories

Pecking order theory suggests that, partly due to issue costs, the preferred 'pecking order' for financing is as follows: 1, retained earnings; 2, debt; 3, new equity.

Agency theory suggests that if a company is mainly equity financed there is less pressure on cash flow, and managers will often embark on 'vanity projects' such as ill-judged acquisitions. Higher gearing creates a discipline that can effectively deal with this agency problem.

Essential reading

See Chapter 6 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which recaps on the different capital structure theories in greater detail, this will be useful if you were exempt from the Financial Management exam.

2 Investments that change financial risk

2.1 When NOT to use the WACC

We noted in Chapter 2 that the current WACC cannot be used as a discount rate at which to appraise projects if:

(a) A project causes a company to change its existing capital structure (financial risk)
(b) A project incurs higher than normal business risk (covered in the next section)

Where the financial risk or business risk of an extra project is different from normal, there is an argument for a cost of capital to be calculated for that particular project; this is called a **project-specific cost of capital**.

2.2 Changing financial risk – adjusted present value (APV)

Modigliani and Miller's theory on gearing tells us that the impact of debt finance is purely to save tax. If so, then the value of this can be quantified and added as an adjustment to the present value of a project.

If a question shows an investment has been funded by an unusually high level of debt or asks for project appraisal using 'the adjusted present value method', you must apply the following steps.

Formula to learn for APV

Step 1	Step 2	Step 3
Calculate project NPV **as if ungeared,** ie K_e^i	**Adjust** for the impact of **financing** (eg present value of tax saved, benefit of any loan subsidy)	Subtract the cost of **issuing** new finance

2.2.1 Points to note

Be careful which discount factors you use in APV:

Step 1	Step 2
Calculate the **project NPV** using an **ungeared cost of equity** (K_e^i) calculated either by using the M&M formula **or an asset beta (see next section).** These cash flows are risky.	Add the PV of the tax saved **at the required return on debt** (K_d pre-tax). This reflects the low risk of the tax savings

If you are told in an exam question that a **subsidised loan** is offered then this clearly adds some extra value to the APV. This should be factored into Step 2 and calculated as the **present value of the net interest savings** due to the subsidy, discounted at the normal pre-tax **K_d** (again because it is low risk).

Formula provided for ungearing the cost of equity in Step 1

$$K_e = K_e^i + (1-T)(K_e^i - K_d)\frac{V_d}{V_e} \quad \text{(Formula is given)}$$

K_e = cost of equity of a geared company, K_e^i = cost of equity in an ungeared company

Activity 3: APV demonstration

Epsilon plc is considering a project that would involve investment of $11 million now and would yield $2.9 million per annum (after tax) for each of the next five years.

$8 million of the project will be financed by a loan, at an interest rate of 5%. The costs of raising this loan are estimated at $200,000 (net of tax).

The company's **existing** K_e is 12% and corporation tax is 30%. Epsilon currently has a ratio of 1:2 for market value of debt to market value of equity.

Required

Review the illustration of the use of the M&M formula for calculating the ungeared cost of equity, and then **complete the shaded areas** to calculate the project APV.

Solution

Workings for ungeared cost of equity

$$K_e = K_e^i + (1-T)(K_e^i - K_d)\frac{V_d}{V_e}$$

$$12 = K_e^i + (0.7)(K_e^i - 5)1/2$$

so 12 = K_e^i + 0.35 (K_e^i – 5)

so 12 = K_e^i + 0.35K_e^i – 1.75

so 13.75 = 1.35K_e^i

K_e^i = 13.75/1.35 = 10.19% this is the cost of equity ungeared.

Round this down to **10%** to use the discount tables in Step 1 of APV.

Step 1

Base case NPV at **ungeared** cost of equity

Time	0	1-5
Project cash flows $m		
Df 10%	1.0	
Present value		
Overall NPV of project as if ungeared		

Step 2

Annual interest paid $m	
Time	1–5
Tax saved on interest $m	
Df at cost of debt	
Present value	

Step 3

Issue costs $m =	

APV

APV $m Step 1 + Step 2 + Step 3 =	

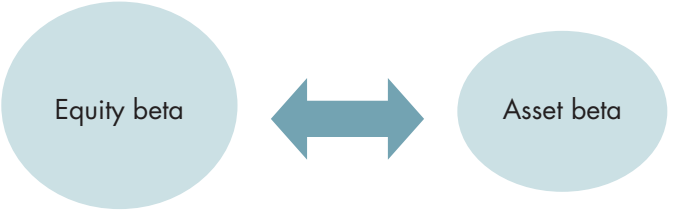
2.2.2 Alternative method of ungearing the cost of equity in Step 1

An alternative method of calculating an ungeared K_e in Step 1 of APV is to adjust the company's **equity beta** by stripping out the effect of gearing **to create an ungeared or an asset beta.** This beta is then input to the capital asset pricing model to calculate an ungeared cost of equity.

This approach is also important in the next chapter, and is introduced here.

The beta of a company is called an equity beta – this reflects both **business risk** (the risk of the business operations) and **financial risk** (the risk of using debt finance in the capital structure).

To understand the level of business risk (only) faced by a business, an equity beta can be adjusted to show its value if the company was ungeared. An ungeared beta therefore measures only business risk, not financial risk.



An asset beta will be smaller than an equity beta because an asset beta only measures business risk, whereas an equity beta measures business risk and financial risk.

Key term

Equity beta: a measure of the market risk of a security, including its business and financial risk.

Asset beta: an ungeared beta measuring only business risk.

Formula provided for calculating an asset beta

$$\beta_a = \left(\frac{V_e}{(V_e + V_d(1-T))}\right)\beta_e + \left(\frac{V_d(1-T)}{(V_e + V_d(1-T))}\right)\beta_d$$

Note that in most exam questions the debt beta can be assumed to be zero (this assumption can be made unless a debt beta is provided), this means that the right hand side of the formula can normally be ignored.

Activity 4: APV using an asset beta

Epsilon (from Activity 3) has an **equity beta of 1.75**. The risk-free rate of return is 5%, the market return is 9% and the rate of tax is 30%. The debt beta can be assumed to be zero.

Required

Recalculate the ungeared cost of equity for use in Step 1 of APV by ungearing the equity beta, and using the CAPM. Remember the CAPM is shown on your formula sheet as:

Formula provided

$$E(r_i) = R_f + \beta(E(r_m) - R_f)$$

Solution

2.3 APV in an international context

Because international investments often include significant levels of debt (as discussed in the previous chapter), APV may be applied in an international context. The steps will be the same.

2.4 Drawbacks of APV

APV is an M&M theory and suffers from the drawbacks of M&M described in Section 1.3.

Essential reading

See Chapter 6 Section 2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides a numerical illustration of the impact of a loan subsidy on the APV approach.

3 Investments that change business risk

3.1 Adjusting information from a comparative quoted company (CQC)

For projects with **different business risk** (compared to current operations) it is inappropriate to use the existing WACC to calculate a project NPV; instead a marginal cost of capital (using the CAPM) should be used.

When a company is moving into a new business area it can use the beta of a company in that sector (a comparable quoted company, CQC) and ungear their cost of equity **or** their equity beta to establish the **business risk** of this new area.

This ungeared cost of equity or ungeared beta can then be adjusted again to reflect the debt level of the company making the investment so that it reflects the appropriate level of financial risk when evaluating an investment.

This involves three steps:

Step 1:

Ungear the **cost of equity or ungear the equity beta** relating to the **comparable company**.

Step 2:

Regear the **cost of equity or asset beta** with the **capital structure to be used in the new investment**.

Step 3:

Use the regeared cost of equity to calculate a **revised WACC** to use in the appraisal of the project.

Activity 5: Business risk – two approaches

Stetson plc is a **passenger airline** which has a debt:equity ratio of 1:1. It wishes to expand into **air freight**. It has identified that the beta of a highly geared parcel delivery company (Company X) is 1.8 and its K_e is 18.4% – **these are influenced by its gearing of 2:1 debt to equity**. Assume that debt has a beta of 0.

Risk-free rate = 4% Market rate = 12% Tax = 30%

Required

Calculate the cost of capital that Stetson should use to appraise this investment by:

(a) Ungearing and regearing the beta approach covered above

(b) Ungearing and regearing the cost of equity using the M&M K_e formula covered in the previous section

Formulae (given in the exam)

Formula provided

$$\beta_a = \left(\frac{V_e}{(V_e + V_d(1-T))}\right)\beta_e + \left(\frac{V_d(1-T)}{(V_e + V_d(1-T))}\right)\beta_d$$

$$K_e = K_e^{\,i} + (1-T)\left(K_e^{\,i} - K_d\right)\frac{V_d}{V_e}$$

Solution

(a) **Step 1** Find a company's equity beta in the area you are moving into and ungear the beta:

Step 2 Regear the beta:

Step 3 Use the regeared beta to calculate an appropriate cost of capital:

(b) **Step 1** Find a company's Ke in the area you are moving into and ungear it:

Step 2 Then regear the Ke with your own gearing:

Step 3 Use the revised Ke to calculate an appropriate cost of capital:
(identical to Step 3 in part (a))

3.2 Drawbacks of approach

3.2.1 Finding a suitable CQC

The key problem with using the geared and ungeared beta formula for calculating a firm's equity beta from data about other firms is that it is **difficult to identify a comparative company with identical operating characteristics to use as a benchmark**.

For example, there may be differences between firms caused by different cost structures (eg the ratio of fixed costs to variable costs), and the type of products and markets of a comparative company business is unlikely to be a perfect match to a proposed project.

3.2.2 Other issues

In addition there are technical flaws in the models used (either adjusting beta factors or using M&M theory to adjust the cost of equity) which have been reviewed in earlier sections.

Essential reading

See Chapter 6 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides another numerical illustration of this area.

Chapter summary

Cost of capital and changing risk

1 Impact of debt finance on the cost of capital

1.1 M&M theory

- **Modigliani & Miller**
  - In a zero tax world, debt is cheaper (lower risk) but its use makes equity more expensive (higher financial risk) so the WACC is unchanged.
  - With tax, debt brings the benefit of tax savings and a company should **maximise its use of debt finance** to drive down its WACC.
- **A lower WACC increases the value of the company to its investors**

1.2 Revised formula for K_e

1.3 Drawbacks of M&M

- **A key assumption of M&M theory is that capital markets are perfect** eg a company will always be able to raise finance to fund good projects.

Capital market imperfections
Direct financial distress costs – managing the insolvency process.
Indirect financial distress costs – costs of higher debt payments, loss of sales/higher costs from suppliers.

2 Investments that change financial risk

2.1 When NOT to use the WACC

2.2 Adjusted present value (APV)

Step 1 – calculate the base case NPV as if ungeared using an asset beta or using the M&M formula for K_e.

Step 2 – add the PV of the tax saved as a result of the debt & benefit of subsidy (use K_d)

Step 3 – subtract the cost of issuing new finance

2.3 APV in an international context

2.4 Drawbacks of APV

3 Investments that change business risk

3.1 Adjusting information from a comparative quoted company

Step 1 – ungear the **cost of equity or equity beta** relating to the **comparable company**.

Step 2 – regear the **cost of equity or asset beta** with the **capital structure to be used in the new investment**.

Step 3 – use the cost of equity to calculate a **revised WACC** to use in the appraisal of the project.

3.2 Drawbacks of approach

Difficult to identify a comparative company with identical operating characteristics to use as a benchmark.

Technical flaws in the models used (adjusting beta factors or using M&M theory to adjust the cost of equity).

1.4 Static trade-off theory

The level of gearing that is appropriate for a business depends on its **specific business context**.

Mature, asset intensive, industries tend to have high gearing because they are at low risk of default and so financial distress costs are likely to be outweighed by the value of tax saved from interest payments

1.5 Other theories

Pecking order theory suggests the preferred order for financing is: **1, retained earnings; 2, debt; 3, equity**.

Agency theory. Equity finance facilitates the agency problem.

Knowledge diagnostic

1. **Modigliani and Miller theory with tax**

   In the absence of financial distress costs, the use of debt finance will drive down WACC and increase value for investors.

2. **Static trade-off theory**

   The level of gearing depends on the business context.

3. **Current WACC is sometimes not appropriate as a cost of capital**

   If financial or business risk change.

4. **APV**

   M&M technique: discount the project as if ungeared and adjust for financing effects separately.

5. **Asset and equity betas**

   An asset beta is an ungeared beta, an equity beta is geared.

6. **Change in business risk**

   Use a comparable company (if available) to act as a benchmark for risk of new business and adjust for the impact of differences in gearing.

Further study guidance

Question practice

Now try the question below from the Further question practice bank (available in the digital edition of the Workbook):

Q10 Tampem

BPP
LEARNING MEDIA

Financing and credit risk

7

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Assess the **appropriateness of sources of finance** – equity, debt, hybrids, lease finance, venture capital, business angels, private equity, asset securitisation (see Chapter 16), Islamic finance and initial coin offerings. Include assessment of the financial position, risk and value (see Chapter 14)	B3(a)
• Assess the role and developments in Islamic financing, explaining its rationale, benefits and deficiencies	B3(b)
• Assess a company's debt exposure to interest rate changes using the simple Macaulay **duration** and modified duration methods. Discuss the benefits and limitations of duration including the impact of convexity	B3(e) (f)
• Assess the company's exposure to credit risk, including: – The role of, and **the risk models** used by, rating agencies – Estimate the likely credit spread over risk free – Estimate the firm's current cost of debt capital using the appropriate term structure of interest rates and credit spread	B3(g)

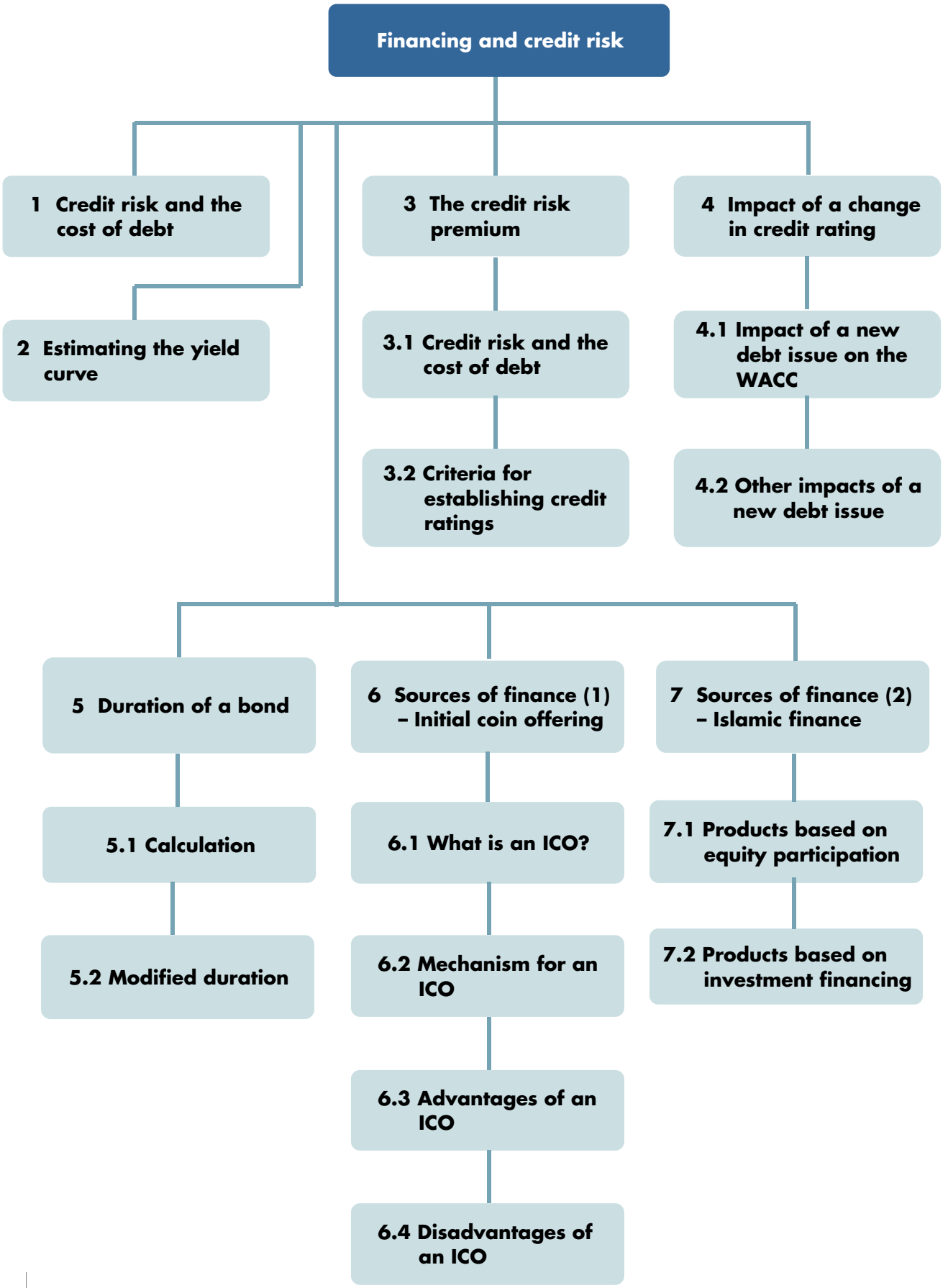
Exam context

This chapter completes **Section B** of the syllabus: '**advanced investment appraisal**'. Remember, every exam will have questions that have a focus on syllabus Sections B and E (treasury and advanced risk management techniques).

This chapter builds on Chapter 2 (which introduced the concept of credit ratings/spreads), and Chapter 4 (which introduced the Black–Scholes option pricing model).

Here we consider a range of general financing issues. There are two **main themes**. First, the use of bond finance and how yield curves and credit ratings can be used to estimate the cost of debt. Second, emerging sources of finance which should build on your knowledge of sources of finance, from your earlier studies.

Chapter overview



1 Credit risk and the cost of debt

One of the drawbacks of M&M theory is that it fails to recognise that a significant increase in gearing will alter the credit rating of a company, which can impact on the cost of capital and therefore on shareholder wealth.

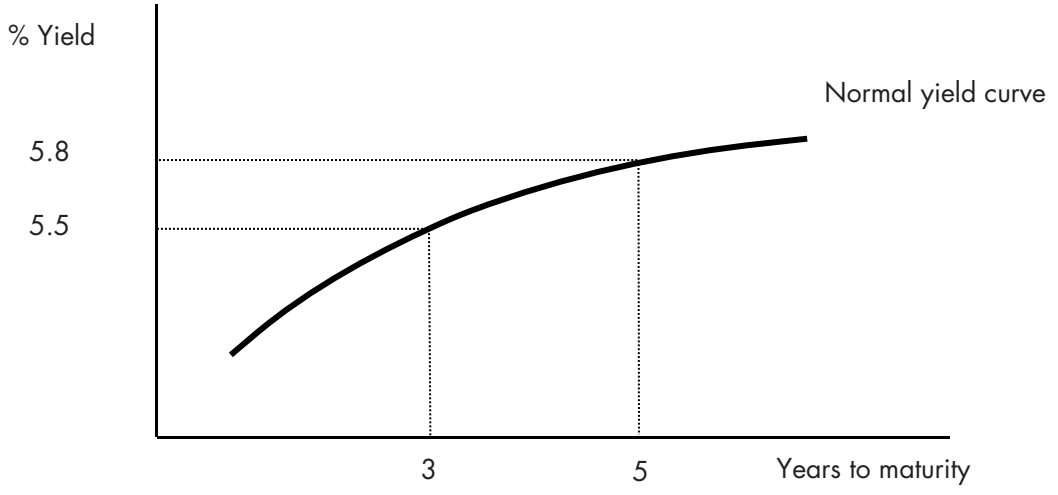
As we have seen in Chapter 2, the yield expected on a bond will depend on two factors:

(a) The risk-free rate derived from the **yield curve; estimating the yield curve** is discussed in **Section 2**.

(b) The **credit risk premium** – derived from a bond's credit rating; this is discussed in **Section 3**.

2 Estimating the yield curve

Chapter 2 introduced the yield curve, which shows how the yield on government bonds varies according to the term of the borrowing.



The yield curve can be calculated **by comparing government bonds with different prices and maturities**.

If an exam question provides the coupon interest rate being paid by a government bond and its market price then you can calculate the **required yield in each year** by comparing the market price of the bond to the interest and capital repayments from the bond.

Illustration 1

Estimating required yield in Year 1

If we know that a government bond with a coupon rate of 4% and one year to maturity is trading at \$99.50, then we can estimate the required yield in Year 1 as follows:

Amount invested today =	\$99.50
Amount due to be received in one year = (\$4.00 interest + \$100.00 capital) =	\$104.00
Return on investment = $\left(\frac{104}{99.5} - 1\right) \times 100$	**4.5%**

The yield in a specific year can also be estimated using an equation, this is more useful in the exam.

This approach identifies the expected return (or expected yield) that is required to discount the future cash flow from the bond (\$104) back to the given market price, or present value (here \$99.50), as follows:

$\$99.5 = \$104 \times (1 + r)^{-1}$

So $99.5/$104 = $(1 + r)^{-1}$

So $0.957 = (1 + r)^{-1}$

Given that $(1 + r)^{-1} = 1/(1 + r)$, then: $1/0.957 = 1 + r$

So $1+r = 1.045$

So $r = 0.045$ or **4.5%**

Estimating required yield in Year 2

If we are then told that another government bond with a coupon rate of 3.5% and **two years** to maturity is trading at $97.2, then we can estimate the required yield in Year 2 using the same equation-based approach as:

$\$97.2 = \$3.5 \times (1 + r_1)^{-1} + \$103.5 \times (1 + r_2)^{-2}$ (where r_1 and r_2 are the yields in Year 1 and Year 2)

We know the required yield for cash flows in Year 1 is 4.5% or 0.045 (see earlier) so:

$\$97.2 = \$3.5 \times (1 + 0.045)^{-1} + \$103.5 \times (1 + r_2)^{-2}$

So $(\$97.2 - \$3.35)/\$103.5 = (1 + r_2)^{-2}$

So $0.907 = (1 + r_2)^{-2}$

So $1/0.907 = (1 + r_2)^2 = 1.1025$

So $(1 + r_2) = \sqrt{1.1025} = 1.05$

So $r_2 = 0.05$ or **5.0%**.

This is the required yield for cash flows received in Year 2.

Activity 1: Yield curve

A government bond with a coupon rate of 4.5% and **three years** to maturity is trading at $97.4.

Required

Using the above information, and the information provided in the previous illustration (ie expected yield in Year 1 is 4.5% and in Year 2 is 5%), estimate the required yield in Year 3.

Solution

3 The credit risk premium

3.1 Credit risk and the cost of debt

As we have seen in Chapter 2, the credit risk premium is the extra return (or **credit spread**) required by investors above the risk-free rate that is required to compensate for the risk of a bond.

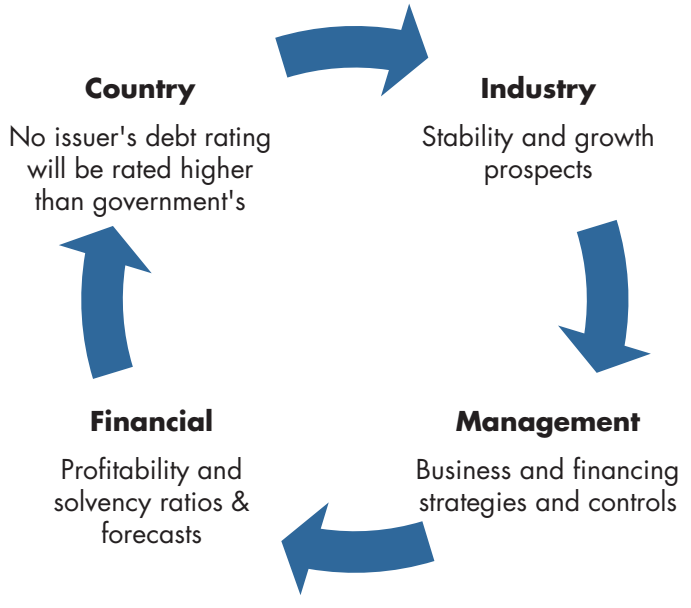
Building blocks of cost of debt	%
Yield curve benchmark	From previous section
Credit spread on debt	Given in an exam question
Required yield on debt (pre-tax)	Yield curve + credit spread
Cost of debt post-tax	Required yield × (1 – tax rate)

Example of credit ratings (recap)

Standard & Poor's	Definition
AAA, AA+, AAA–, AA, AA–, A+	• Excellent quality, lowest default risk
A, A–, BBB+	• Good quality, low default risk
BBB, BBB–, BB+	• Medium rating
BB or below	• Junk bonds (speculative, high default risk)

3.2 Criteria for establishing credit ratings

The issuer of debt will pay for a credit rating; this will involve the disclosure of confidential information to a credit rating agency. The criteria for rating debt encompasses the following:



Essential reading

See Chapter 7 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides further background on the calculation of credit ratings.

4 Impact of a change in credit rating

4.1 Impact of a new debt issue on the WACC

One reason that a company's credit rating can worsen is due to the issue of new debt; this can have a number of potential impacts on the weighted average cost of capital:

* Exam questions often specify that the impact of the new debt issue on the value or cost of equity is not known, or can be assumed to be insignificant. If so, there is no need to adjust the cost of equity using the M&M cost of equity formula from Chapter 6.

Activity 2: Impact of a change in credit rating

Currently Tetron Co has debt finance with a market value of $10 million which is **due to mature in one year**. Tetron also has $90 million of equity (market value), and a cost of equity of 8%.

Tetron Co is considering the issue of $5 million of new of debt with a **maturity of three years**. Tetron is worried that the extra debt will worsen its credit rating from its current AAA to A and that this will increase its WACC. Tax is at 20%.

The impact of the new debt issue on the value of equity is hard to predict and can be assumed to be insignificant.

Relevant data	1 year	3 years
AAA	10	18
A	60	75
Yield curve rate	4.4	5.5

Required

Complete the following evaluation of the impact of a worsening of Tetron's credit rating from AAA to A as a result of the new debt issue, by completing the shaded areas.

Solution

1 **Tetron's current WACC**

Current required return on debt =	

$$WACC = \left(\frac{V_e}{V_e + V_d}\right) K_e + \left(\frac{V_d}{V_e + V_d}\right) K_d (1 - T)$$

Current WACC =	

2 **New required yield on debt at a credit rating of A**

Current debt finance (one year to maturity)	
New debt finance (three years to maturity)	

3 **New market value of debt.**

Current debt finance (one year to maturity) Repays \$10m + \$0.45 = \$10.45m in one year	Time 1 \$m df Present value
New debt finance	\$5 million as given

4 **Revised WACC**

Revised WACC =	

Workings to revised WACC

4.2 Other impacts of a new debt issue

Additional debt may have other restrictive covenants which may restrict a company from buying or selling assets, this may restrict a company from being able to maximise returns to shareholders.

Debt repayment covenants require a company to build up a fund over time which will be enough to redeem the debt at the end of its life. These may make it harder to pay dividends to shareholders.

If the WACC rises (which does not necessarily happen as shown in Activity 2), this will reduce the value of a company to its investors.

5 Duration of a bond

We have seen, in Chapter 3, the concept of duration in the context of project appraisal to give a measure of the average amount of time over which a project delivers its value. Duration is also known as Macaulay duration.

The same concept can be applied to a bond, where it helps to explain the risk of a bond to investors.

5.1 Calculation

The average amount of time taken to recover the cash flow from a bond is **not only affected by its maturity date** – it is also affected by the **size of the interest** (coupon) **payments**, eg a 5% bond maturing in three years will not give cash back as quickly as a 10% three-year bond.

Duration measures the weighted average number of years over which a bond delivers its returns.

As we have seen, duration is calculated by multiplying the present value of cash inflows to the time period of that inflow and then dividing by the total present value of the cash inflows.

Duration allows bonds of **different maturities** and **coupon rates** to be directly compared.

The illustration below is a recap of the calculation of duration.

Illustration 2

A company has a 5% bond in issue with a nominal value of $100 and is redeemable at nominal value in three years' time. The required yield is 4%.

Required

Calculate the duration of Bond A.

Solution

Bond A

Time	*1*	*2*	*3*	*Total*	
Cash	5	5	105		
DF 4%	0.962	0.925	0.889		
PV	4.8	4.6	93.3	102.7	
× year	4.8	9.2	279.9		
	(4.8 + 9.2 + 279.9)/102.7 =			**2.86**	years

5.1.1 Influences on duration

Duration will be higher if the bond has:

(a) A long time to maturity
(b) A low coupon rate

5.2 Modified duration

Modified duration is a useful measure of the risk of a bond to an investor.

Modified duration is calculated as:

Formula to learn

$$\frac{\text{(Macaulay) duration}}{1+\text{yield}}$$

Illustration 3

From the previous illustration the modified duration of Bond A is 2.86/1.04 = 2.75.

If the modified duration is 2.75 then, if required yields rise by 1%, the bond price will fall by 2.75%.

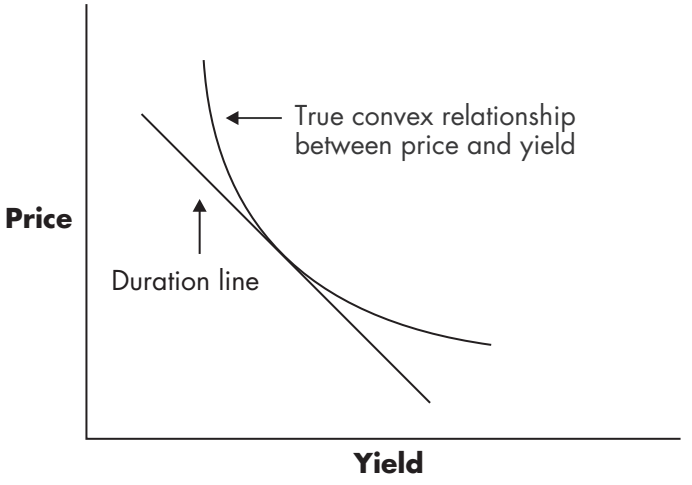
This is a **useful measure of the price sensitivity (risk) of a bond to changes in interest rates**.

5.2.1 Convexity and modified duration

A limitation of modified duration is that it assumes a linear relationship between the yield and the price.

In fact, the actual relationship between price and yield is given by the curve below.

Relationship between bond price and yield



The impact of **convexity** (ie a non-linear relationship) will be that the modified duration will tend to overstate the fall in a bond's price and understate the rise. Therefore modified duration should be treated with caution in your predictions of interest rate/price relationships.

The problem of convexity only becomes an issue with more substantial fluctuations in the yield.

Essential reading

See Chapter 7 Section 2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides a further example of bond duration.

6 Sources of finance (1) – Initial coin offering (ICO)

Essential reading

See Chapter 7 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a recap of the variety of types of finance that are available; most of this is a recap from the Financial Management exam.

6.1 What is an ICO?

An Initial Coin Offering (ICO) is a new way for organisations to raise capital. Like an Initial Public Offering (IPO), an ICO raises finance from investors. However, there are two key differences:

(a) Instead of receiving shares, an investor receives a new type of coin or token
(b) Payment is made in a cryptocurrency such as bitcoin or ether

6.1.1 Types of tokens/coins

Investment tokens	Equity tokens which offer a share in the company
Asset tokens	Represent a physical asset or product eg allowing investors to purchase difficult-to-store physical assets such as gold online.
Utility tokens	Provide users with access to a product or service; eg Filecoin raised over $250 million, its tokens enable access to its decentralised cloud storage service.

The future value of these tokens depends on the success of the venture.

6.1.2 Regulatory status

The attitude of regulators to ICOs differs around the world; in some countries (China and South Korea) ICOs are banned.

In general, regulators are **less concerned** with ICOs that **do not** offer investors the reasonable expectation of profit eg where an ICO aims to simply develop technology or where investors receive utility tokens to exchange for future services (these ICOs currently tend to be outside the definition of a 'security' and therefore are not normally of interest to regulators).

ICOs that in some way offer **future income streams** are likely to be **judged to be securities** (eg equity tokens or tokens that can also serve as a 'payment voucher' for an underlying service). These ICOs are likely to have to fulfil the related regulatory criteria for an issue of securities (full prospectus etc). There may also be a risk that if this has not been done then fines may be levied (which may be severe), or the regulator puts a stop to the ICO.

6.2 Mechanism for an ICO

One of the attractions of an unregulated ICO is its simplicity, the issuer raises money by issuing a '**white paper**' providing details of the concept that the venture intends to build, and details of the tokens that will be issued in exchange for cryptocurrency.

The white paper is available via the venture's website, which also provides the mechanism for payment of cryptocurrency to the venture's account (typically bitcoin or ether). It is now more common for payments to be made into an escrow account (an account established by an independent third party), to provide greater assurance of the venture's validity.

Most ICO sites include instructions for how investors should go about buying their bitcoins or ether – the assumption being that they don't already own any cryptocurrency (ACCA, 2018).

6.3 Advantages of an ICO

Since 2017, there has been a dramatic increase in ICO activity, due to:

(a) Its speed and ease of use as a source of finance for new ideas, compared to traditional methods

(b) Investor interest, often based on a speculative expectation of rapid, high returns

6.4 Disadvantages of an ICO

6.4.1 To investors

Fraud risk	ICOs tend to be launched by start-ups. Organisation details are often vague with just a website, and no specific geographic location. White papers may make wild claims about the potential for the project being financed.
Valuation risk	Valuation of tokens is highly speculative, in addition the entities involved are generally start-ups.
Security risk	If a token repository is hacked and tokens stolen, investors typically have no recourse.

6.4.2 To the issuer

Value of cryptocurrency	For example, the value of bitcoin fell by over 50% between mid-December 2017 and early Feb 2018.
Risk of money laundering	The anonymity of transactions makes ICOs a target for investment from funds belonging to organised crime.
Risk to investor	As discussed earlier, this may reduce the availability of funds and the price that investors are willing to pay.
Risk of regulation	This is illustrated by Protostarr, which abandoned its ICO in 2017 after being contacted by the US SEC to discuss its status.

7 Sources of finance (2) – Islamic finance

The justification for the use of Islamic finance may be either religious or commercial reasons; here we focus on **commercial reasons**:

- **Availability of finance**. The impact of the credit crash on Islamic nations, eg wealthy Gulf countries, has been less than in many other parts of the world. The Gulf countries own approximately 45% of the world's oil and gas reserves.
- Islamic finance may also appeal due to its **more prudent investment and risk philosophy**. Conventional banks aims to profit by taking in money deposits in return for the payment of interest (or **riba**) and then lending money out in return for the payment of a higher level of interest. **Islamic finance does not permit the charging of interest** and invests under arrangements which share the profits and losses of the enterprises.

7.1 Products based on equity participation

To tap into the **Islamic equity markets**, a company must be sharia compliant. To achieve this, there are two key screening tests:

1 **Does the company engage in business practices that are contrary to Islamic law**, eg alcohol, tobacco, gambling, money lending and armaments are not acceptable.

2 Does the company pass **key financial tests**, eg **a low debt–equity ratio** (less than approx 33%); in theory any interest-based transaction is not permitted, but in reality it is accepted that this is not realistic.

To establish social justice, Islam requires that investors and entrepreneurs share risk and reward; there are two main products that are **offered by Islamic banks** that facilitate this (remember that Islamic banks cannot lend money out in a conventional way in exchange for interest repayments). Despite being offered by banks, both products actually create **equity participation**.

1 **Mudaraba**

Profits are shared according to a pre-agreed contract. There are no dividends paid. **Losses are solely attributable to the provider of capital, eg a bank**. The entrepreneur (the mudarib) takes sole responsibility for running the business, because they have the expertise in doing so – if losses are made the entrepreneur loses their time and effort.

Mudaraba contracts can either be **restricted** (to a particular project) or **unrestricted** (funds can be used in any project).

2 **Musharaka**

Profits are shared according to a pre-agreed contract. There are no dividends paid. Losses are shared according to capital contribution. **Both the organisation/investment manager and finance provider participate in managing and running the joint venture**.

Profits are normally shared in a proportion that takes into account the capital contribution **and** the expertise being contributed by the bank and the entrepreneur/joint venture partners. Losses are shared in proportion to the % capital being contributed by each party.

Under a diminishing musharaka agreement the mudarib pays increasingly greater amounts to increase their ownership over time, so that eventually the mudarib owns the whole venture or asset.

7.1.1 Sukuk bonds

The other key product that allows equity participation is a **sukuk bond.** Although these are often referred to as Islamic bonds, the sukuk holders share risks and rewards, **so this arrangement is more like equity**. The sukuk holder shares in the risk and rewards of ownership of a **specific asset, project or joint venture**.

Sukuks require the creation of a **special purpose vehicle (SPV)** which acquires the assets. This adds to the costs of the bond-issuing process, but they are often registered in tax-efficient jurisdictions, eg Bahrain.

The **prospectus** for a sukuk **must clearly disclose its purpose, its risk and the Islamic contract on which it is based** (mudaraba, musharaka, ijara (see below)) – all of which will be crucial in obtaining sharia compliance (which must be disclosed in the prospectus too).

7.2 Product based on investment financing (ie no equity participation)

Debt-based finance is also possible but, even here, **no interest can be charged**; the products ensure both parties involved **share risk** (eg late payment fees can be applied by the bank but any such fees must be given to charity), and **no money is actually loaned** (the finance is linked to an **asset being purchased** on behalf of the client).

Murabaha	The financial institution purchases the asset and sells it to the business or individual. There is a pre-agreed mark-up to be paid, in recognition of the convenience of paying later, for an asset that is transferred immediately. No interest is charged.
Ijara	The financial institution purchases the asset for the business to use, with lease payments, period and payment terms being agreed at the start of the contract. The financial institution is still the owner of the asset and incurs the risk of ownership. **This means that the financial institution will be responsible for major maintenance and insurance**, which is different from a conventional finance lease.
Salam	A commodity is sold for future delivery; cash is received from the financial institution **in advance** (at a discount) and delivery arrangements are determined immediately. Nb Sharia scholars have concerns about derivatives products (eg futures) because they are not based on real economic activity (unless they are held to delivery).
Istisna	For funding large, long-term construction projects. The financial institution funds a project; the client pays an initial deposit, followed by instalments during the course of construction. At the completion, ownership of the property passes to the client.

Essential reading

See Chapter 7 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which considers the pros and cons of Islamic finance.

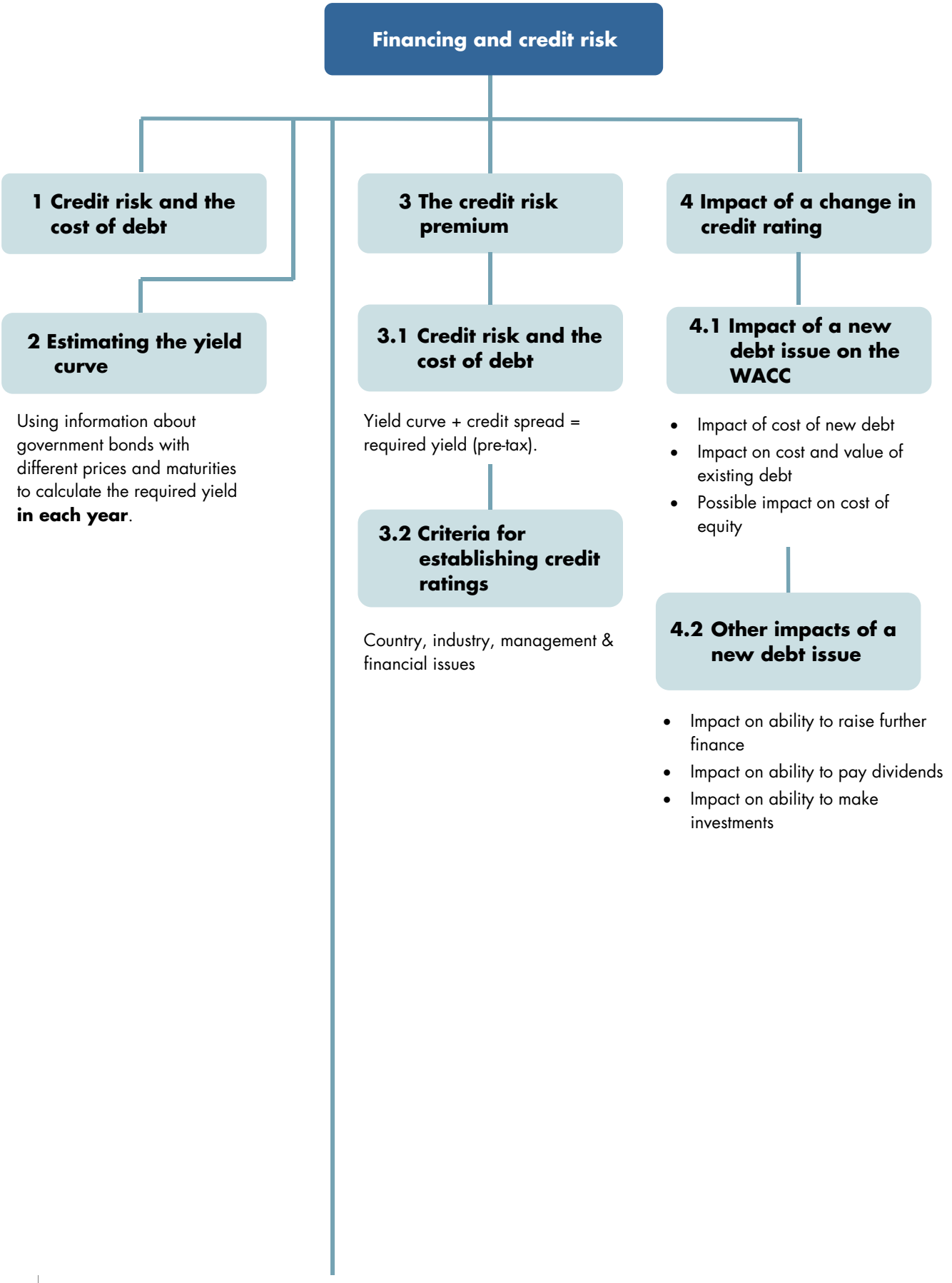
Activity 3: Islamic finance

Required

Why might a bank prefer to advance funds based on a Musharaka contract instead of a Mudaraba contract?

Solution

Chapter summary



5 Duration of a bond

5.1 Calculation

Weighted average number of years over a which a bond delivers its value

5.2 Modified duration

Duration ÷ (1 + required yield)

Measures price sensitivity of a bond to a change in the required return.

Problem of convexity means that the impact of interest rate rises are understated and impact of falls in the interest rate is overstated.

6 Sources of finance (1) – Initial coin offering

6.1 What is an ICO?

Issue of tokens in exchange for cryptocurrency

6.2 Mechanism for an ICO

If unregulated – a 'white paper' outlines detail of the venture and provides a mechanism for payment.

6.3 Advantages of an ICO

Speed and ease of use

6.4 Disadvantages of an ICO

Risk to issuer of regular interference (if tokens are deemed to be a security) Risk of money laundering

Risk of value of cryptocurrency falling

7 Sources of finance (2) – Islamic finance

Restrictions over type of business activity.

Prohibition on the payment of interest

7.1 Products based on equity participation

- Mudaraba
- Musharaba (joint venture)
- Sukuk bonds (tradeable)

7.2 Products based on investment financing

- Murabaha (trade credit)
- Ijara (leasing)
- Salam (commodity sold for future delivery)
- Istisna (instalment payments)

Knowledge diagnostic

1. **Credit ratings**

   Determined by country, industry, management and financing factors.

2. **Impact of worsening credit ratings**

   Worsening credit ratings will increase the cost of debt on new and existing debt (will also affect the value of existing debt).

3. **Duration of a bond**

   This shows the period of time over which a bond delivers its value. The higher duration is, the greater the risk to the investor.

4. **Modified duration**

   This shows the impact of a 1% change in interest rates on bond value.

5. **Types of token or coin**

   Tokens can be investment, asset or utility tokens.

6. **Islamic finance**

   Share risk and return between the entrepreneur and the finance provider.

Further study guidance

Question practice

Now try the question below from the Further question practice bank (available in the digital edition of the Workbook):

Q11 Levante

Further reading

There is a Technical Article available on ACCA's website, called 'Aspects of Islamic finance' which has been written by a member of the AFM examining team.

Another useful Technical Article available on ACCA's website is called 'Bond valuation and bond yields', again this has been written by a member of the AFM examining team.

We recommend that you read these articles as part of your preparation for the AFM exam.

Valuation for acquisitions and mergers

8

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Apply asset-based, income-based and cash flow based models to value equity	B4(a) in part
• Forecast an organisation's free cash flow and free cash flow to equity	B4(b)
• Advise on the value of an organisation using its free cash flow and free cash flow to equity under alternative horizon and growth assumptions	B4(c)
• **Explain** the use of the BSOP model to estimate the value of equity and discuss the implications of the model for a change in the value of equity. **Explain** the role of the BSOP model in the assessment of default risk, the value of debt and its potential recoverability	B4(d), B4(e)
• Discuss the problem of overvaluation	C2(a)
• Estimate the potential near-term and continuing growth levels of a corporation's earnings using both internal and external measures	C2(b)
• Discuss, assess and advise on the value created from an acquisition or merger of both quoted and unquoted entities using models such 'book value-plus', market-based and cash flow models, including free cash flows; taking into account the changes in the risk profile of the acquirer and target entities	C2(c)
• Apply appropriate models eg risk adjusted cost of capital, APV and changing P/E multipliers resulting from the acquisition or merger	C2(d)
• Demonstrate **an understanding** of the procedure for valuing high growth start-ups	C2(e)

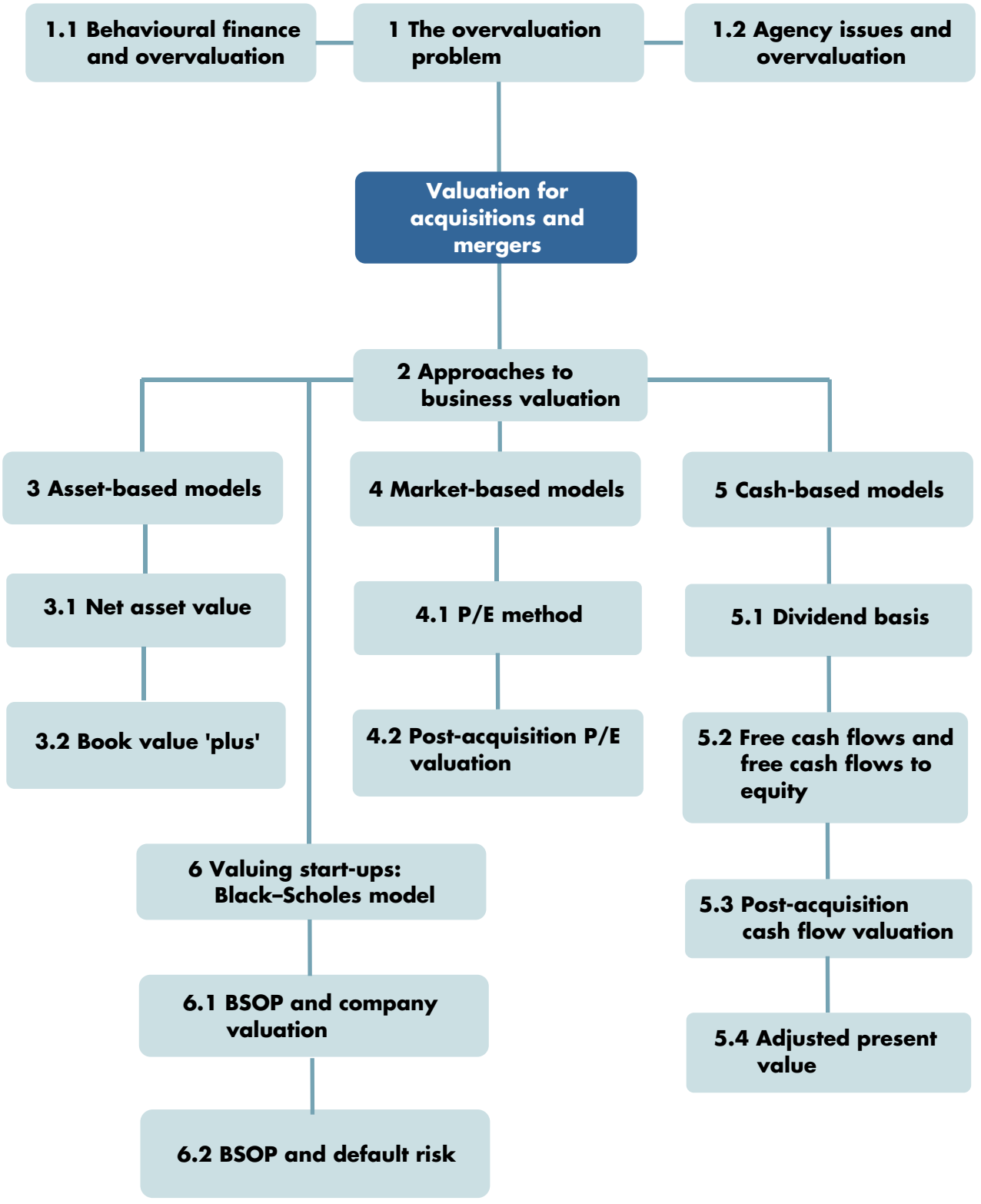
Exam context

This chapter mainly focuses on Section C of the syllabus 'Acquisitions and Mergers', although it also covers some remaining areas of syllabus Section B.

The techniques that are covered in this chapter are used to ensure that the decision to **invest** by acquisition is carefully analysed and results in an outcome that benefits shareholders. Valuation questions are common in both Section A and Section B of the AFM exam.

Valuation techniques will require you to make estimates/assumptions. In the exam, it is accepted that a business does not have a single 'precise' valuation, and markers will reward a variety of logical, justified approaches, so there is often not a 'single' correct answer.

Chapter overview



1 The overvaluation problem

When a company acquires a target company, it will pay a 'bid premium' above the target's current market value. Where this premium is **excessive**, this creates a problem of **overvaluation**.

Many studies suggest that the **target company** shareholders **enjoy the benefit** of the 'bid premium' but the shareholders **of the acquirer** often do not benefit as a result of **overvaluation**.

1.1 Behavioural finance and overvaluation

A number of **behavioural** factors may explain why acquisitions are often overvalued.

1.1.1 Overconfidence and confirmation bias

People tend to overestimate their capabilities. If this is happening at board level it may lead **the board to overestimate their ability to turn around a firm** and to produce higher returns than its previous management.

Overconfidence can result from managers paying more attention to evidence supporting the logic of an acquisition than they will to evidence that questions this logic. This is **confirmation bias**.

1.1.2 Loss aversion

Many takeover bids are contested, ie more than one company is involved in bidding for a firm. In this situation there is a likelihood that the bid price will be pushed to excessively high levels. This can be explained in psychological terms in that there is a stronger desire to possess something because there is a threat of it being taken away from you. This is sometimes called **loss aversion**.

1.1.3 Entrapment

Where a strategy is failing, managers may become unwilling to move away from it because of their personal commitment to it (for example, it may have been their idea). This **entrapment** may mean that they commit even more funds (eg buying another company even if this means paying a price that is excessive) in an increasingly desperate attempt to turn around failing businesses.

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Entrapment can help to explain excessive prices being paid to acquire companies that are **seen as crucial** to helping to turn around a failing strategy.

1.1.4 Anchoring

If valuing an unlisted company, the bidder may be strongly influenced by that company's initial **asking price**, ie this **becomes a (biased) reference point** for the valuation (however irrational it is).

1.2 Agency issues and overvaluation

Managers may follow their own self-interest, instead of focusing on shareholders. For example, managers may look to make large acquisitions (and may pay too much for them) primarily to reduce the vulnerability of their company to being taken-over (Ryan 2007).

2 Approaches to business valuation

Overvaluation may also arise due to a miscalculation of the value of an acquisition.

To ensure that a company does not overpay for a target, it is important that careful analysis is undertaken to establish a realistic valuation for a potential acquisition.

There are **three basic approaches** to valuation:

- **Asset-based models**

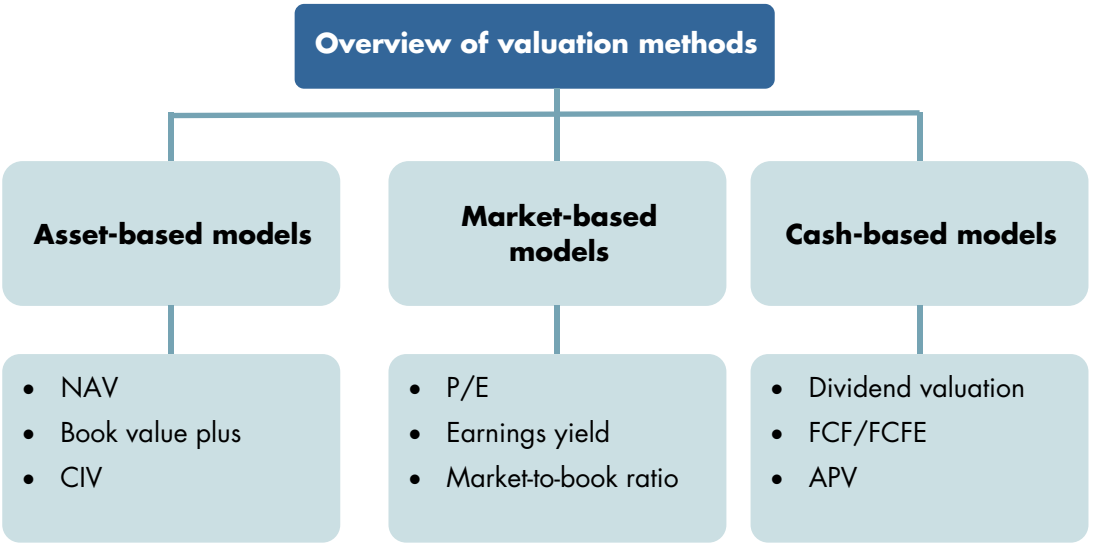
  These models attempt to value the assets that are being acquired as a result of the acquisition.

- **Market-based models**

  These models use market data to value the acquisition.

- **Cash-based models**

  These models are based on a discounted value of the future cash flows relating to an acquisition.



An acquisition may potentially have an impact on both the **financial and the business risk** of the acquirer. This impact needs to be incorporated into the analysis of the valuation of an acquisition.

PER alert

One of the performance objectives in your PER is to 'select investment or merger or acquisition opportunities using appropriate appraisal techniques'.

3 Asset–based models

3.1 Net asset value (NAV)

Asset-based methods use the **statement of financial position** as the starting point in the valuation process.

This values a target company by comparing its assets to its liabilities, which gives an estimate of the funds that would be available to the target's shareholders if it entered voluntary liquidation. For an unquoted company, this value would need to **at least** be matched by a bidder, and this value is often used as a **starting point** for negotiating the acquisition price.

Activity 1: Asset valuation

Transit Co's latest statement of financial position is shown below:

	$m
Non-current assets	1,350
Current assets	1,030
Total assets	**2,380**
Share capital	240
Retained earnings	860
Total equity	**1,100**
Current liabilities	700
Non-current liabilities	580
Total liabilities	**1,280**
Total equity plus liabilities	**2,380**

Required

Which of the following is the correct asset valuation of Transit Co's equity?

- $2,380 million
- $1,680 million
- $1,100 million
- $240 million

The target company's net asset value may need to be adjusted if an exam questions tells you that the **realisable value** of assets differs from their book value.

3.1.1 Drawbacks of NAV approach

This technique is sometimes used to estimate a minimum **value for an unquoted company that is in financial difficulties or is difficult to sell** (if a company is **listed** then its minimum value is its current **share price**).

This technique ignores:

- The value of future profits
- The value of intangibles

However, both of these drawbacks can be addressed.

3.2 Book value 'plus'

Because this valuation of a target company ignores the profit of the target company a **premium** is normally negotiated, based either on a multiple of the firm's profits or an **estimated value of the company's intangible assets**. This is called a **'book value plus'** model.

3.2.1 Intangible assets

In many firms **intangible assets** are of enormous value; a company's knowledge base, its network of contacts with suppliers and customers, and the trust associated with its brand name are often significant sources of value.

Calculated Intangible Value (CIV) assesses whether a company is achieving an above-average return on its tangible assets. This figure is then used in determining the present value attributable to intangible assets.

CIV involves the following steps:

(a) Estimate the profit that would be **expected** from an entity's tangible asset base using an **industry average** expected return.

(b) Calculate the present value of any *excess* profits that have been made in the recent past, using the **WACC** as the discount factor.

Activity 2 (continuation of Activity 1): CIV

Transit Co's average pre-tax earnings for the last three years has been $400 million, and its average year end asset base for the last three years has been $2,000 million.

The average (pre-tax) return on tangible assets in this sector has been 12%, corporate income tax is 25% and Transit Co's weighted average cost of capital is estimated to be 10%.

Required

Using CIV, calculate the value of Transit Co's intangible assets.

Solution

1 Estimate the profit that would be **expected** from an entity's tangible asset base using an **industry average** expected return.

2 Calculate the present value of any *excess* profits that have been made in the recent past, using the **WACC** as the discount factor.

3.2.2 Drawbacks of CIV approach

(a) It uses the **average industry return** on assets as a basis for computing excess returns; the industry average may be distorted by extreme values.

(b) CIV assumes that **past profitability** is a sound basis for evaluating the **current value** of intangibles – this will not be true if, for example, a brand has recently been weakened by a corporate scandal or changes in legislation.

(c) CIV also assumes that there will be **no growth** in value of the excess profits being created by intangible assets.

Essential reading

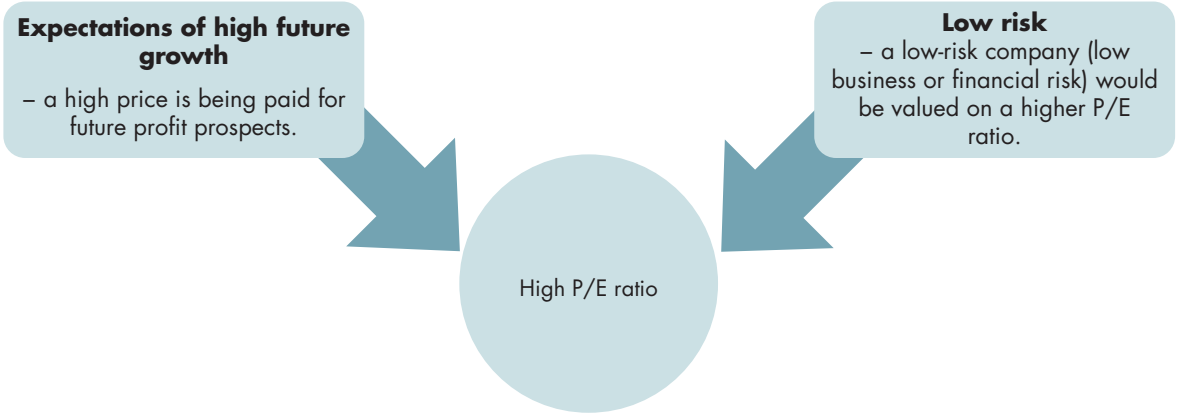
See Chapter 8 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides some further thoughts on asset-based approaches.

4 Market-based models

A sensible starting point for valuing a listed company is the **market value** of its shares.

If the stock market is **efficient** the market price will reflect the market's assessment of the company's future cash flows and risk (both business risk and financial risk).

It follows that the relationship between a company's share price and its earnings figure, ie its **P/E ratio**, also indicates the market's assessment of a company or a sector's future cash flows and risk (both business and financial risk).



4.1 P/E method

A P/E ratio can be applied to valuing a takeover target by taking the latest earnings of the **target** and multiplying by an **appropriate P/E ratio.**

Market-based value =	**earnings of target**	×	**appropriate P/E ratio**

Shows the **current profitability** of the company

Reflects the **growth prospects/risk** of a company

Activity 3: Technique demonstration

Groady plc wants to acquire an Italian company, Bergerbo S.p.A., a company in the **same industry**.

BERGERBO S.P.A. SUMMARISED STATEMENT OF PROFIT OR LOSS
FOR THE YEAR ENDING 31 DECEMBER 20X3

	€m
PBIT	9.8
Interest expense	2.3
Taxable profit	7.5
Taxation (25%)	1.9
Profit after tax	5.6
Dividend	5.0
Retained earnings	0.6

Bergerbo's P/E ratio is 16.0

Required

If Groady's P/E is currently 21.2, and it anticipates turning Bergerbo around so that it shares Groady's growth prospects, calculate the value of Bergerbo in €m.

Solution

4.1.1 Problems with this method

- **Choice of which P/E ratio to use**

  Care has to be taken that the P/E ratio used reflects the **business and financial risk (ie capital structure) of the company that is being valued**. This is quite difficult to achieve in practice.

  Also, the P/E ratio will normally be **reduced** if the company that is being valued is **unlisted**. Listed companies have a higher value, mainly due to the greater ease in selling shares in a listed company. The P/E ratio of an unlisted company's shares will be 30%–50% lower compared to the P/E ratio of a similar public company.

- **Earnings calculation**

  The earnings of the target company may need to be adjusted if it includes one-off items that will tend not to recur, or if it is affected by directors' salaries which might be adjusted after a takeover.

  Historic earnings will not reflect the potential future synergies that may arise from an acquisition. Earnings may need to be adjusted to reflect such synergies.

  Finally, the latest earnings figures might have been manipulated upwards by the target company if it has been looking to be bought by another company.

- **Stock market efficiency**

  Behavioural finance (see Section 1) suggests that stock market prices may not be efficient because they are affected by psychological factors, so P/E ratios may be distorted by swings in market sentiment.

4.1.2 Using your judgement

In practice, using the P/E ratio approach may require you to **make a number of judgements** concerning the growth prospects and risk of the company that is being valued and therefore which P/E ratio is appropriate to use. There may be arguments for increasing the P/E ratio to reflect expectations of higher growth or lower risk as a result of an acquisition (or for decreasing the P/E ratio to reflect expectations of lower growth or higher risk as a result of an acquisition). In the exam you should make and **state your assumptions clearly**, and **you should not worry about coming up with a precise valuation** because, in reality, valuations **are not a precise science** and are affected by bargaining skills, psychological factors and financial pressures.

4.2 Post-acquisition P/E valuation

Where an acquisition affects the growth prospects of the **bidding company** too, the P/E ratio of the **bidding company** will change. In this case, the P/E approach needs to be adapted.

4.2.1 Maximum to pay for an acquisition

Maximum value = (Post-acquisition group earnings × new P/E ratio) – value of the company that is making the bid

Bidder's earnings + Target's earnings + impact of synergies	Will be **given** in an exam question	**Value pre-acquisition**

The post-acquisition value of the group can be compared to the pre-acquisition value of the bidding company (ie the acquirer); **the difference gives the maximum that the company should pay for the acquisition**.

Activity 4: Post-acquisition values

Macleanstein Inc is considering making a bid for 100% of Thomasina Inc's equity capital. Thomasina has a P/E ratio of 14 and earnings of $500 million.

It is expected that $150 million in annual synergy savings will be made as a result of the takeover and the P/E ratio of the combined company is estimated to be 16.

Macleanstein currently has a P/E ratio of 17 and earnings of $750 million.

Required

(a) What is the maximum amount that Macleanstein should pay for Thomasina?
(b) What is the minimum bid that Thomasina's shareholders should be prepared to accept?

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Solution

4.2.2 Calculation of value added by the acquisition

Value added =	**(Group earnings** × **new P/E ratio)**	**– value of the bidding company AND the target company**

This is the post-acquisition value of the group

Value pre-acquisition of both the bidder AND target

Illustration 1

Using the previous activity:

Current value of Macleanstein = $750m × 17 = $12,750m

Current value of Thomasina = $500m × 14 = $7,000m

Group post-acquisition earnings = $750m + $500m + $150m = $1,400m

Value added = $2,650m	**($1,400m × 16) – (12,750 + 7,000)**

Essential reading

See Chapter 8 Section 2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides background on other, less important, earnings based methods.

5 Cash-based models

The final set of valuation models are based on the concept of valuing a company using its forecast cash flows discounted at a rate that reflects that company's business and financial risk. These models are often seen as the most elegant and theoretically sound methods of business valuation, and can be adapted to deal with acquisitions that change financial risk or business risk.

5.1 Dividend basis

The simplest cash flow valuation model is the **dividend valuation model (DVM)**.

This is based on the theory that an equilibrium price for any share is the **future expected stream of income** from the share **discounted** at a suitable cost of capital.

Formula provided

$$\text{Value per share} = P_0 = \frac{d_0(1+g)}{r_e - g}$$

d_0 = current dividend

r_e = cost of equity **of the target**

g = annual dividend growth rate

The formula calculates the value of a share as the present value of a **constantly growing future dividend**.

The anticipated dividends are based on existing management policies, so this technique is most relevant to **minority shareholders** (who are not able to change these policies).

5.1.1 Estimating dividend growth

You will have seen these methods before in the Financial Management exam.

Estimating future dividend growth

Use historical growth

$$1+g = \sqrt[n]{\frac{\text{newest dividend}}{\text{oldest dividend}}}$$

See Illustration 2

Use current re-investment levels

g = br

b = balance of earnings reinvested

r = expected return on reinvested earnings

See Illustration 3

Illustration 2

AB Co has just paid a dividend of 40p per share; this has grown from 30p four years ago.

Required

What is the estimated rate of dividend growth?

Solution

$30 \times (1 + g)^4 = 40$

$\therefore (1 + g)^4 = 40/30 = 1.3333$

$\therefore 1 + g = \sqrt[4]{1.3333} = 1.0746$

$\therefore g = 0.0746$ or 7.46%

Illustration 3

RS Co has just paid a dividend per share of 30p. This was 60% of earnings per share. Estimated return on equity = 20%.

Required

What is the estimated rate of dividend growth?

Solution

b = balance of earnings reinvested

b = 1 – 0.6 = 0.4 r = 0.2

g = 0.4 × 0.2 = 0.08 or 8%

5.1.2 Other issues

When using the dividend valuation model to value an **unlisted company** it may be necessary to use the **beta of a similar listed company** to help to calculate a K_e. This beta will need to be ungeared and then regeared to reflect differences in gearing (see Chapter 6).

5.1.3 Drawbacks

(a) It is difficult to estimate future dividend growth.

(b) It creates zero values for zero dividend companies and negative values for high growth companies (if g is greater than r_e).

(c) It is inaccurate to assume that growth will be constant.

5.1.4 Non-constant growth

The DVM model can be adapted to value dividends that are forecast to go through **two phases**:

Phase 1 (eg next two years)	**Phase 2 (eg Year 3 onwards)**
• **Growth is forecast at an unusually high (or low) rate**	• **Growth returns to a constant rate**
Use a normal NPV approach to calculate the present value of the dividends in this phase.	1 Use the formula to assess the NPV of the constant growth phase; however the time periods need to be adapted eg: $P_0 = \frac{d_0(1+g)}{K_e - g}$ is adapted to $P_2 = \frac{d_2(1+g)}{K_e - g}$ 2 Then adjust the value given above by discounting back to a present value (here using a T_2 discount rate).

Activity 5: Non-constant growth

Hitman Co's latest dividend was $5 million. It is estimated to have a cost of equity of 8%.

Required

Use the DVM to value Hitman Co assuming 3% growth for the next three years and 2% growth after this.

Solution

Phase 1 (3% growth per annum)

Time	*1*	*2*	*3*
Dividend $m			
DF @ 8%	0.926	0.857	0.794
PV			

Total =

Phase 2 (2% growth)

$P_0 = \frac{d_0(1+g)}{r_e - g}$ is adapted to $P_3 = \frac{d_3(1+g)}{r_e - g}$

P_3 =

Then discounting back to a present value =

Total Phase 1 + Phase 2 =

5.1.5 Earnings growth

Note that the techniques that have been covered for estimating dividend growth (historic method and current reinvestment method) can also be used to evaluate forecasts of a company's earnings growth.

5.2 Free cash flows and free cash flows to equity

Key term

Free cash flow (FCF): the cash available for payment to investors (shareholders and debt holders), also called free cash flow to firm.

Free cash flow to equity (FCFE): the cash available for payment to shareholders, also called dividend capacity.

This method can **build in the extra cash flows** (synergies) resulting from a change in management control, and **when** the synergies are expected to be received. There are two approaches which can be used.

Free cash flow (FCF) method	Free cash flow to equity (FCFE) method
PBIT	PBIT
less	**less**
tax, investment in assets	**interest,** tax, debt repayment, investment in assets
plus	**plus**
depreciation, any new capital raised	depreciation, any new capital raised

Approach 1		Approach 2	
1	Identify the **FCF** of the target company **(before interest)**	1	Identify the **FCFE** of the target company **(after interest)**
2	Discount at **WACC**	2	Discount at an appropriate cost of equity, $\mathbf{K_e}$.
3	This calculates the NPV of the cash flows **before** allowing for interest payments	3	This calculates the NPV of the **equity**
4	**Subtract the value of debt from Step 3 to obtain the value of the equity.**		

Activity 6: FCF and FCFE method

Wmart Co plans to make a bid for the entire share capital of Ada Co, a company in **the same industry**. It is expected that a bid of $75m for the entire share capital of Ada Co will be successful.

The acquisition will generate the following **after-tax operating** cash flows (ie pre-interest) over the next few years by:

Year	$m
1	5.6
2	7.4
3	8.3
4 onwards	12.1

Both companies have similar gearing levels of 16.7% (debt as a % of total finance).

Ada Co has a $15 million bank loan paying a fixed rate of 5.75%.

Wmart Co has an equity beta of 2.178, the risk-free rate is 5.75% and the market rate is 10%.

Corporation tax is at 30%.

Required

Assess whether the acquisition will enhance shareholder wealth in Wmart Co. (Use both Approach 1 and Approach 2.)

Solution

Approach 1

Approach 2

5.3 Post-acquisition cash flow valuation

Where an acquisition affects the growth prospects or risk of the **bidding company** too, this approach needs to be adapted. Where an acquisition alters the bidding firm's **business risk** there is an impact on the **existing value** of the acquirer as a result of the change in risk, so the following approach needs to be used.

Approach	
1	Calculate the asset beta of both companies
2	Calculate the average asset beta for the group post-acquisition
3	Regear the beta to reflect the gearing of the group post-acquisition
4	Estimate the post-acquisition value of the group's equity using a cash flow valuation approach
5	Subtract the existing value of the bidder to determine the maximum value to pay for the target
6	Subtract the pre-acquisition value of both companies to calculate the value created by the acquisition (ie the value of the synergies)

Activity 7: Technique demonstration

Salsa Co plans to make a bid for the entire share capital of Enco Co, a company in a **different industry**. It is expected that a bid of £80m for the entire share capital of Enco Co will be successful. This will be entirely financed by new debt at 6.8%.

After the acquisition the post-tax operating cash flows of Salsa's existing business will be:

Time	*1*	*2*	*3*	*4*	*5*
£m	24.12	25.57	27.10	28.72	30.45

After the acquisition the post-tax operating cash flows of Enco's existing business will be:

Time	*1*	*2*	*3*	*4*	*5*
£m	6.06	6.30	6.56	6.84	7.13

After the acquisition, £6.5 million of land will be sold and there will be synergies of £5 million post-tax p.a.

Before the acquisition, Salsa had £45 million of debt finance (costing 5.6% pre-tax) and 40 million shares worth £9 each and an equity beta of 1.19. As a consequence of the acquisition, the credit rating of Salsa will fall and the interest paid on **existing** debt will rise by 1.2% to 6.8%.

Enco has an equity beta of 2.2, its existing share price is £1.00 and it has 62.4 million shares in issue; it also has £5 million of existing debt that would be taken over by Salsa Co.

The risk-free rate is 4.5% and the market rate is 8%; corporation tax is 30%.

Required

Evaluate the impact on shareholder wealth **assuming that cash flows after Year 5 will grow at 2% p.a.** (assume that the beta of debt is zero).

Solution

Tutorial note

In fact this approach is slightly inaccurate because the weightings used in Step 3 do not reflect the value of the company **post-acquisition**; a computer model can solve this, so this is not something you will have to deal with in the exam.

5.4 Adjusted present value

Adjusted present value (APV) has been **covered numerically in Chapter 6**.

APV can also be used to **value acquisitions that change the gearing of the bidding company**. One reason that this could happen is that the acquisition is a bid that is financed by **borrowing** (see Chapter 10).

Step 1 – base case	Step 2 – financing effects	Step 3 – issue costs
Calculate the present value of the target's future cash flows **as if ungeared** (at an **ungeared cost of equity**)	Add the PV of the **tax saved** as a result of the **debt used** (using all of the debt involved in the acquisition ie the debt of the target company plus any debt used to buy the target company)	Subtract the **cost of issuing new finance**

This technique values the enterprise (ie debt plus equity) and the amount of debt needs to be subtracted in order to value the equity in the target company.

6 Valuing start-ups: Black–Scholes (BSOP) model

The BSOP model was introduced in Chapter 4; this can also be applied to company valuation and the assessment of default risk, although in these contexts you will **not have to perform any calculations**.

6.1 BSOP and company valuation

This approach is mainly useful for a start-up firm that is high risk and difficult to value using normal techniques.

The value of a firm can be thought of in these terms:

- If the firm fails to generate enough value to repay its loans, then its value = 0; shareholders have the **option** to let the company die at this point.

- If the firm does generate enough value, then the extra value over and above the debt belongs to the shareholders.

- In this case shareholders can pay off the debt (this is the **exercise price**) and continue in their **ownership** of the company (ie just as the exercise of a **call option** results in the ownership of an asset).

- BSOP can be applied because shareholders have a **call option** on the business. The protection of limited liability creates the same effect as a call option because there is an upside if the firm is successful, but shareholders lose nothing other than their initial investment if it fails.

- The value of a company can be calculated as the **value of a call option**.

6.2 BSOP and default risk

The BSOP model can also be used to assess the probability of asset values falling to a level that would trigger default. This can be assessed by looking at the past levels of volatility of a firm's asset values and assessing the number of standard deviations that this fall would represent.

Within the BSOP model, $N(d_2)$ depicts the probability that the call option will be in-the-money (ie have intrinsic value for the equity holders).

If $N(d_2)$ depicts the probability that the company has not failed and the loan will not be in default, then $1 - N(d_2)$ depicts the probability of default.

The probability of default is used in the BSOP model to calculate the market value of debt.

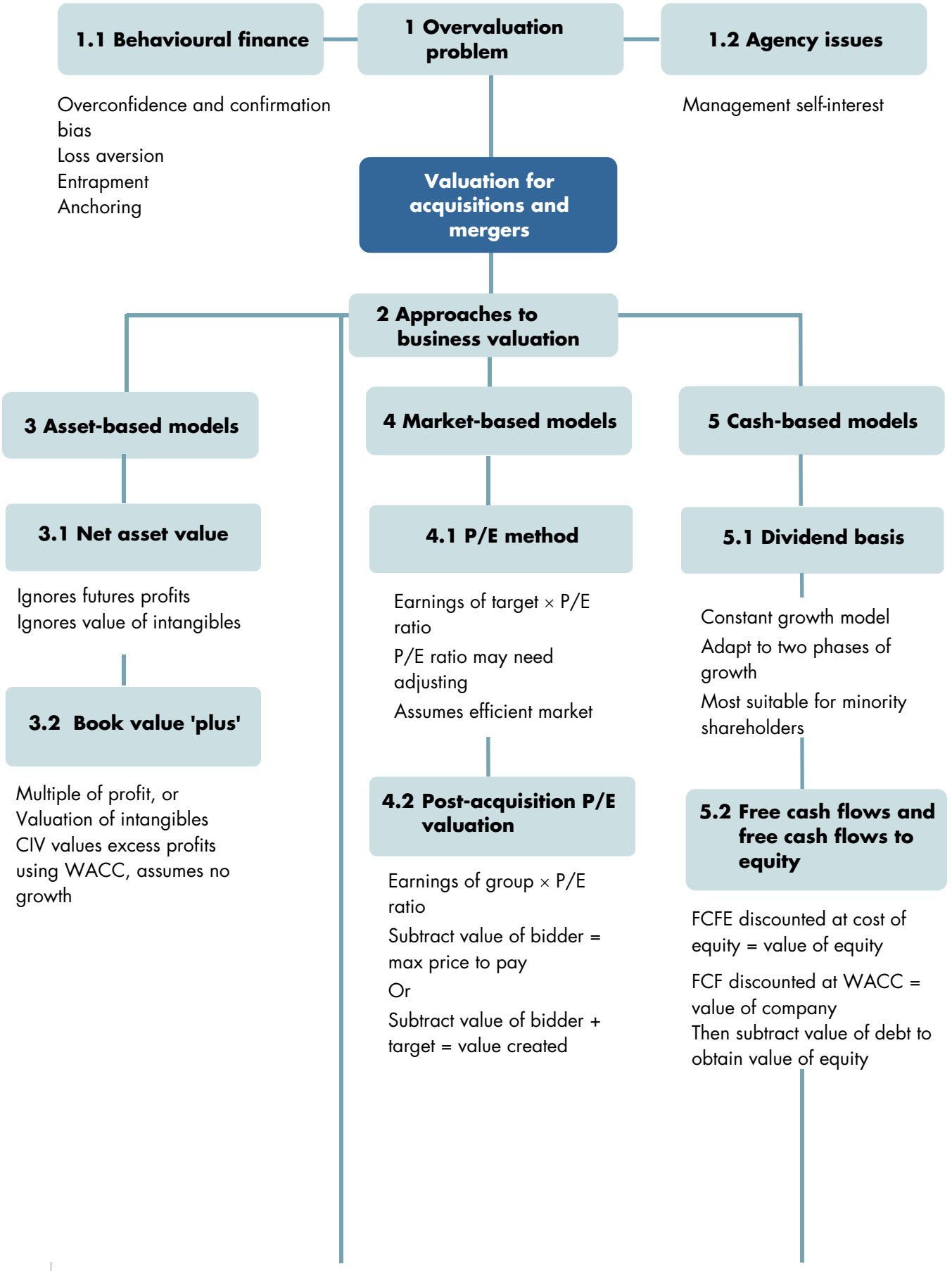
If the present value of the repayments on the debt is less than the market value, this shows the expected loss to the lender on holding the debt. If the expected loss and default risk are known then the recoverability of the debt in the event of default can be estimated.

This section is not examinable numerically.

Essential reading

Review Chapter 7 Section 1.2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, to recap on the relationship between expected loss, default risk and recoverability. See Chapter 8 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, which provides some further thoughts on the use of the BSOP model in these contexts.

Chapter summary



5.3 Post-acquisition cash flow valuation

Cash-based equity valuation
Subtract value of bidder = max price to pay
Or
Subtract value of bidder + target = value created

If business risk changes:
Calculate average asset beta of target and bidder and regear for post-acquisition gearing.

5.4 Adjusted present value

1 Value cash flows at ungeared cost of equity.
2 Value tax saved on debt at required return on debt.
3 Adjust for issue costs.

6 Valuing start-ups: Black–Scholes model

Traditional valuation methods hard to apply

6.1 BSOP and company valuation

Values equity as a call option, because there is an upside if the firm is successful, but shareholders lose nothing other than their initial investment if it fails.

6.2 BSOP and default risk

If $N(d_2)$ is the probability that the call option is in-the-money (ie the company has not failed), then $1 – N(d_2)$ depicts the probability of default.

Knowledge diagnostic

1. **Overvaluation problem**

   A significant problem in acquisitions, can be explained by behavioural or agency factors.

2. **Calculated intangible values**

   This assesses the excess profits post-tax being made, and values these as a constant cash flow using the company's WACC.

3. **P/E ratio**

   This indicates the growth potential of a company.

4. **Post-acquisition valuations**

   This approach is useful where the acquisition has an underlying impact on the growth or risk of the **bidding company** (the acquirer).

5. **Free cash flow**

   The cash flows available for all investors (whether equity or debt holders) ie before interest but after tax.

6. **Free cash flow to equity**

   The cash flows available for equity investors only, ie after interest and tax.

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q12 Mercury Training

Q13 Kodiak Company

Further reading

There is a Technical Article on behavioural finance available on ACCA's website, called 'Patterns of behaviour' which has been written by a member of the AFM examining team. This article was recommended reading in Chapter 2, but if you have not had a chance to read it then please look at it now.

Acquisitions: strategic issues and regulation

9

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• **Discuss** the arguments for and against the use of acquisitions as a growth method	C1(a)
• Evaluate the corporate and **competitive nature** of a given acquisition proposal	C1(b)
• Advise upon the **criteria for choosing an appropriate target** for acquisition	C1(c)
• Compare the various explanations for the high failure rate for acquisitions in enhancing shareholder value – also covered in Chapter 8	C1(d)
• Evaluate, from a given context, the **potential for synergy** separately classified as revenue synergy, cost synergy, financial synergy	C1(e)
• Evaluate the use of the **reverse takeover** as a method of acquisition and as a way of obtaining a stock market listing	C1(f)
• Demonstrate an understanding of the principal factors influencing the development of the regulatory framework for mergers and acquisitions globally and, in particular, be able to compare and contrast the shareholder vs the stakeholder models of regulation	C3(a)
• Identify the **main regulatory issues** in the context of a given offer and: – Identify whether the offer is likely to be in the shareholders' best interests – Advise the directors of a target company on the most **appropriate defence** if a specific offer is to be treated as hostile	C3(b)

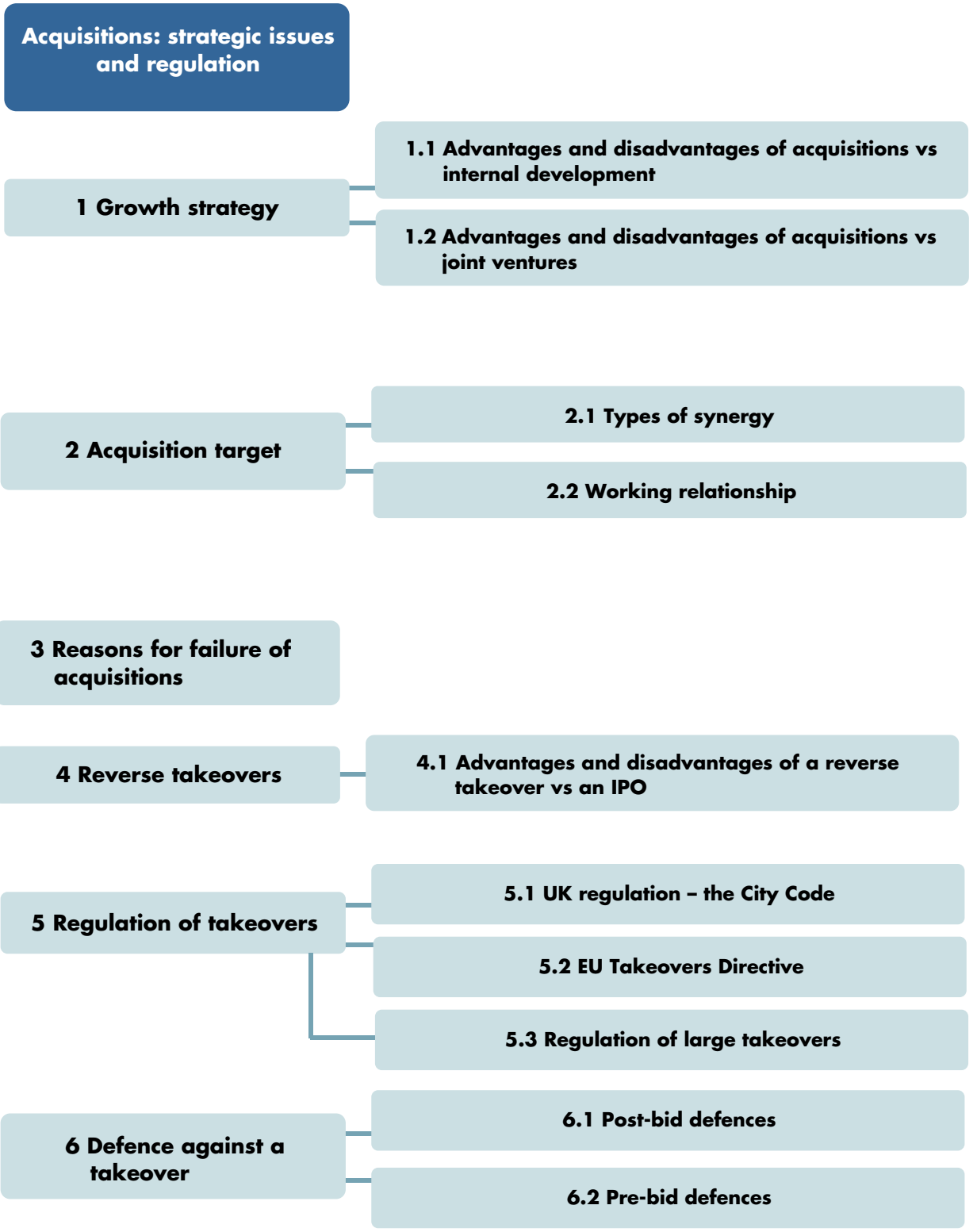
Exam context

This chapter continues Section C of the syllabus 'Acquisitions and Mergers'.

The acquisition decision is not only about 'the numbers', ie the valuation process. The M in AFM stands for 'management' and this is the focus of this chapter, ie how to manage the strategic and regulatory aspects of an acquisition.

These areas are likely to be discussed in conjunction with the valuation techniques covered in the previous chapter.

Chapter overview



1 Growth strategies

To achieve its growth objectives, a company has three strategies that it can use, including:

(a) Internal development (organic growth)
(b) Acquisitions/mergers
(c) Joint ventures

Different forms of expansion have already been identified and discussed in Chapter 5.

Here we briefly recap on this focusing mainly on acquisitions; note that these are general points and may or may not be relevant to the issues facing a company in an exam question.

1.1 Advantages and disadvantages of acquisitions vs internal development

Advantages of acquisitions	Disadvantages of acquisitions
Speed An acquisition allows a company to reach a certain optimal level of production much quicker than through organic growth.	**Acquisition premium** When a company acquires another company, it normally pays a premium over its present market value. Too large a premium may render the acquisition unprofitable. However, this may be offset by a takeover target being undervalued.
Benefit of synergies An acquisition may create synergies (extra cash flows). These are discussed later.	**Lack of control over value chain** Assets or staff may prove to be lower quality than expected.
Acquisition of intangible assets A firm through an acquisition will acquire not only tangible assets but also intangible assets, such as brand recognition, reputation, customer loyalty and intellectual property, which are more difficult to achieve with organic growth.	**Integration problems** Many acquisitions are beset with problems of integration, as each company has its own culture, history and ways of operating, and there may exist aspects that have been kept hidden from outsiders. These are discussed later.

1.2 Advantages and disadvantages of acquisitions vs joint ventures

Advantages of acquisitions	Disadvantages of acquisitions
Reliability Joint venture partners may prove to be unreliable or vulnerable to take-over by a rival.	**Cost and risk** Acquisitions will involve a higher capital outlay and will expose a company to higher risk as a result.
Managerial autonomy Decision making may be restricted by the need to take account of the views of all the joint venture partners. There may be problems in agreeing on partners' percentage ownership, transfer prices etc.	**Access to overseas markets** When a company wants to expand its operations in an overseas market, a joint venture may be the only option of breaking into the overseas market.

Essential reading

See Chapter 9 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of types of acquisitions.

2 Acquisition targets

A company's strategic planning should give a focus for selecting an acquisition target.

The strategic plan might be to diversify, or to find new geographical markets, or to find firms that have new skills/products/key technology, or simply to identify firms that are poorly managed and to turn them around and sell them on at a higher price.

The criteria that should be used to assess whether a target is appropriate will **depend on the motive** for the acquisition.

For example, if the strategic plan is to acquire and turn around companies that are undervalued then the key criteria will be whether a target firm's share price is below the estimated value of the company **when acquired** – which is true of companies which have assets that are not exploited.

Having identified the general type of target, two areas of particular importance are:

(a) Are there **potential synergies** with the target (covered in section 2.1)?

(b) Is there a likelihood of a **good working relationship** with the target (covered in Section 2.2)?

Key term

Synergies: extra benefits resulting from an acquisition either from higher cash inflows and/or lower risk.

2.1 Types of synergy

2.1.1 Revenue synergy

Higher revenues may be due to sharing customer contacts and distribution networks or increased market power.

2.1.2 Cost synergy

This may result from being able to negotiate better terms from suppliers, sharing production facilities or sharing Head Office functions.

2.1.3 Financial synergy

Examples include: a reduction in **risk** due to diversification (this assumes shareholders are not already well diversified), a reduction in the **tax** paid by two firms combined (losses in one firm reduce the tax paid by the other), or when a firm with excess **cash** acquires a firm with promising projects but insufficient capital.

2.2 Working relationship

Possible issues that impede a good working relationship between the acquired company and its new owner include language, culture and strategic values. These issues should be examined as part of a **due diligence** investigation prior to a takeover being finalised.

2.2.1 Due diligence

Prior to takeover bid, investigations should be undertaken to assess the target, three types are common:

- **Legal due diligence:** checks for any legal concerns, for example any pending litigation and are there concerns about the costs of complying with the local regulatory environment.
- **Financial due diligence**: focuses on verifying the financial information provided (eg updated financial forecasts).
- **Commercial due diligence**: considers for example an assessment of competitors and a fuller analysis of the assumptions that lie behind the business plan.

3 Reasons for failure of acquisitions

Overvaluation has been discussed in the previous chapter. Other potential reasons for the failure of acquisitions are discussed here.

Risk	Explanation
Clash of cultures	Especially if the two firms follow different business strategies
Uncertainty among staff	Lay-offs expected, the best staff often leave
Uncertainty among customers	Customers fear post-acquisition problems and sales fall
Unanticipated problems	Information systems may be more difficult to integrate than expected, assets or staff may prove to be lower quality than expected
Paying too high a price for the target	Managers' desire to grow may stem less from a desire to benefit shareholders and more from a desire to empire-build or to make the company less of a takeover target; so they may overpay to acquire the target.

To minimise these risks a firm should have a **clear post-integration strategy**. This should include:

(a) **C**ontrol of key factors – eg new capex approval centralised

(b) **R**eporting relationships – appoint new management and establish reporting lines quickly

(c) **O**bjectives and plans – to reassure staff and customers

(d) **O**rganisation structure – integrating business processes to maximise synergies

(e) **P**osition audit of the acquired company – build understanding of the issues faced by the target via regular online employee surveys and strategy discussion forums with front line staff and managers.

PER alert

One of the performance objectives in your PER is to 'review the financial and strategic consequences of an investment decision'. This chapter evaluates mergers and acquisitions as a method of corporate expansion and also looks at the potential corporate consequences of such activity. This information will be invaluable in practice, as it gives you an idea of the issues that might arise when considering the viability of mergers and acquisitions.

4 Reverse takeovers

Key term

Reverse takeover: a situation where a smaller quoted company (S Co) takes over a larger unquoted company (L Co) by a share-for-share exchange.

To acquire L Co, a large number of S Co shares will have to be issued to L Co's shareholders. This will mean that **L Co will hold the majority of shares and will therefore have control of the company**.

The company will then often be renamed, and it is normal for the larger company (L Co) to impose its own name on the new entity.

Illustration 1

In 2007, Eddie Stobart, a well-known UK road haulage company, used a reverse takeover **to obtain a listing on the London Stock Exchange**. This deal combined Eddie Stobart's road transport, warehouse and rail freight operations, with Westbury (a property and logistics group).

Eddie Stobart's owners, William Stobart and Andrew Tinkler, were appointed chief executive and chief operating officer of the new company. They owned 28.5% of the new company following the merger.

The merged group was renamed **Stobart** and took up Westbury's share listing.

4.1 Advantages and disadvantages of a reverse takeover vs an IPO

A reverse takeover is a route to a company obtaining a stock market listing. Compared to an initial public offering (IPO), a reverse takeover has a number of potential advantages and disadvantages:

Advantages of reverse takeovers	Disadvantages of reverse takeovers
Speed • An IPO typically takes between one and two years. By contrast, a reverse takeover can be completed in a matter of months.	**Risk** • There is the risk that the listed company being used to facilitate a reverse takeover may have some liabilities that are not clear from its financial statements.
Cost • Unlike an IPO, a reverse takeover will not incur advertising and underwriting costs. In addition a reverse takeover results in two companies combining together, with the possibility of **synergies** (see earlier) resulting from this combination.	**Lack of expertise** • Running a listed company requires an understanding of the regulatory procedures required to comply with stock market rules. There is the risk that the unlisted company that is engineering the reverse takeover does not have a full understanding of these requirements.
Availability • In a downturn, it may be difficult to stimulate investor appetite for an IPO. This is not an issue for a reverse takeover.	**Share price decrease** • If the shareholders in the listed company sell their shares after the reverse takeover then this could lead to a sharp drop in the share price.

5 Regulation of takeovers

Takeover regulation in the UK (and the US) is based on a **market-based or shareholder-based model** and is designed to protect **a wide and dispersed shareholder base**.

In the UK and the US companies normally have wide share ownership so the emphasis is on agency problems and the protection of the widely distributed shareholder base.

In Europe most large companies are **not** listed on a stock market, and are often **dominated by a single shareholder** with more than 25% of the shares (often a corporate investor or the founding family). Banks are powerful shareholders and generally have a seat on the boards of large companies.

Regulations in Europe have been developed to control the power of these powerful stakeholder groups, which is sometimes referred to as a **stakeholder-based system**.

European regulations on takeovers have generally in the past relied on legal regulations that seek to **protect a broader group of stakeholders**, such as creditors, employees and the wider national interest.

5.1 UK regulation – the City Code

This is a voluntary code that aims to protect the interests of shareholders during the bid process. Although it is voluntary, any listed company not complying may have its membership of the London Stock Exchange suspended. **The details** of this code do not have to be memorised, but awareness of its existence and purpose is examinable.

Activity 1: Homework exercise

Here are a few of the key rules in the UK's City Code (for full details see www.thetakeoverpanel.org.uk).

Required

What is the purpose of these types of regulations?

(a) **Rules 2.2, 2.4, 2.6**. Any companies that are identified as potential bidders have a 28-day period within which they must either announce a firm intention to bid or state that they do not intend to make a bid (in which case they cannot make another bid for a six-month period without the consent of the board of the target company).

(b) **Rule 2.5**. Where a bid involves an element of cash, the bidding company must obtain confirmation by a third party that it can obtain these resources.

(c) **Rule 3**. The board of an offeree company must obtain competent independent advice on any offer and the substance of such advice must be made known to its shareholders. If the board disagrees with the advice this must be explained to shareholders.

(d) **Rule 9**. An offer must be made for all other shares if the % shareholding rises above **30%**, at not less than the highest price paid by the bidding company in last year.

(e) **Rule 31**. After a formal offer there is a 14-day deadline for the defence document to be published, and a 46-day deadline for the offer to be improved and finalised. Offers are normally conditional on more than 50% of the shares being secured.

(f) **Rule 35**. If a bid fails then the bidder cannot make another bid for another 12 months.

Solution

5.2 EU Takeovers Directive

The Takeovers Directive was introduced by the EU in 2006 in order to achieve harmonisation and convergence of the shareholder-based and stakeholder systems. In terms of approach, it has mainly led to the **convergence** of the **European system** and the **UK and US** one, by adopting many of the elements of the **City Code**. Its key points included:

- **The mandatory bid rule**

  The aim of this rule is to protect minority shareholders by providing them with the opportunity to exit the company at a fair price once the bidder has accumulated a certain percentage of the shares. In the UK, this threshold is specified by the City Code for Takeovers and Mergers and is at 30%.

  The mandatory bid rule is based on the grounds that once the bidder obtains control it may exploit its position at the expense of minority shareholders. This is why the mandatory bid rule normally also specifies the price that is to be paid for the shares.

  The bidder is normally required to offer to the remaining shareholders a price not lower than the highest price for the shares already acquired during a specified period prior to the bid.

- **The principle of equal treatment**

  In general terms, the principle of equal treatment requires the bidder to offer to minority shareholders the same terms as those offered to earlier shareholders from whom the controlling block was acquired.

- **Squeeze-out rights**

  Squeeze-out rights give the bidder who has acquired a specific percentage of the equity (usually 90%) the right to force minority shareholders to sell their shares.

  The rule enables the bidder to acquire 100% of the equity once the threshold percentage has been reached and eliminates potential problems that could be caused by minority shareholders.

However, in two key areas the original wording of the European code was **significantly diluted in the final draft:**

- **Board neutrality and anti-takeover measures (Article 9)**

  Seeking to address the agency issue where management may be tempted to act in their own interests at the expense of the interests of the shareholders, it was originally proposed that the board would not be permitted to carry out post-bid aggressive defensive tactics (such as selling the company's main assets, known as a 'crown jewels' defence, or entering into special arrangements giving rights to existing shareholders to buy shares at a low price, known as poison pill defence), without the prior authority of the shareholders.

  However, this has become an **optional provision** for member countries – because there is the argument that the shareholders may have limited experience so managers are better placed to act in the shareholders' best interest.

- **The break-through rule (Article 11)**

  The effect of the break-through rule is to enable a bidder with 75% of the capital carrying voting rights to break through the company's multiple voting rights and exercise control as if one-share-one-vote existed.

  Again this has become an **optional provision** for member countries.

5.3 Regulation of large takeovers

It is likely that any acquisition that is likely to lead to a **substantial lessening of competition** will be investigated by a country's competition authorities.

A detailed investigation often takes six months to complete and may result in a block to the bid or a requirement that the acquiring company disposes of parts of the acquired business.

In the UK the **Competition and Markets Authority** may intervene to prevent mergers that cause the creation of a company with a market share of above 25%, if it feels that there will be a substantial lessening of competition.

Mergers fall within the exclusive jurisdiction of the **European Commission (Competition)** where, following the merger, the following two tests are met.

(a) **Worldwide revenue** of more than **€5 billion p.a.**
(b) **European Union** revenue of more than **€250 million p.a.**

The European Commission will assess the merger in a similar way as the Competition and Markets Authority in the UK, by considering the effect on competition in the market.

The merger will be blocked if the merged company results in such a dominant position in the market that consumer choice and prices will be affected.

Essential reading

See Chapter 9 Sections 2 and 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of regulation.

6 Defence against a takeover

6.1 Post-bid defences

Where a bid is not welcomed by the board of the target company, then the bid becomes a **hostile bid**. Where the board feels that the takeover is not in the **best interest of their shareholders**, they can consider launching a defensive strategy.

This will normally involve attacking the value created for shareholders by the bid and sometimes this will extend to attacking the track record of the bidder.

A defence could also involve the following tactics:

Tactic	Explanation
White knights	This would involve inviting a firm that would rescue the target from the unwanted bidder. The white knight would act as a friendly counter-bidder.
Crown jewels	Valuable assets owned by the firm may be the main reason that the firm became a takeover target. By selling these the firm is making itself less attractive as a target. Care must be taken to ensure that this is not damaging the company. If the funds raised are used to grow the core business and therefore enhancing value, then the shareholders would see this positively and the value of the corporation will probably increase. Alternatively, if there are no profitable alternatives, the funds could be returned to the shareholders through **special dividends or share buybacks**. In these circumstances, disposing of assets may be a feasible defence tactic. This will require shareholder approval.
Litigation or regulatory defence	The target company can challenge the acquisition by inviting an investigation by the regulatory authorities or through the courts. The target may be able to sue for a temporary order to stop the bidder from buying any more of its shares.

6.2 Pre-bid defences

In order to deter takeover bids in the first place, the best defence is to have an efficiently run company with no underutilised assets. This will contribute to excellent relationships with shareholders and will help to maximise a company's share price, which will help to deter takeover bids.

However, subject to local regulations, schemes can also be designed to make any takeover difficult, for example:

Poison pills

If a hostile bid is made, or the stake held by single shareholder rises above a certain key level (eg 15% in the case of Yahoo) then a 'poison pill' within the target's capital structure is triggered: eg new shares are issued to existing shareholders at a discount, or convertibles can be exchanged into ordinary shares on favourable terms.

Poison pills are controversial because they hinder an active market for corporate control and by giving directors the power to deter takeovers. They also put directors in a position to enrich themselves, as they may ask to be compensated for consenting to a takeover.

Golden parachutes

These are significant payments made to board members when they leave. In many countries these schemes are illegal/non-compliant with local codes (eg the City Code in the UK).

Essential reading

See Chapter 9 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a summary of defensive tactics.

Chapter summary

Acquisitions: strategic issues and regulation

1 Growth strategy

1.1 Advantages and disadvantages of acquisition vs internal development

Advantages: speed, synergies, acquisition of intangible assets

Disadvantages: acquisition premium, lack of control, integration problems

1.2 Advantages and disadvantages of acquisition vs joint venture

Advantages: reliability, autonomy

Disadvantages: cost and risk, access to overseas markets

2 Acquisition target

2.1 Types of synergy

- Sales synergy (eg share sales outlets)
- Cost synergy (eg share R&D)
- Financial synergy (eg lower risk, lower tax bill)

2.2 Working relationship

- Culture, strategy
- Due diligence (legal/financial, commercial)

3 Reasons for failure of acquisitions

Clash of cultures

Uncertainty among staff

Customer uncertainty – fear of problems leads to a fall in sales

Assets or staff prove to be lower quality than expected

Paying too high a price for the target – empire building

Risk can be managed by a clear integration strategy and by due diligence

4 Reverse takeovers

4.1 Advantages and disadvantages of reverse takeover vs IPO

A **smaller quoted company (S Co) takes over a larger unquoted company (L Co) by a share for share exchange**.

A reverse takeover is a route **to a stock market listing**. An IPO has a number of **advantages** compared to an IPO:

Speed – a reverse takeover can be completed in a few months

Cost – a reverse takeover will have significantly lower issue costs

Availability – it may be difficult attract investors to an IPO

In addition a reverse takeover results in two companies combining together, with the possibility of **synergies.**

As a route to obtaining a stock market listing, **drawbacks** include: **risk** (the listed company being used may have some hidden liabilities), **lack of expertise** – running a listed company requires an understanding of compliance procedures.

5 Regulation of takeovers

5.1 UK regulation – the City Code

A bid announcement is required if the offeree company is the subject of speculation due to the bidding company's actions. The bidding company will be forced to state whether an offer is being considered, within 28 days, if a firm bid is **not made** then the bidding company will have to **wait six months before it can make another bid**.

(a) Where a bid involves an element of cash, the **bidding company must obtain confirmation by a third party that it can obtain these resources**.

(b) An offer must be made for all other shares if the % shareholding rises above **30%**, at **not less than the highest price paid by the bidding company in last year**.

(c) After a formal offer there is a 14 day deadline for the defence document to be published, a 46 day deadline for the offer to be improved and finalised, and a 81 day deadline for shareholder votes to be assessed and the result announced. **Offers are normally conditional on more than 50% of the shares being secured**.

(d) **If a bid fails, the bidder cannot make another bid for another 12 months**.

5.2 EU Takeovers Directive

- **The mandatory-bid rule** – aims to protect minority shareholders by providing them with the opportunity to exit the company at a fair price once the bidder has accumulated a certain percentage of the shares. In the UK, this threshold is specified by the City Code for Takeovers and Mergers and is at 30%.

  Once the bidder obtains control they may exploit their position at the expense of minority shareholders. This is why the mandatory-bid rule normally also specifies the price that is to be paid for the shares.
- **The principle of equal treatment** – requires the bidder to offer to minority shareholders the same terms as those offered to earlier shareholders from whom the controlling block was acquired.
- **Squeeze-out rights** – give the bidder who has acquired a specific percentage of the equity (usually 90%) the right to force minority shareholders to sell their shares. Enables the bidder to acquire 100% of the equity once the threshold percentage has been reached and eliminates potential problems that could be caused by minority shareholders.

5.3 Regulation of large takeovers

Regulated by national (eg CMA) or supranational authorities (eg EU)

6 Defence against a takeover

6.1 Post-bid strategies

Where the board feels that a takeover is not in its shareholders' best interest it may decide to launch a **defence** against the bid. This can include:

(a) White knights
(b) Crown jewels
(c) Litigation/regulation

6.2 Pre-bid strategies

Poison pills and golden parachutes

May not be permitted by local takeover panel rules

BPP LEARNING MEDIA

Knowledge diagnostic

1. **Alternative growth strategies other than acquisition**

   Joint venture and internal development (organic growth).

2. **Types of synergy**

   Three types: revenue, cost, financial.

3. **Reverse takeover**

   The takeover of a small listed company by a larger unlisted company using a share for share exchange.

4. **EU Takeovers Directive**

   Key points include the mandatory bid rule, the principle of equal treatment and squeeze-out rights.

5. **Pre-bid defences**

   These deter a bid in the first place.

6. **Post-bid defences**

   These are used after a bid has been received.

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q14 Saturn Systems

Q15 Gasco

Further reading

There is a Technical Article available on ACCA's website, called 'Reverse Takeovers'.

We recommend you read this article as part of your preparation for the AFM exam.

Financing acquisitions and mergers 10

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Compare the various **sources of financing** available for a proposed cash-based acquisition	C4(a)
• **Evaluate the advantages and disadvantages of a financial offer** for a given acquisition proposal using pure or mixed mode financing and recommend the most appropriate offer to be made	C4(b)
• Assess the **impact of a given financial offer** on the reported financial position and performance of the acquirer	C4(c)

Exam context

This chapter completes section C of the syllabus 'Acquisitions and Mergers'.

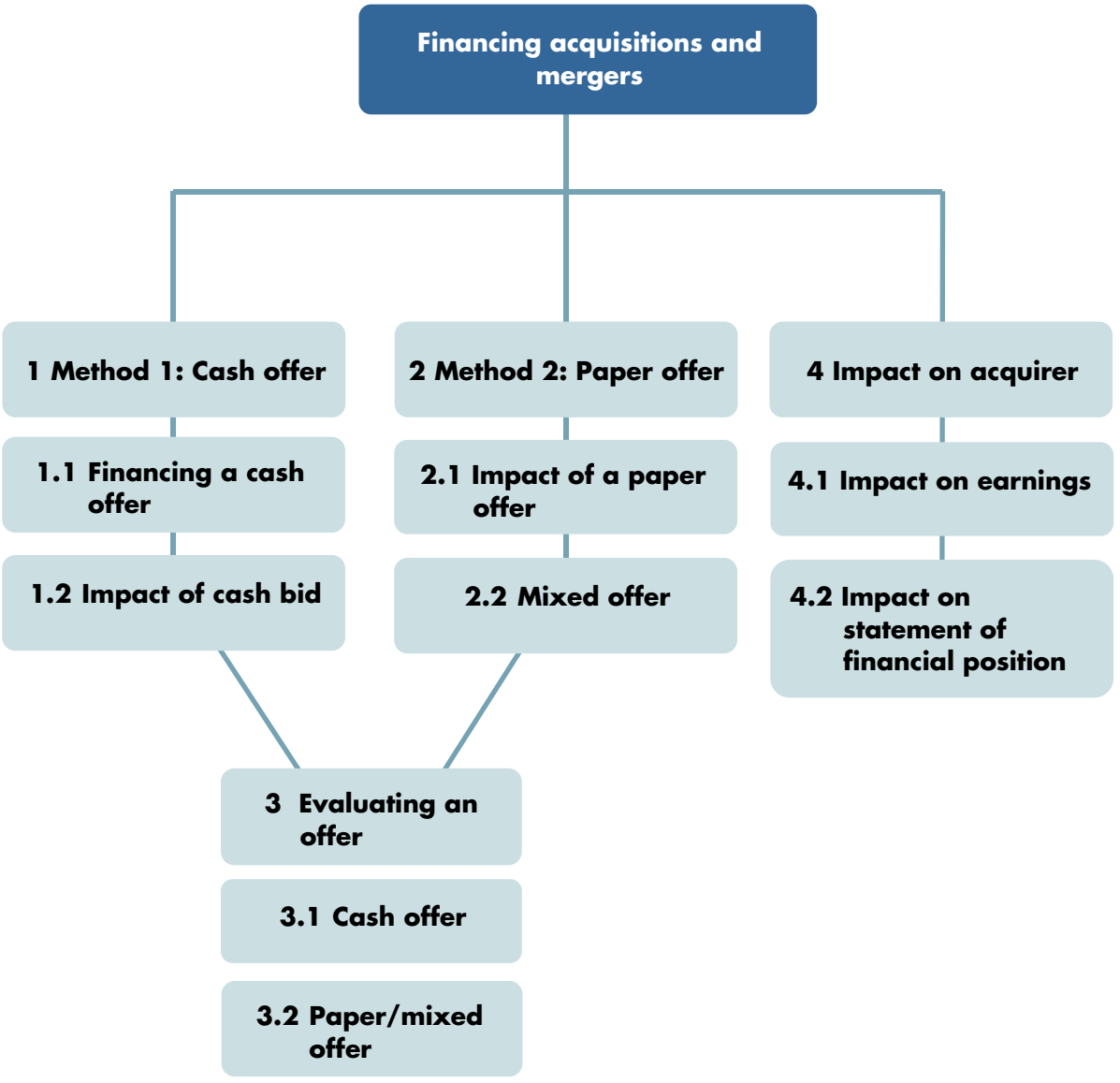
The chapter starts by discussing how a bidding firm can finance an acquisition, either by cash or by a share offer or a combination of the two, and the funding of cash offers.

The next theme is how to evaluate a financial offer in terms of the impact on the acquiring company's shareholders and the criteria for acceptance or rejection.

Finally we discuss ways of estimating the possible impact of an offer on the performance and the financial position of the acquiring firm.

The topics covered in this chapter are likely to be discussed in conjunction with the valuation techniques covered in Chapter 8.

Chapter overview



1 Method 1: Cash offer

The most common ways of paying for a target company's shares are by offering **cash** or **paper** (normally shares).

1.1 Financing a cash offer

How to obtain the cash required to finance a **cash offer** is a **gearing decision** and has been covered in earlier chapters – note that a cash offer/bid does not **necessarily** mean that any extra borrowing takes place, although this will often be the case.

1.2 Impact of a cash offer

Impact	Explanation
Value	Cash has a **definite** value, this will often be attractive to shareholders in the target company and may enhance the chances of a bid succeeding.
Control	**Less impact** on the control exercised by the owners of the bidding company, although any new debt used may carry restrictive covenants.
Gearing	**Gearing may rise *if*** cash is raised by borrowing, this may bring benefits in terms of tax savings on debt finance (see APV in Chapter 8) or may cause problems if it affects a company's credit rating.
Tax	Exposes a shareholder in the target company to **capital gains tax** (CGT), although this is not an issue for some investors (eg pension funds do not pay CGT).
Risk	**The risk of problems post-acquisition is borne by the acquirer** – if the share price falls post-acquisition then this only affects the acquirer as the target company shareholders have received their definite cash payment.

2 Method 2: Paper offer

2.1 Impact of a paper offer

The impact of paper (ie shares) being used to finance an acquisition can be assessed using the same factors considered above.

Impact	Explanation
Value	Shares have an **uncertain value**, often a higher price will have to be offered if the bid is a paper bid than if it was a cash bid to compensate the target's shareholders for this.
Control	The percentage of the shares owned by the bidding company's shareholders will be reduced as more shares are issued, so their **control will be diluted.**
Gearing	**Gearing will fall** as more equity is issued.
Tax	Gain is not realised for tax purposes until shares are sold – the timing of share sales can be staggered across different years to maximise the use of CGT allowances.
Risk	Post-acquisition **risk is shared between the bidding company and the target** – if the share price falls post-acquisition this affects both are affected.

2.2 Mixed offer

Because cash might be preferred by some shareholders (eg due to certainty) and paper by others (eg wanting to share in anticipated gains from a takeover), it is not uncommon for an acquisition to be financed by a **mixture** of cash and shares.

Illustration 1

In 2010 the acquisition of Cadbury by Kraft was financed by approximately 60% cash and 40% shares.

Essential reading

See Chapter 10 Sections 1–2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of financing bids.

3 Evaluating an offer

In the exam, you may be asked to evaluate a given offer and/or to suggest an offer.

3.1 Cash offer

A cash bid can simply be compared against the current market value of the target company or against an estimated value of an acquisition using **the techniques covered in Chapter 8** (these techniques will help to form the basis for a suggested cash offer).

While a significant premium above the market price is often expected (20%–30% is not uncommon), it is important (to the buyer) that the amount paid is **not greater than the value** that will be generated from the target company **under new ownership**.

3.2 Paper/mixed offer

How much a paper bid, or a bid that is partly financed by the issue of paper, is worth can be **assessed quickly** by looking at the value of the shares of the bidding company before acquisition.

However, a more accurate valuation would be based on the **value of the shares post-acquisition**.

The value of shares **post-acquisition** will be a matter of concern for the both the bidding company and the target company:

- The **bidding company** will not want to issue so many shares that its share price falls post acquisition, and there may also be concerns about the effect of a paper bid on diluting the control of existing shareholders.
- The **target company** will want to estimate the likely post-acquisition value of the shares to assess the attractiveness of the takeover bid.

Having evaluated a paper bid, you may choose to suggest an increase or a decrease in the number of shares offered.

The techniques for valuing a company post-acquisition have been covered in Chapter 8.

Note that post-acquisition values may also be required to evaluate a cash bid, but this is especially likely to be tested in the context of paper bids which forms the context for the recap of post-valuation techniques given here.

3.2.1 Post-acquisition value using earnings

Post-acquisition earnings valuation	
1	Estimate the group's **post-acquisition earnings** including synergies
2	Use **an appropriate P/E ratio to value these earnings** (this will be given)

Having obtained a post-acquisition valuation you may need to take one of the following steps:

- Deduct the cash element of the bid (if any) and then divide by the new number of shares in issue to calculate a **post-acquisition share price.**

  (To allow the **bidding company** to assess whether its share price will rise or fall, and to allow the **target company** to estimate the likely post-acquisition value of the shares to assess the attractiveness of the takeover bid.)

- Deduct the value of whole bid to see **if value is created for the bidding company's shareholders**.

Activity 1: Technique demonstration

Minprice Co is considering making a bid for the entire share capital of Savealot Co. Both companies operate in the **same industry**. It is anticipated that Minprice Co's P/E ratio will remain unchanged after the takeover.

You are given the following information:

	Minprice	*Savealot*
Revenue	$284m	$154m
Current share price ($1 ordinary shares)	$3.00	$5.00
EPS	$0.191	$0.465
No shares in issue	155m	21m
Gearing (D:E)	40:60	20:80

The acquisition will be financed by issuing ordinary shares in Minprice to replace those in Savealot. A 2 for 1 offer is proposed in order to deliver a significant bid premium to Savealot's shareholders.

Required

(a) Estimate the likely impact on both groups of shareholders; would they approve of the proposal?

(b) Calculate the maximum number of shares that Minprice could justify in terms of a paper bid.

Solution

(a)

- Estimate the group's **post-acquisition earnings** including synergies:

- Use an appropriate P/E ratio to value these earnings:

- Divide by the new number of shares in issue to get the estimated **post-acquisition share price:**

- Deduct the value of whole bid to see **if value is created for the bidding company's shareholders**.

- Evaluation of result

(b)

3.2.2 Post-acquisition value using cash flows

Post-acquisition cash flow valuation	
1	Estimate the group's **post-acquisition cash flows** including synergies.
2	Calculate an appropriate **cost of capital** and complete a **cash flow valuation**.

As before, having obtained a post-acquisition valuation you may need to take one of the following steps:

- Deduct the cash element of the bid (if any) and then divide by the new number of shares in issue to calculate a **post-acquisition share price**.
- Deduct the value of whole bid to see **if value is created for the bidding company's shareholders**.

4 Impact of a given offer on the financial performance and position of the acquiring firm

4.1 Impact on earnings

You may also be asked to evaluate the impact of a given offer on earnings (profits after tax and preference dividends) and key ratios such as EPS.

Activity 2: Continuation of Activity 1

	Minprice	*Savealot*
Revenue	$284m	$154m
Current share price ($1 ordinary shares)	$3.00	$5.00
EPS	$0.191	$0.465
Number of shares in issue	155m	21m
Gearing (D:E)	40:60	20:80

The acquisition will be financed by issuing ordinary shares in Minprice to replace those in Savealot. A 2-for-1 offer is proposed in order to deliver a significant bid premium to Savealot's shareholders.

Required

Evaluate the likely impact on the EPS of Minprice.

Solution

4.2 Impact on statement of financial position

The consolidated statement of financial position may need to be analysed using ratio analysis. Basic ratios have been covered earlier in the Workbook and will be returned to in Chapter 14.

The main issue to be aware of here is that the difference between the value of a take-over bid and the net assets of the company being acquired is accounted for as '**goodwill**' in the consolidated statement of financial position.

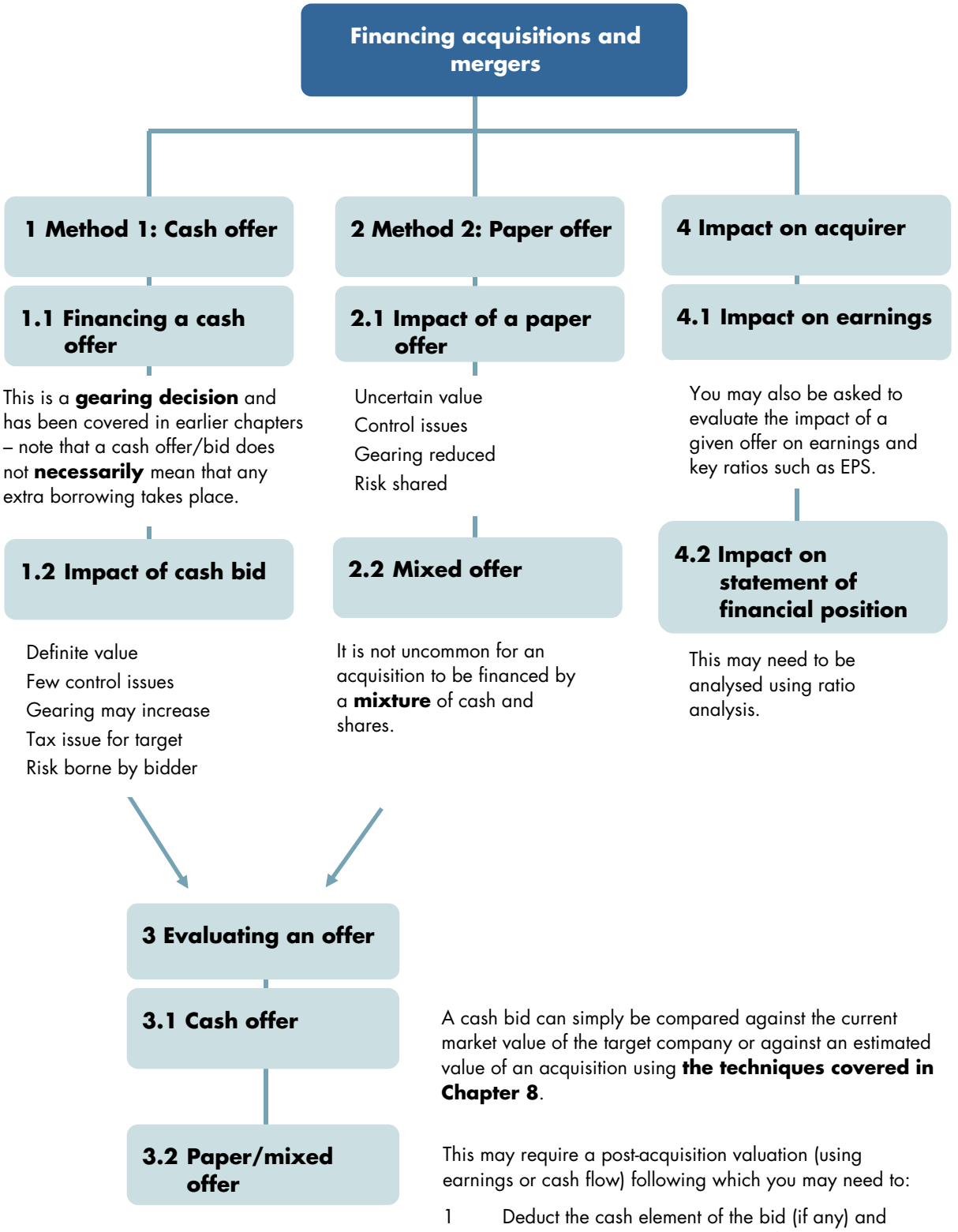
Essential reading

See Chapter 10 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion on forecasting the impact of a given financial offer on the acquiring firm.

PER alert

You will be expected to demonstrate competence in the analysis of various finance options when fulfilling the performance objective 'evaluate potential investment and financing decisions'. This chapter has focused on the various ways in which mergers could be financed and assesses the costs and benefits of each option – knowledge which you can put into practice if your organisation is involved in merger and acquisition activity.

Chapter summary



A cash bid can simply be compared against the current market value of the target company or against an estimated value of an acquisition using **the techniques covered in Chapter 8**.

This may require a post-acquisition valuation (using earnings or cash flow) following which you may need to:

1 Deduct the cash element of the bid (if any) and then divide by the new number of shares in issue to calculate a **post-acquisition share price.**

2 Deduct the value of whole bid to see **if value is created for the bidding company's shareholders**.

Knowledge diagnostic

1. **Cash offer**

   Often cheaper because more attractive to target shareholders.

2. **Paper offer**

   Impacts on control of bidding company.

3. **Mixed offer**

   May combine the advantages of cash (certainty) and paper (cash flow).

4. **Post-acquisition valuation**

   Especially important if evaluating a paper offer.

5. **Impact of higher P/E of bidder**

   If this is higher than the implied P/E of the offer, EPS will rise and shareholder wealth may also rise.

6. **Goodwill**

   This will result from an acquisition at above the value of the net assets of the target.

Further study guidance

Question practice

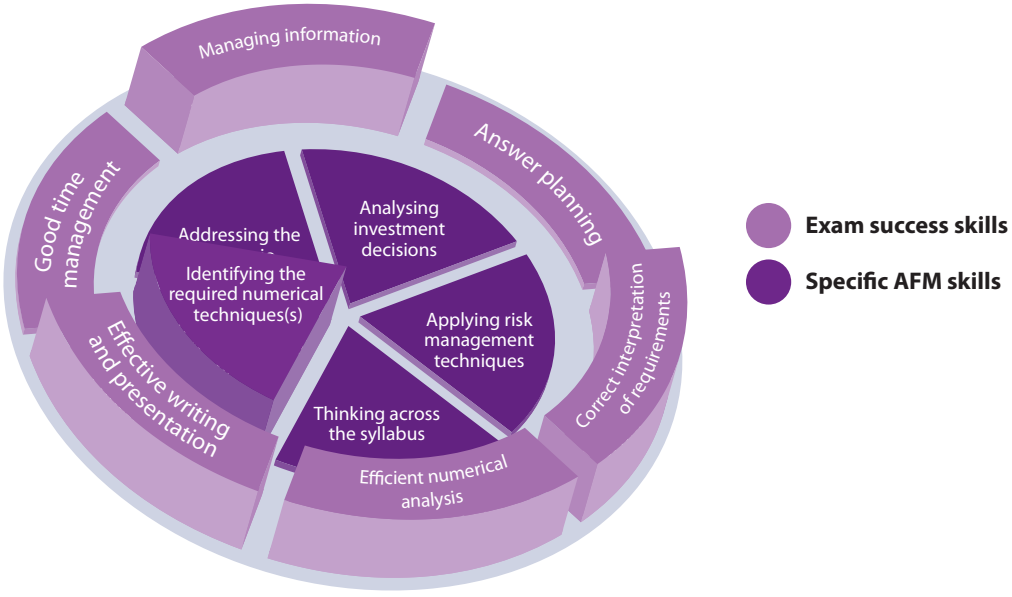
Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q16 Pursuit

Q17 Olivine

SKILLS CHECKPOINT 3

Identifying the required numerical technique(s)



Introduction

It is important to be aware that sometimes exam questions will not directly state which numerical techniques should be used and you may have to use clues in the scenario of the question to select an appropriate technique.

The reason that the need to use a specific technique is not always made clear is **not** due to poorly worded exam questions – it is a deliberate test of your skill as appropriate for an exam that is positioned as a Masters-level qualification.

This issue commonly arises in syllabus Section C, Acquisitions and Mergers. Often you will need to assess from the scenario what type of valuation is required and what techniques can be used given the details that are provided in the scenario. This issue is also common in syllabus Section D, Corporate Reconstruction and Reorganisation, because this often requires valuation techniques to be used as well.

In syllabus Section B, investment appraisal questions will also sometimes be formulated so that you will have to infer that specific techniques (such as real options or adjusted present value) are required ie the question may not always specifically tell you to use these techniques.

Having identified the required technique, it is also important to apply it in a practical, time-efficient way, without attempting to achieve absolute 100% perfection; this skill has been addressed in Skills Checkpoint 2.

Skills Checkpoint 3: Identifying the required numerical technique(s)

AFM Skill: Identifying the required numerical technique(s)

The key steps in applying this skill are outlined below, and will be explained in more detail in the following sections as the question 'Mercury Training' is answered.

STEP 1:
Where a question does not make it clear that a specific technique is to be used, carefully analyse the requirement and consider which techniques **could** potentially be employed to deliver a relevant answer.

STEP 2:
Next, carefully analyse the scenario and consider why numerical information has been provided and which of the techniques that you have identified in step 1 can be used given this information. Make notes in the margins of the question. Do not rush into performing detailed calculations.

STEP 3:
Complete your numerical analysis.

Exam success skills

The following question is an extract from a past exam question; this extract was worth approximately 18 marks.

For this question, we will also focus on the following **exam success skills**:

- **Managing information**. It is easy for the amount of information contained in scenario-based questions to feel overwhelming. In the AFM exam, each question will be scenario based. It is therefore essential to focus on developing a clear understanding of the scenario before moving into any calculations.
- **Correct interpretation of requirements**. In part (b) the word 'advice' requires suggestions, so narrative as well as calculations.
- **Efficient numerical analysis**. The key to success here is to provide clear, explained workings.
- **Effective writing and presentation**. Underline key numbers. Make sure that your numerical analysis is supported by an appropriate level of written narrative. It is often helpful to use key words from the requirement as headings in your answer as you do this.

Skill activity

STEP 1 Where a question does not make it clear that a specific technique is to be used, carefully analyse the requirement and consider which techniques could be employed to deliver a relevant answer.

Required

(a) Estimate the cost of equity capital and the weighted average cost of capital for Mercury Training.

(8 marks)

(b) Advise the owners of Mercury Training on a range of likely issue prices for the company. **(10 marks)**

(Total = 18 marks)

To some extent part (a) of this question makes it clear which techniques should be used, although there is more than one way to calculate the cost of equity. So in part (a) we may need to calculate the cost of equity using:

- The capital asset pricing model
- The dividend growth model, or
- Modigliani & Miller's formula for the cost of equity (as shown on the formula sheet)

In part (b) no specific techniques are suggested. However, you will be aware from your studies that there are a range of techniques that could be used to value a company, including:

- Asset-based models (eg NAV, CIV)
- Market-based models (eg using P/E ratios)
- Cash-based models (eg dividend valuation, free cash flow approach, free cash flow to equity approach, adjusted present value)

Now we need to consider whether we have what information is available in the scenario to see which models can be applied here.

STEP 2

Next, carefully analyse the scenario and consider why numerical information has been provided and which of the techniques identified in Step 1 can be used given this information. Make notes in the margins of the question. Do not rush into performing detailed calculations.

Mercury is unlisted and therefore does not have a beta factor

Question – Mercury Training (18 marks)

Mercury Training was established in 20W9 and since that time it has developed rapidly. The directors are **considering a flotation** of the company.

The company provides **training** for companies in the computer and telecommunications sectors. It offers **a variety of courses ranging from short intensive courses in office software to high level risk management courses using advanced modelling techniques**. Mercury employs a number of in-house experts who provide technical materials and other support for the teams that service individual client requirements.

1/3 of Mercury's business is financial services so the remaining 2/3 is training. Weightings for an average beta?

In **recent years**, Mercury has diversified into the **financial services sector** and now also provides **computer simulation systems to companies for valuing acquisitions**. This business now accounts for **one-third** of the company's total revenue.

Mercury currently has 10 million, 50c shares in issue.

Needed for an asset beta for the training part of the business?

Jupiter is one of the few competitors in Mercury's line of business. However, Jupiter is only involved in the training business.

Jupiter is listed on a small company investment market and has an estimated beta of 1.5. Jupiter has 50 million shares in issue with a market price of 580c.

Needed for an asset beta for the financial services part of the business?

The average beta for the financial services sector is 0.9. Average market gearing (debt to total market value) in the financial services sector is estimated at 25%.

Data supports the calculation of an asset based valuation and also a dividend based valuation of Mercury in part (b).

No information on P/E ratios or cash flow is given so an earnings valuation and a cash flow valuation are not possible.

Needed for ungearing and regearing betas?

Other summary statistics for both companies for the year ended 31 December 20X7 are as follows:

	Mercury	*Jupiter*
Net assets at book value ($ million)	65	45
Earnings per share (c)	100	50
Dividend per share (c)	25	25
Gearing (debt to total market value)	30%	12%
Five-year historic earnings growth (annual)	12%	8%

Analysts forecast revenue growth in the training side of Mercury's business to be 6% per annum, but the financial services sector is expected to grow at just 4%.

Data permits the use of the CAPM as it identifies the risk premium and the risk free rate
Also helps to identify the cost of debt to allow a WACC to be calculated in part (a)

Background information:

- The equity risk premium is 3.5% and the rate of return on short-dated government stock is 4.5%.
- Both companies can raise debt at 2.5% above the risk-free rate.
- Tax on corporate profits is 40%.

STEP 3 Now complete your workings and numerical analysis.

Use headings to briefly explain your approach to the marker

Assuming that the debt beta is zero for simplicity and speed of calculation

Using beta factors and gearing from the question

(a) **Cost of equity using an average beta factor**

Step 1 – Ungear beta of Jupiter and financial services sector

$$\beta_a = \beta_g \frac{V_e}{V_e + V_d(1-T)}$$

Jupiter $= 1.5 \times \frac{88}{88 + (12 \times 0.6)} = 1.3866$

Financial Services sector $= 0.9 \times \frac{75}{75 + (25 \times 0.6)} = 0.75$

Step 2 – Calculate average asset beta for Mercury

Using the weightings given in the question.

$\beta_a = (2/3 \times 1.3866) + (1/3 \times 0.75) = 1.1744$

Step 3 – Regear Mercury's beta

Regearing using Mercury's gearing as given

$$\beta_a = \beta_a \times \frac{V_e}{V_e + V_d(1-T)}$$

$$1.1744 = \beta_e \times \frac{70}{70 + 30(1-0.4)}$$

$$1.1744 = \beta_e \times 0.795$$

$$\beta_e = 1.48$$

Step 4 – Calculate cost of equity capital and WACC

Using CAPM:

Cost of equity capital $= R_f + \beta_i(E(r_m) - R_f) = 4.5 + (1.48 \times 3.5)$
$= \underline{\mathbf{9.68\%}}$

WACC $= \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d (1 - T)$

$= (0.7 \times 0.0968) + (0.3 \times [0.045 + 0.025] \times 0.6)$

$= \underline{\mathbf{8.04\%}}$

Where k_d = risk-free rate (4.5%) + premium on risk-free rate (2.5%)

(b) **Range of likely issue prices**

Lower range of issue price for Mercury will be the net assets at fair value divided by the number of shares

= \$65 million/10 million shares

= \$6.50 per share

Using information provided and explaining meaning

This value ignores the value of Mercury's intangible assets (such as its reputation and its employee skills and customer reputation. As such it is likely to be the **lower end** of the range in terms of Mercury's value.

Upper range – use **dividend valuation model**

Historical earnings growth rate of 12% is greater than the cost of equity capital, therefore cannot be used in the dividend valuation model and cannot be sustained in the long run.

A weighted average approach must therefore be used.

Two possible earnings rates:

(a) The **weighted anticipated growth rate** of the two business sectors in which Mercury operates (2/3 × 6%) + (1/3 × 4% = 5.33%)

(b) **The rate implied from the firm's reinvestment** (9.68% – see part (a) Step 4 above)

The mark allocation implies that more work is required here & so the br model can be used to estimate growth

b = balance of earnings reinvested = (100-25)/100 = 75% or 0.75

$g = br_e = 0.75 \times 0.0968 = 7.26\%$

Using the higher of the two feasible rates – that is, 7.26%:

$$P_0 = \frac{d_0(1 + g)}{(k_e - g)}$$

$$P_0 = \frac{25(1 + 0.0726)}{(0.0968 - 0.0726)} = \$11.08 \text{ per share}$$

Using the lower of the two feasible rates – that is, 5.34%:

$$P_0 = \frac{d_0(1 + g)}{(k_e - g)}$$

$$P_0 = \frac{25(1 + 0.0533)}{(0.0968 - 0.0533)} = \$6.05 \text{ per share}$$

Assuming that the growth calculated by using Mercury's own data is more reliable and relevant than the sector average growth data, the higher of the two feasible rates – that is, 7.26% – will be more relevant in terms of valuing Mercury. In addition, the value of $6.05 does not look sensible as this is below the asset value calculated earlier.

If floated, a price even above $11.08 (which is based on a minority shareholding earning a dividend from the shares) could be achieved. **Investors** are likely to be willing to pay a premium for the benefits of control (**control premium**) – often as much as 30%–50% of the share price.

Exam success skills diagnostic

Every time you complete a question, use the diagnostic below to assess how effectively you demonstrated the exam success skills in answering the question. The table has been completed below for this activity to give you an idea of how to complete the diagnostic.

Exam success skills	Your reflections/observations
Managing information	Did you spend sufficient time reading the scenario and planning your approach before starting your calculations?
Correct interpretation of requirements	Did you understand what was meant by the verb 'advise'? ie suggestions on the meaning and reliability of the numbers
Efficient numerical analysis	Did you show your workings and add brief narrative to explain your approach to the marker (see steps in part (a) solution)?
Effective writing and presentation	Did you use headings (key words from requirements)? Did you use full sentences? Did you explain the meaning of the numbers?
Most important action points to apply to your next question	

Summary

AFM is positioned as a Masters level exam. One of the skills that is required at this level of your studies is the ability to identify the techniques required to analyse a problem.

To test this skill, exam questions will sometimes not directly state which numerical techniques should be used and you may have to use clues in the scenario of the question to select an appropriate numerical technique.

This issue commonly arises in syllabus Section C, Acquisitions and Mergers where you will often need to:

- Assess from the scenario what type of valuation is required, and
- What techniques can be used given the details that are provided in the scenario

This issue is also common in syllabus Section D, Corporate Reconstruction and Reorganisation, because this often requires valuation techniques to be used as well.

In syllabus Section B, advanced investment appraisal, questions will also sometimes be formulated so that you will have to infer that specific techniques are required by presenting you with information that allows these techniques to be used. For example,

- Real options can only be valued if a standard deviation value is provided, so if a question contains standard deviation this is a clue that real options need to be valued.
- Stage 1 of adjusted present value discounts a project at an all-equity financed rate, so if a question states that a project should be discounted at an all-equity financed rate this is a clue that adjusted present value should be calculated.

The role of the treasury function

11

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Discuss the role of the treasury management function within: – The short-term management of financial resources – The longer-term maximisation of corporate value – The management of risk exposure	E1(a)
• Discuss the operations of the derivatives market, including risks such as delta, gamma, vega, rho and theta, and how these can be managed	E1(b) in part
• Advise on the use of bilateral and multilateral **netting** and matching as tools for minimising FOREX transactions costs and the management of market barriers to the free movement of capital and other remittances (covered in Chapter 16)	E2(c)

Exam context

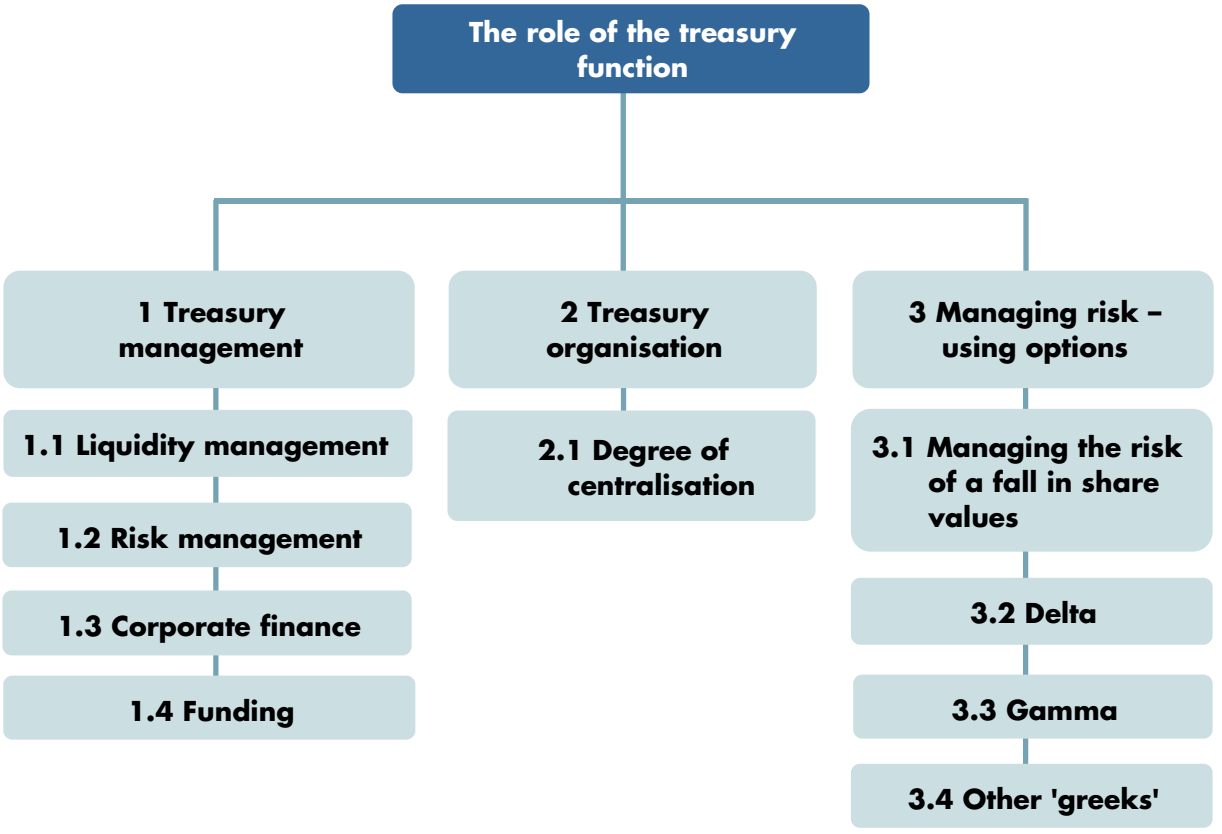
This chapter moves in to **Section E** of the syllabus: '**Treasury and advanced risk management techniques**'; this syllabus section is covered in **Chapters 11–13**.

Following the introduction of the new exam structure in September 2018 **every exam will have a question that has a focus on syllabus Section E**.

This chapter briefly outlines the role of the treasury function before moving on to consider currency and interest rate risk management techniques in the following two chapters.

There is a significant overlap between this chapter and Chapter 2 where the principles behind risk management have already been discussed.

Chapter overview



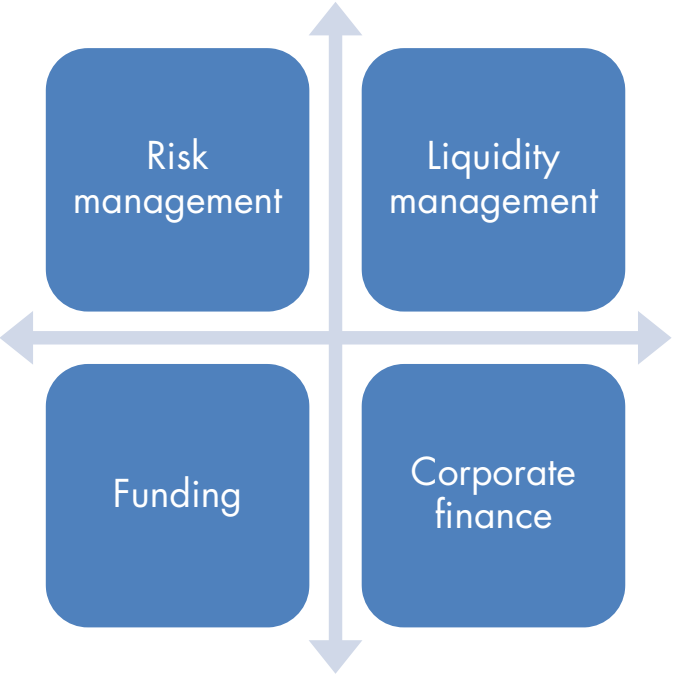
1 Treasury management

The Association of Corporate Treasurers' definition of treasury management is given below:

Key term

Treasury management: primarily involves the management of liquidity and risk, and also helps a company to develop its long term financial strategy.

A treasury department is likely to focus on four key areas:



1.1 Liquidity management

This is the management of short-term funds to ensure that a company has access to the cash that it needs in a **cost-efficient manner** (ie ensuring that a company is not holding unnecessarily high levels of cash, or incurring high costs from needing to organise unforeseen short-term borrowing). This is a key function of treasury management.

1.1.1 Netting

Netting involves identifying amounts owed between subsidiaries of a company in different foreign currencies. All foreign currency transactions are converted to a single common currency and netted-off. This reduces transaction fees and the time and cost of hedging inter-company transactions.

Activity 1: Technique demonstration

ZA group consists of a French company, a US company and a UK company. ZA has the following inter-company transactions for the first half of the year.

		Paying subsidiary		
		UK	**US**	**French**
Receiving subsidiary	**UK**	–	£2m	£1m
	US	$1.8m	–	$0.6m
	French	€3.3m	€4.84m	–

ZA has decided to implement a system of multilateral netting using £s as the settlement currency.

Exchange rates on 31 March are: €1.1 per £ and US$1.2 per £.

Required

Complete the following table, to illustrate multilateral netting and discuss its impact.

Solution

		Paying subsidiary					
		UK	**US**	**French**	**Total receipts**	**Total payments**	**Net**
Receiving subsidiary	**UK**	–	£2m	£1m	£	£	£
	US	£	–	£	£	£	£
	French	£	£	–	£	£	£

Discussion:

1.2 Risk management

This involves understanding and quantifying the risks faced by a company, and deciding whether or not to manage the risk. This is an **important area** and has been covered in **Section 3 of Chapter 2**.

For firms that are facing **significant levels of interest rate risk or currency risk**, risk management is likely to be appropriate. Specific techniques of currency and interest rate risk management are covered in the next two chapters.

However, some general risk measurement and management techniques relating to the Black–Scholes options pricing model are introduced in Section 3 of this chapter.

1.3 Corporate finance

This is the examination of a company's investment strategies. For example, how are investments appraised, and how are potential acquisitions valued? These areas have all been covered in earlier chapters and are central to the maximisation of shareholder wealth.

1.4 Funding

This involves deciding on suitable forms of finance (and by implication the level of dividend paid), and has been covered in earlier chapters.

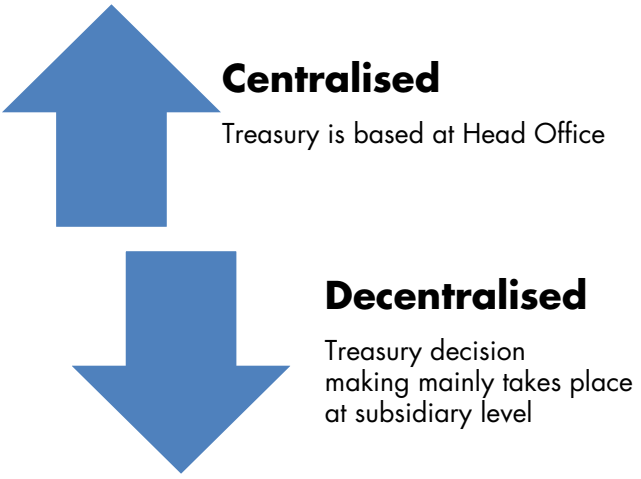
PER alert

One way in which you can demonstrate competence in the performance objective 'manage cash using active cash management and treasury systems' is to manage cash on a centralised basis to both maximise returns and minimise charges. This section introduces the treasury management function and how it can be used to pool cash from various sources which can be placed on deposit.

2 Treasury organisation

It is the responsibility of the board of directors to ensure that a treasury department is organised appropriately to meet the organisation's needs. This will involve making decisions about the degree of centralisation of the treasury department, and whether it should be organised as a profit centre or a cost centre.

2.1 Degree of centralisation



2.1.1 Advantages of centralisation

Within a **centralised** treasury department, the treasury department effectively acts as an **in-house** bank serving the interests of the group. This has a number of advantages:

Economies of scale	Borrowing required for a number of subsidiaries can be arranged **in bulk** (meaning lower administration costs and possibly a better loan rate), also combined cash surpluses can be invested **in bulk**.
Matching	Cash surpluses in one area can be used to **match** to the cash needs in another, resulting in an overall saving in finance costs. It is also possible to **match** receipts and payments in a given currency across all the subsidiaries. The time and cost of currency hedging is therefore minimised.
Control	Better control through the use of standardised procedures.
Expertise	Experts can be employed with knowledge of the latest developments in treasury management.
Netting	Netting of inter-company balances can be applied to save on transaction costs (as discussed).

2.1.2 Other approaches

It is also possible to have a mixture of the two approaches, this might involve **regional** treasury departments with each department being responsible for the activities of a number of different countries.

This approach will also allow some of the benefits of decentralisation (see next activity).

Activity 2: Decentralised treasury

Required

What advantages could there be to having an element of decentralisation in treasury operations?

Solution

Essential reading

See Chapter 11 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of the organisation of the treasury function.

3 Managing risk – using options

One technique for **managing risk** involves the use of options. These will be applied to currency and interest rate risk in later chapters, but are introduced here in the context of shares.

3.1 Managing the risk of a fall in share values

A treasury department may be responsible for managing a company's portfolio of investments. The company will be faced with **the risk that the value of these assets** (eg shares) **decreases**.

3.1.1 Use of put options

Put options entitle the holder to **sell** the shares at a fixed price. Put options result in compensation being received if **share prices fall** which allows investors to protect themselves against a drop in the share price (note that this makes put options unsuitable as an incentive scheme for senior management because it would be a reward for a falling share price).

When an **investor** buys an option they are setting up a **long position**.

Illustration 1

Hez Co currently owns 100,000 shares in Zeta Co. Zeta Co's shares are currently trading at $10, but Hez Co is concerned about the risk of a fall in Zeta's share price.

Hez is considering the purchase of put options on Zeta shares which entitle the holder to sell Zeta shares at an exercise price of $10 per share. Remember, the purchaser of an option is said to have a **long** position.

Currently the put option is at-the-money (it is not worth anything now but will be in-the-money if the share price falls even slightly). However, if Zeta's share price fell to $9, the put option would be in-the-money and $1 (per share) of compensation would be received by the holder of the put option.

3.1.2 Black–Scholes (BSOP) model

In Chapter 4 we introduced the Black–Scholes option pricing (BSOP) model which shows how the price for call and put options is set and in Chapter 8 we saw the application of this model to business valuation and default risk.

The BSOP model is built around a number of variables, often referred to as '**the greeks**', which each have **implications for risk management**. Of the variables discussed in the rest of Section 3, only 'delta' (Section 3.2) will be tested numerically.

3.2 Delta

Delta is $N(-d_1)$ for a put option (and $N(d_1)$ for a call option).

Delta measures **how much an option's value changes as the underlying asset value changes**.

Illustration 2 (continuing from Illustration 1)

If the delta of put options on Zeta shares is –0.5 this means that a $1 fall in the share price causes a rise in the value of a put option of $0.5.

If there is an equal chance of a rise or a fall in Zeta's share price from its current value of $10 of say $1.00, then the expected value of a put option at $10 is made of a 50% chance of a value of $1.00 (if the share price falls, the option will be in-the-money by $1) and a 50% chance 0 (if the share prices rises, the option will be out-of-the-money).

This means the value of the option, ie the amount it will cost to buy a put option, is (0.5 × $1) + (0.5 × 0) = **$0.50**.

However, suppose the share price has now fallen to $9. From a price of $9, if the share price may rise or fall with equal probability by $1.00, then the expected value of a put option (with a strike price of $10) is made of a 50% chance of a value of $2.00 (if the share price falls, the option will be in-the-money) and a 50% chance of $0 (if the share prices rises, the option will have no value).

This means the new value of the option ie the amount you will need to pay to own a put option is (0.5 × $2) + (0.5 × 0) = **$1**.

So the value of the put option has risen by $0.50 due to a fall in the share price of $1.

This is a delta of –0.50.

3.2.1 Values of delta

–1	0	+1
Deltas can be near –1 for a long put option which is deep **in-the-money**; the price of the option and the value of the underlying asset move in line with each other.	**Deltas can be near zero** for a long put (or call) option which is deep **out-of-the-money**, where the price of the option will be insensitive to changes in the price of the underlying asset.	**Deltas can also be near +1** for a long call option which is deep **in-the-money**; the price of the option and the value of the underlying asset move in line with each other.

3.2.2 Hedge ratio

Delta also defines the hedge ratio, ie the number of option contracts required to manage the risk of the underlying assets.

Key term

Delta hedge: defines the number of options required.

For example the number of share options required = number of shares ÷ delta

Illustration 3 (continuation of Illustration 2)

If the price of Zeta shares is $10 and the put option has a delta of –0.5, Hez Co would need to buy put options on 100,000 shares ÷ 0.5 = 200,000 put options to maintain their wealth in the event of a fall in Zeta's share price.

If the number of put options had been 100,000, this would not have given sufficient compensation because put options will cost a premium of $0.50 per share (see Illustration 2).

The impact of 200,000 put options is demonstrated below:

Before buying options and with share price at $10:

Hez's wealth = $10 × 100,000 shares = $1,000,000

After buying 200,000 options and if the share price is $9, Hez's wealth would become:

($9 × 100,000) + ($1 value of put option × 200,000 put options) – ($0.50 cost of options × 200,000 put options) = $1,000,000

If put options on only 100,000 shares are bought wealth would have fallen because the put options will not provide adequate compensation, after taking into account the premium for buying the option.

Activity 3: Delta hedging

Cautious Co owns 1,000 shares in For4Fore plc which are currently trading at 444p. The standard deviation of the share price is 25% and the risk-free rate of return is 4.17%.

Formula provided

$$d_1 = \frac{\ln(P_a/P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

Required

There are European style put options to sell shares in For4Fore at 430p per share in exactly four months' time. How many put options should Cautious Co purchase to hedge this risk?

You may assume that the delta of a put option is equivalent to $N(-d_1)$

Solution

3.3 Gamma

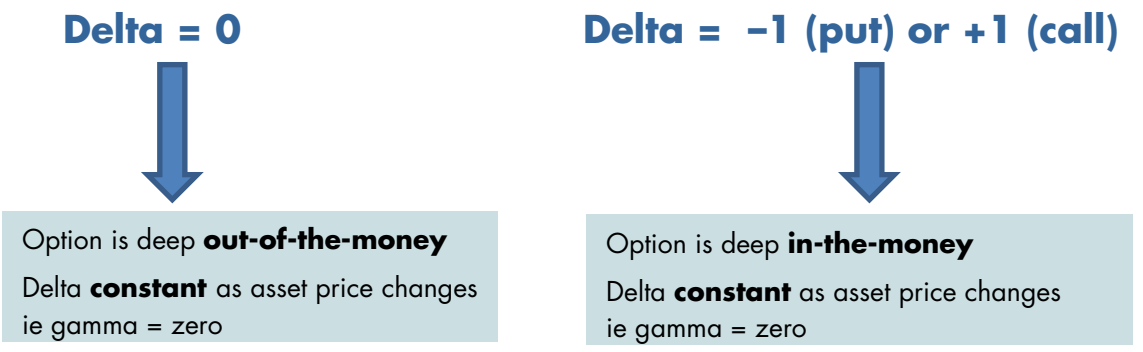
Gamma measures **how much delta changes with the underlying asset value**.

This indicates by how much the delta hedge needs to be adjusted as the underlying asset value changes.

Illustration 4

For example, if the gamma is 0.01 this means that for a 1% rise in the underlying asset value the delta should change by a factor of 0.01%.

3.3.1 When the value of gamma is low (ie delta change is small as the asset value changes)



As we have seen, deltas can be near zero for a long put or call option which is deep **out-of-the-money**, where the price of the option will be insensitive to changes in the price of the underlying asset because a small change in the value of the asset will still mean that the option is deep out-of-the-money.

Deltas can also be near –1 for a long put option which is **deep in-the-money** (or +1 for a long call option which is deep in-the-money), where the price of the option and the value of the underlying asset move mostly in line with each other and this will still be the case even if there is a small move in the asset value.

3.3.2 When the value of gamma is high (ie delta change is high as the asset value changes)

When a long put option is **at-the-money** (which occurs when the exercise price is the same as the market price) the delta is –0.5 (+0.5 for a call option) but also changes rapidly as the asset price changes.

Therefore, the highest gamma values are when a call or put option is at-the-money.

3.4 Other 'greeks'

The variables used in the BSOP are often referred to as 'the greeks'. These are the factors affecting option value. Other factors, or greeks, that affect option value are discussed briefly here.

3.4.1 Theta (time)

Key term

Theta: the change in an option's price (specifically its time premium) over time.

An option's price has two components, its **intrinsic value** and its **time premium**. When it expires, an option has no time premium.

Thus the time premium of an option diminishes over time towards zero and theta measures **how much value is lost over time**, and therefore how much the option holder will lose through retaining their options.

3.4.2 Vega (volatility)

Key term

Vega: measures the sensitivity of an option's price to a change in the implied volatility of the underlying asset.

Vega is the **change in value of an option that results from a one percentage point change in the implied volatility of the underlying asset**. If a dollar option has a vega of 0.2, its price will increase by 20 cents for a 1% point increase in the volatility of the value of the dollar.

We have seen earlier that the Black–Scholes model is very dependent on accurately estimating the volatility of the option price. Vega is a measure of the consequences of an incorrect estimation.

Long-term options have **larger vegas** than **short-term options**. The longer the time period until the option expires, the greater the potential variability of the underlying asset.

3.4.3 Rho (rate of interest)

Key term

Rho: measures the sensitivity of option prices to interest rate changes.

Generally, the **interest rate** is the **least significant influence** on change in price and, in addition, interest rates tend to change slowly and in small amounts.

In Chapter 4 (Section 3.2) we discussed the positive impact of higher interest rate on the value of call options. The sensitivity of option prices to changes in the interest rate is measured as rho. An option's rho is the amount of change in value for a 1% change in the risk-free interest rate.

Rho is positive for calls and negative for puts, ie:

Prices	*Interest rate rises*
Calls	Increase
Puts	Decrease

Long-term options have larger rhos than short-term options because the more time there is until expiration, the greater the effect of a change in interest rates.

Chapter summary

The role of the treasury function

1 Treasury management

1.1 Liquidity management

This is the short-term management of cash to ensure that a company has access to the cash that it needs in a **cost-efficient manner** (eg netting inter-company transactions into a single currency).

1.2 Risk management

This involves understanding and quantifying the risks faced by a company, and deciding whether or not to manage the risk. This is an **important area** and has been covered in **Section 3 of Chapter 2**.

1.3 Corporate finance

This is the examination of a company's investment strategies.

1.4 Funding

This involves deciding on suitable forms of finance (and by implication the level of dividend paid).

2 Treasury organisation

2.1 Degree of centralisation

Centralise for economies of scale, matching, expertise, netting, control.

Decentralise for controllability and local knowledge.

Regional hubs are a halfway house.

3 Managing risk – using options

3.1 Managing the risk of a fall in share values

Buy put options to hedge this risk. Value using BSOP model.

3.2 Delta

Delta is $N(-d_1)$ for a put option.

Delta measures **how much an option's value changes as the underlying asset value changes**.

Value between –1 and +1

Defines the hedge ratio.

3.3 Gamma

Gamma measures **how much delta changes with the underlying asset value**.

The highest gamma values are when a call or put option is at-the-money.

3.4 Other 'greeks'

Theta (time)

Vega (volatility)

Rho (rate of interest)

Knowledge diagnostic

1. **Treasury management**

   Involves the management of liquidity, risk, funding and corporate finance.

2. **Netting**

   Netting involves identifying amounts owed between subsidiaries of a company in different foreign currencies. All foreign currency transactions are converted to a single common currency and netted-off; reduces transaction fees and the time and cost of hedging inter-company transactions.

3. **Centralisation**

   This allows development of expertise, and for techniques such as matching and netting to be applied.

4. **Delta hedge**

   A delta hedge defines the number of options required.

   For example the number of share options required = number of shares ÷ delta.

5. **Gamma**

   Measure the impact of a change in delta of the underlying asset value.

6. **Other 'greeks'**

   Other influences on option value include time (theta), interest rates (rho) and volatility (vega).

Further study guidance

Question practice

Now complete try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q18 Treasury management

Q19 For4fore

Further reading

In Chapter 3 we recommended a useful Technical Article available on ACCA's website is called 'Risk Management'. This article examines the potential for risk management to 'add value' and is written by a member of the AFM examining team.

If you have not yet read this, we recommend you read it as part of your preparation for the AFM exam.

Research exercise

Use an internet search engine to identify treasury practices by searching for a company's annual report and searching for treasury management within this. For example, Britvic's annual report is interesting, but choose any company you are familiar with or are interested in.

There is no solution to this exercise.

Managing currency risk 12

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Discuss the operations of the derivatives market, including: – The relative advantages and disadvantages of exchange-traded vs OTC agreements – Key features, such as standard contracts, tick sizes, margin requirements and margin trading – The sources of basis risk and how it can be managed	E1(b) in part
• Assess the impact on a company to exposure in translation, transaction and economic risks and how these can be managed (translation and economic risk are covered in Chapter 5)	E2(a)
• Evaluate, for a given hedging requirement, which of the following is **the most appropriate strategy**, given the nature of the underlying position and the risk exposure: – The use of the forward exchange market and the creation of a money market hedge – Synthetic foreign exchange agreements (SAFEs) – Exchange-traded currency futures contracts – Currency swaps (covered in the next chapter) – FOREX swaps (covered in the next chapter) – Currency options	E2(b)

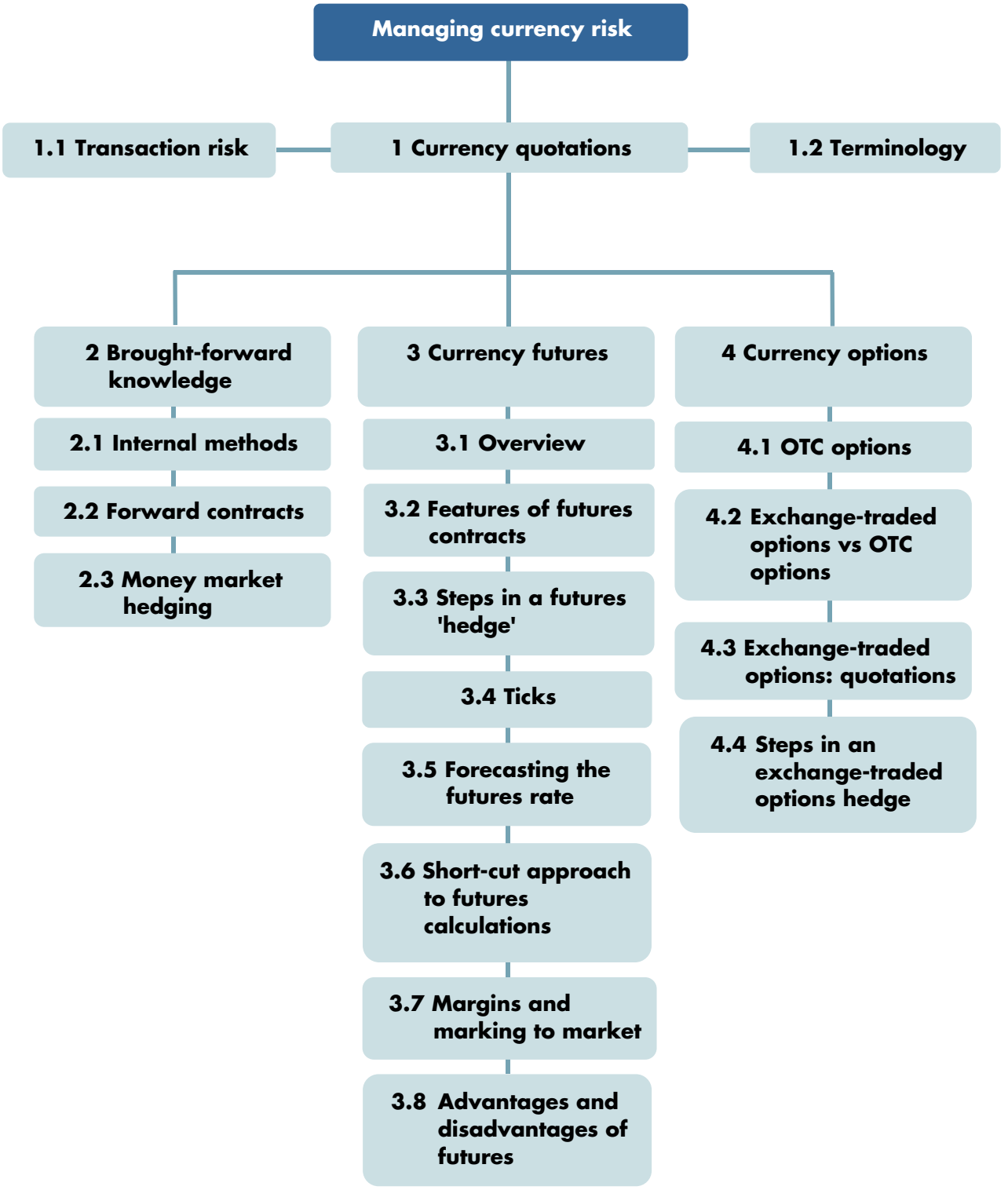
Exam context

This chapter continues **Section E** of the syllabus: **'Treasury and advanced risk management techniques'**.

Every exam will have a question that has a focus on syllabus Section E, which is most likely to focus mainly on Chapter 12 and/or Chapter 13.

This chapter focuses on currency risk management.

Chapter overview



1 Currency quotations

1.1 Transaction risk

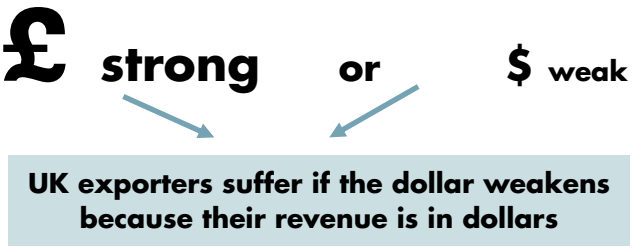
The **main focus of this chapter is transaction risk** (the risk that changes in the exchange rate adversely affect the value of foreign exchange transactions) and how this risk can be managed or '**hedged**'.

The management of other currency-related risks (political, translation, economic) is also important but these have been already been covered in Chapter 5 (which also considered reasons why exchange rates change).

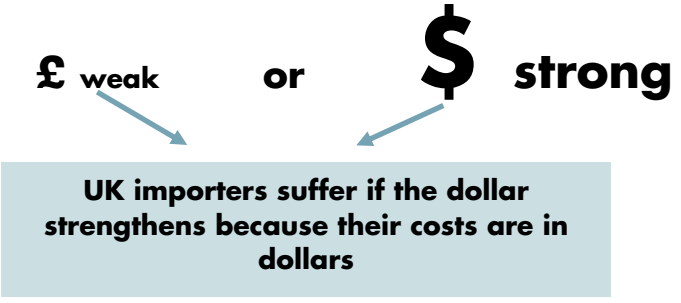
In this chapter we mainly deal with the £ (UK sterling) as the local or domestic currency and the A$ (dollars) as the foreign currency. Many countries use the $ as a currency (for example USA, Australia, Canada) and the A$ is intended to be a generic reference to a $ based currency.

In exam questions the domestic and foreign currency could involve any combination of currencies.

1.1.1 Impact on exporters if local currency strengthens (foreign currency weakens)



1.1.2 Impact on importers if local currency weakens (foreign currency strengthens)



Activity 1: Introduction to transaction risk

The value of the pound sterling has decreased from 1.8 A$ to the £ to 1.5 A$ to the £.

Required

Calculate the impact of this on:

(a) A UK exporter due to receive A$360,000 from a foreign customer

(b) A UK importer due to pay A$360,000 to a foreign supplier

Solution

(a)

(b)

1.2 Terminology

1.2.1 Spot rate and spreads

A **spot rate** is the rate available if **buying** or **selling** a currency **immediately**.

By offering a **different exchange rate** to exporters and importers, a bank can make a profit on the spread (ie the difference). Exchange rates are therefore often quoted as a spread.

Tutorial note

It is vital that you can identify which part of a spread will be offered to a company in an exam question.

Illustration 1

1.9612–1.9618 A$ to the £

An **importer** will receive 1.9612 A$ for every **£ it sells to the bank** (to raise $s needed to pay an invoice)

An **exporter** will pay 1.9618 A$ for every **£ it buys from the bank** (in exchange for the A$s received from an export sale)

If you are unsure which part of a spread to use, remember that a company will always be offered the **worst rate by the bank**.

1.2.2 Direct and indirect rates

In some countries, such as the UK, exchange rates are normally shown **per unit of the domestic currency** ie per £ (as above). This is called an indirect quote because it does not immediately tell you the value of a foreign currency.

In other countries it is more common for exchange rates to be quoted **per unit of the foreign currency**, this is called a direct quote.

An exam question will normally make it clear which approach is being used but be aware that if an exchange rate is quoted as a currency pair, eg 1.5 A$/£, then it is describing the value of the currency on the right-hand side, ie the value of one £ in this example.

Illustration 2: Direct quote

In the previous illustration the exchange rates were quoted to the £, ie an indirect quote.

These rates **can** be converted so that they are per $ (ie direct quote) as follows: 1 ÷ 1.9612 = 0.5099, and 1 ÷ 1.9618 = 0.5097.

0.5097–0.5099 £ to the A$

An **exporter** receives £0.5097 for every **A$ it sells to the bank**

An **importer** pays £0.5099 for every **A$ it buys from the bank**

The interpretation of the spread is based on the same logic but the importer now uses the right-hand side **and** the exporter the left-hand side.

Again, if you are unsure which part of a spread to use, remember that a company will always be **offered** the **worst rate for a specific transaction by the bank**.

Activity 2: Interpreting spreads

Spot exchange rates are as follows:

1.9612–1.9618 A$ per £

0.8500–0.9000 £ per €

Required

(a) Calculate the receipts in £s for a UK company from a receipt of A$200,000.
(b) Calculate the cost in £s for a UK company of paying an invoice of €400,000.

Solution

(a)

(b)

2 Brought-forward knowledge

2.1 Internal methods

Simple techniques can be used within a company to eliminate some of the transaction risk it faces.

Wherever possible, a company that expects to have receipts in a foreign currency will net this off against payments in the same currency before looking to lock into hedging arrangements. This is called **matching**.

Matching payments against receipts will result in a single, smaller amount of currency to be hedged. This will be cheaper than hedging each transaction separately.

Netting has already been considered in the previous chapters.

Essential reading

See Chapter 12 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a general discussion of these basic approaches.

2.2 Forward contracts

A **contract** with a bank covering a **specific** amount of foreign currency (FX) for delivery on a specific future date **at an exchange rate agreed now**.

As with spot rates, a bank will quote a forward exchange rate as a (larger) **spread**, eg:

Forward rate 1.9600–1.9612 $ per £

Again, a company will always be offered the **worst rate**.

Activity 3: Forward contracts

The spot exchange rate on 30 January 20X7 is 1.9612–1.9618 A$ per £ and the 3-month forward rate is 1.9600–1.9615 A$ per £.

Required

(a) Calculate the receipts from a $2 million sale, due to be received in three months' time if forward rates are used.

(b) Calculate the cost of paying an invoice of $2 million in three months' time, if forward rates are used.

Solution

(a)

(b)

Advantages of forward contracts	Disadvantages of forward contracts
• Simple, no up-front transaction cost	• Fixed date agreements (only apply on a specific date)
• Available for many currencies, normally for more than one year ahead	• Rate quoted may be unattractive

2.3 Money market hedging

2.3.1 For exporters

Borrowing in the foreign currency allows an exporter to take their foreign currency revenue now, at **today's spot rate** and thereby avoiding exchange rate risk. The foreign currency revenue will be used to repay the loan when it is received.

2.3.2 For importers

Transferring an amount of money into an overseas bank account, at **today's spot rate**, that is sufficient to repay the amount owed to the supplier in future allows an importer to avoid exchange rate risk.

Essential reading

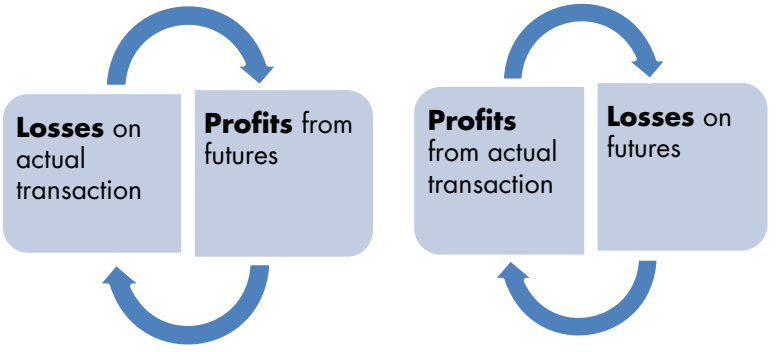
See Chapter 12 Sections 2 and 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of forward contracts and money market hedges.

3 Currency futures

3.1 Overview

Like a forward, a futures contract is intended to **fix the outcome of a transaction**.

However, unlike forwards, this is achieved by entering into a futures contract that is **separate** from the actual transaction and operates in such a way that if you make a loss in the spot market, you will expect to make a profit in the futures market (and vice-versa).



The gain or loss on a futures contract derives from future exchange rate movements – so futures are a **derivative**.

3.2 Features of futures contracts

Currency futures are mainly available from the US markets such as the New York Board of Trade (NYBOT) futures and options exchange.

- Each contract fixes the exchange rate on a large, standard amount of currency.
- Contracts normally expire at the end of each quarter (March, June, September and December) but can be used on any date up to the expiry date.
- A smaller range of currencies are traded on the futures market compared to those available on the forward market.

They fix the exchange rate for a set amount of currency for a specified time period.

Futures have **less credit risk** than forward contracts, as organised exchanges have clearing houses that guarantee that all traders in the market will honour their obligations.

3.3 Steps in a futures 'hedge'

Step 1: Now

Contracts should be set in terms of **buying or selling the futures contract currency** – choosing the closest standardised futures date **after** the transaction date.

Step 2: In the future

Complete the **actual** transaction on the **spot market**.

Step 3: At the same time as Step 2

Close out the futures contract by doing the opposite of what you did in Step 1.

Calculate net outcome.

3.4 Ticks

Key term

Tick: the smallest movement in the exchange rate, which is normally quoted on the futures market to four decimal places.

If a futures contract (on a US market) is for £125,000 every 0.0001 movement will give a company £125,000 × 0.0001 = $12.5 **profit or loss**. This is called the **tick size: note** this profit or loss is in **dollars**.

If the futures exchange rate has moved in your favour by 0.0030 then this will be 30 ticks × $12.5 = $375 per contract.

Illustration 3: Futures hedging

Today is 31 December. Spandau plc anticipates that in two months' time it will need to pay for purchases of $11 million. The exchange rates on 31 December are:

Spot rate: 1.9615 $ per £.

Futures rates:

	March	*June*
$ per £ – contract size £125,000	1.9556	1.9502

Required

Calculate the outcome of using a futures hedge in two months' time if the spot rate is 1.9900 $ per £ and the futures rate is 1.9880 $ per £.

Solution

Step 1: Now (31 December)

Type of contract:

The contract currency is £s and Spandau will need to sell £s (to obtain the $s needed), so **contracts to sell** are needed.

Date of contract:

The earliest futures expiry date after the transaction is **March** so this will be chosen.

Number of contracts:

The standard contract size is £125,000. At the March futures rate of 1.9556, the number of contracts needed is $11m ÷ 1.9556 = £5,624,872. So the number of contracts needed is £5,624,872/£125,000 = **45 contracts** (rounding to the nearest whole contract)

So Spandau will need to enter into **45 March contracts to sell @ 1.9556**

Step 2: End February

Complete the **actual** transaction on the **spot market**.

So $11m invoice will **cost** @ Feb spot rate 1.9900 = **£5,527,638**

This cost is lower because the £ has strengthened. This means that a loss is likely to be made on the futures contract.

Step 3: At the same time as Step 2

Close out the futures contract by **buying** £s back from the futures market.

31 Dec: contracts to sell £s at	1.9556
end Feb: contracts to buy £s at	1.9880
Difference	0.0324

A **loss** has been made as the buying price is above the selling price.

The loss can be quantified in one of two ways (either can be used):

1 0.0324 × 125,000 × 45 contracts = $182,250, or
2 $12.50 × 324 ticks × 45 contracts = $182,250

Converting $182,250 into £s at February's spot rate = $182,250/1.9900 = £91,583 loss

So the net outcome from the futures hedge = £5,527,638 cost (Step 2) + £91,583 (Step 3) loss = £5,619,221.

Activity 4: Futures demonstration

Today is 31 December. Spandau plc anticipates that in four months' time it will have receipts of $5.1 million; it has a policy of hedging 100% of its transaction risk in the month the transaction arises.

The exchange rates on 31 December are:

Spot rate: 1.9615 $ per £.

Futures rates:

	March	*June*
$ per £ – contract size £125,000	1.9556	1.9502

Required

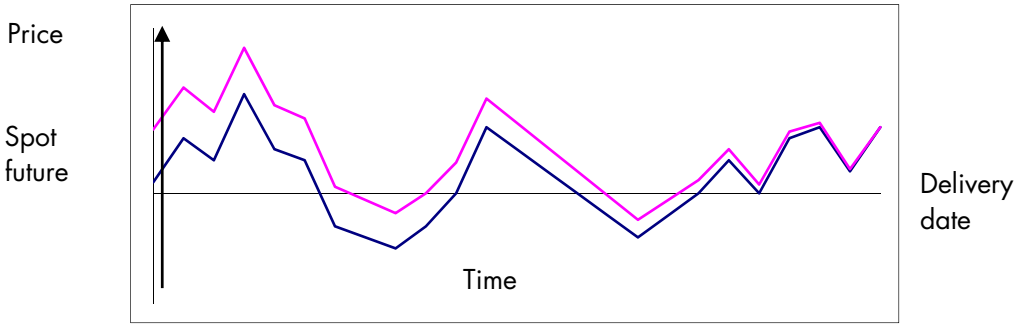
Calculate the outcome of the futures hedge in four months' time if the spot rate is 2.0000 $ per £ and the futures rate is 1.9962 $ per £.

Solution

3.5 Forecasting the futures rate

In the previous example the closing futures price (needed for Step 2) was given but **in the exam you may have to calculate it** on the assumption that the difference between the spot price and futures price (known as the '**basis**') falls evenly over time.

Typical movement of futures price vs spot price through time:



We can use the assumption of a gradual reduction in the difference between the spot rate and the futures rate over time to make a sensible estimated if the closing futures price.

Illustration 4: (continuation of Illustration 3)

Today is 31 December. Spandau plc anticipates that in two months' time it will need to pay for purchases of $11 million. The exchange rates on 31 December are:

Spot rate: 1.9615 $ per £.

Futures rates:

	March	*June*
$ per £ – contract size £125,000	1.9556	1.9502

Required

Calculate the estimated March futures price in two months' time, assuming the spot rate at that point is 1.9900 $ per £

Solution

	Now (31 Dec)
March futures contract	1.9556
Spot rate	1.9615
Difference (basis) **Future – spot**	**(0.0059)**
Time difference	3 months (to expiry of March contract)

In two months' time (end February) there will only be one month to the expiry of the March future so only one month of the basis should remain which is (0.0059) × 1/3 = (0.0020) rounding to four decimal places.

We can forecast the March future in two months' time as being the spot rate of 1.9900 $ per £ less 0.0020 = **1.9880**.

This was the closing futures price given in the previous illustration, and shows how it could be calculated.

Note that if the forecast future spot rate is not given by a question, you can make a sensible assumption eg assume that it will be the same as the forward rate.

3.5.1 Basis risk

There is risk that basis will not decrease in this predictable way. This is known as **basis risk**.

The futures price will change constantly as the market reacts to changes in expectations of exchange rate movements. Generally, the spot rate and the futures price will move by a similar amount but not in exactly the same way, and will tend to move in a similar direction. So, unlike a forward contract, where the exchange rate is fixed, one does not know the precise end result when entering into a futures contract – although any variations in the outcome are likely to be minor.

To **manage basis risk** it is important that the futures contract chosen is the one with the closest maturity date after the actual transaction.

Activity 5: Technique demonstration

(Activity 4 continued).

Today is 31 December. The exchange rates on 31 December are:

Spot rate: $ per £ 1.9615

Futures rates:

	March	*June*
$ per £ – contract size £125,000	1.9556	1.9502

Required

Calculate the June futures rate in four months' time if the spot rate is 2.0000 $ per £.

Solution

3.6 Short-cut approach to futures calculations

The approach demonstrated helps you to understand the mechanics of the futures hedge and is important **if** you are asked to show the full mechanics of the future calculation, ie what happens in the spot market and what happens in the futures market.

However, **many exam questions do not require this level of detailed analysis** and simply ask for an assessment of the overall outcome of using a futures hedge.

A **quicker** method is available which will deliver full marks if all that is required is to show the overall outcome of a future's hedge.

Effective futures rate = opening future's rate – closing basis

Illustration 5: Short-cut approach

From Illustration 4, the closing basis was calculated as:

	Today 31 Dec	*28 Feb*
March future	1.9556	1.9880
Spot	1.9615	1.9900 given
Basis	–0.0059	–0.0020

The closing basis was then used to calculate the closing rate on the future's contract and an overall net outcome of £5.619m from a payment of $11 million.

This can be thought of as an **effective exchange rate** of $11m/5.619m = **1.9576**.

Using the quicker method we could calculate the outcome from the futures hedge with two pieces of information: opening futures rate and closing basis.

Here the opening futures rate is 1.9556 and the closing basis is (0.0020).

So using the quick method we would forecast the effective futures rate as:

1.9556 – –0.0020 = **1.9576**

This is the same answer as we had using the longer method but is **much quicker** because it removes the need for any detailed analysis of the outcome of the futures hedge.

This is a better method to use in most exam questions.

Activity 6 (cont): Quicker method

The previous activity produced a net revenue of **£2,610,375** from receipts of $5.1 million, ie an effective exchange rate of $5.1m/£2.61m = 1.9540.

Required

Recalculate this outcome using the quick method.

Solution

3.7 Margins and marking to market

The futures exchange will demand an **initial margin** (a deposit) which is put into a client's 'margin account'. Each day any profit or loss on the client's position (**variation margin**) is debited or credited to this account so losses are not allowed to build up.

The process of settling the gains and losses on future contracts at the end of each trading day is referred to as **'marking to market'**. If losses are made that reduce the account below the **maintenance margin** (the minimum balance) the investor will be required to restore the margin account to its maintenance margin level.

Illustration 6: Marking to market

If, for example, a company has entered into a futures contract to buy £62,500 at a rate of GBP/USD 1.6246 (equivalent to $101,538) with an initial margin of $2,000 and a maintenance margin of $1,500, then marking to market could work as shown in the following table:

	Closing futures price $	*Sell £62,500* $	*Profit / (loss)* $	*Pay in* $	*Account balance* $
				2,000	2,000
Day 1	1.6350	102,188	650	–	2,650
Day 2	1.6200	101,250	(938)	–	1,712
Day 3	1.6150	100,938	(312)	100	1,500

Profit on Day 1 is because if the contract were closed out it would be worth $102,188 compared to its value of $101,538 at the start of the day ie a profit of $650. On the other days the value falls and so losses are made.

On Day 3, because the account balance fell to $1,400, a further $100 had to be paid in to meet the requirement for a maintenance margin of $1,500.

Marking to market, and the requirement for an initial margin, has **liquidity implications** for companies and this is often given as the reason why other derivatives are preferable to the use of futures contracts for hedging.

3.8 Advantages and disadvantages of futures

Advantage of futures	Disadvantages of futures
• Flexible dates, ie a September futures can be used on any day up to the end of September	• Only available in large contract sizes and a limited range of currencies
	• Margin payments
	• Basis may not fall in a linear way over time (basis risk)

Essential reading

See Chapter 12 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of currency futures.

4 Currency options

We have already looked at options in earlier chapters.

Unlike forwards and futures, currency options protect against adverse exchange rate movements but still **allow a company to take advantage of favourable exchange rate movements**.

Key term

Currency options: contracts giving the holder the right, but not the obligation, to buy (call) or sell (put) a fixed amount of currency at a fixed rate in return for an upfront fee or premium.

Options are another **derivative** product.

4.1 Over-the-counter options (OTC)

Currency options can be purchased directly (over the counter) from a merchant bank; these options are normally **fixed date** options (**European options**) which means that they can only be exercised on a specific date.

Activity 7: Technique demonstration

It is 1 October. Z Co wishes to hedge the **possible** receipt of A$2 million from the sale of a foreign subsidiary that it expects to be completed in December. The current spot rate is 1.4615 A$ per £.

A$2 million of December dollar OTC put options with an exercise price of A$1.47 can be bought for a premium of £50,000.

Required

What will the outcome of the hedge be in each of the following scenarios?

(a) The spot exchange rate on 31 December is 1.50 A$ per £.
(b) The spot exchange rate on 31 December is 1.30 A$ per £.
(c) The sale of the subsidiary does not happen.

Solution

(a)

(b)

(c)

4.2 Exchange-traded options vs OTC options

Currency options are also available from the US exchanges markets such as the Philadelphia Stock Exchange (PHLX).

Advantages vs OTC options	Disadvantages vs OTC options
• Exchange-traded options cover a period of time (American options); OTC options are fixed date (European options).	• Exchange-traded options are normally offered up to two years ahead; OTC options can be agreed for longer periods.
• Exchange-traded options are tradable – so if they are not needed they can be sold on.	• Exchange-traded options are in standard contract sizes.

4.3 Exchange-traded options: quotations

Call option – a right to buy (the option contract currency)

Put option – a right to sell (the option contract currency)

The prices of exchange traded options are normally quoted as a price per unit of the contract currency as shown in the table below.

Call = right to buy £s (contract currency)

Size of the contract

Exchange traded US$ per £ Options £31,250 (cents per £1)

Strike price		***Calls***			***Puts***	
	April	*May*	*June*	*April*	*May*	*June*
1.2500	2.20	2.75	3.10	0.65	1.20	1.60
1.2750	0.88	1.45	1.85	1.70	2.40	2.85
1.3000	0.25	0.70	1.05	3.65	4.10	4.50

Price in cents per £1

Activity 8: Understanding of option pricing

Required

(a) Why is the cost of an April call at 1.2500 more expensive than an April call at 1.3000?

(b) Why is a May call option more expensive than an April call option?

Solution

(a)

(b)

4.4 Steps in an exchange-traded options hedge

Step 1: Now

Contracts should be selected in terms of **buying or selling the option contract currency** – choosing the closest standardised options date **after** the transaction date and a logical exercise price (eg cheapest or closest to current spot rate).

Assess any shortfall or surplus if option exercised (this can be covered with a forward contract).

Calculate the **premium** this must be paid immediately.

Step 2: In the future

Calculate the outcome if the option is exercised (or whether the spot rate is better). If unsure **assume the option is exercised** (this gives a worst case scenario since if the option is **not** exercised it means that the **spot rate is better**).

Step 3: In the future

Calculate the net position, taking into account the premium (step 1), and the outcome (step 2, including any surplus or shortage if the option is exercised).

Illustration 7: Exchange-traded options

Vinnick, a US company, purchases goods from Santos, a Spanish company, on 15 May on three months' credit for €600,000.

Vinnick is unsure in which direction exchange rates will move so has decided to buy options to hedge the transaction at a rate of €0.7700 = $1.

The details for €10,000 options at 0.7700 are as follows.

Calls			Puts		
July	August	September	July	August	September
2.55	3.57	4.01	1.25	2.31	2.90

The current spot rate is 0.7800.

Required

Calculate the dollar cost of the transaction assuming that the option is exercised.

Solution

Step 1 Set up the hedge

(a) Which contract date? August
(b) Put or call? Call – we need to buy euros (the contract currency)
(c) Which strike price? 0.7700 (given)
(d) How many contracts?

$$\frac{600,000}{10,000} = 60 \text{ (no shortage or surplus)}$$

Use August call figure of 3.57. Remember it has to be multiplied by 0.01 because it is in cents.

Premium = (3.57 × 0.01) × contract size × number of contracts

Premium = 0.0357 × 10,000 × 60 = $21,420

Step 2 Outcome

Options market outcome

60 contracts × €10,000	
Outcome of options position	€600,000
	No surplus or shortfall

Step 3 Net outcome

	$
Options position (600,000/0.77)	(779,221)
Premium	(21,420)
	(800,641)

Activity 9: Exchange-traded options

Today is 31 December, the spot rate is 1.2653 US$ per £. XP plc anticipates that in four months' time it will need to make purchases of $5 million and in six months' time it will have receipts of $2 million.

Options prices are quoted in Section 4.3 – assume that XP plc will take out an option at a rate closest to the spot rate, ie 1.2750 US$ per £.

Required

(a) Calculate the outcome of the four-month hedge (import).
(b) Calculate the outcome of the six-month hedge (export).

Illustrate the outcome if the option is exercised in both cases.

Assume the forward rate for four months is $1.25 per £, and for six months is $1.3 per £.

Solution

Activity 10: Further practice

It is now 28 February and the treasury department of Smart Co, a quoted UK company, faces a problem. At the end of May the treasury department may need to advance to Smart Co's US subsidiary the amount of $15,000,000. This depends on whether the subsidiary is successful in winning a franchise. The department's view is that the US dollar will strengthen over the next few months, and it believes that a currency hedge would be sensible.

The following data is relevant.

Exchange rates US$/£

28 Feb **spot**	1.4461–1.4492
Three months **forward**	1.4310–1.4351

Futures market contract prices

Sterling £62,500 contracts:

March contract	1.4440
June contract	1.4302

Currency **options**:

Sterling £31,250 contracts (cents per £)

	Calls	*Puts*
Exercise price	*June*	*June*
$1.400/£	3.40	0.38
$1.425/£	1.20	0.68
$1.450/£	0.40	2.38

Required

(a) Explain the relative merits of forward currency contracts, currency futures contracts and currency options as instruments for hedging in the given situation.

(b) Assuming the franchise is won, illustrate the results of using forward, future and option currency hedges if the US$/£ spot exchange rate at the end of May is 1.3540.

Solution

PER alert

One of the optional performance objectives in your PER is to advise on managing or using instruments or techniques to manage financial risk. This chapter has focused on a range of techniques for managing exchange rate risk, which is an aspect of financial risk.

Chapter summary

Managing currency risk

1 Currency quotations

1.1 Transaction risk

Risk of exchange rate movements damaging the value of foreign currency transactions.

1.2 Terminology

Company will be offered the worst part of the spread.
Indirect and direct quotes.

2 Brought-forward knowledge

2.1 Internal methods

For example, matching and netting

2.2 Forward contracts

Over-the-counter agreement, fixed date and rate

2.3 Money market hedging

Borrowing in foreign currency to manage foreign currency receivables

Investing in a foreign currency manage foreign payables

3 Currency futures

3.1 Overview

Aims to fix the exchange rate

Notional agreement

Pays compensation if losses are made on actual transactions

3.2 Features of futures contracts

Flexible dates

Limited range of currencies
Standard amounts

Exchange traded, lower default risk

3.3 Steps in a futures hedge

1 Set up type, number and date of futures contracts
2 Actual transaction at spot rate
3 Close out future and net off

4 Currency options

4.1 OTC options

Optional but fixed date

4.2 Exchange traded options

Standard amounts, flexible dates

4.3 Exchange traded option quotations

Prices quoted as cents per unit of contract currency

4.4 Steps in exchange traded options hedge

1 Set up type, number and date of options contracts
2 Actual transaction at spot rate or option
3 Net off including premium, shortfall/surplus

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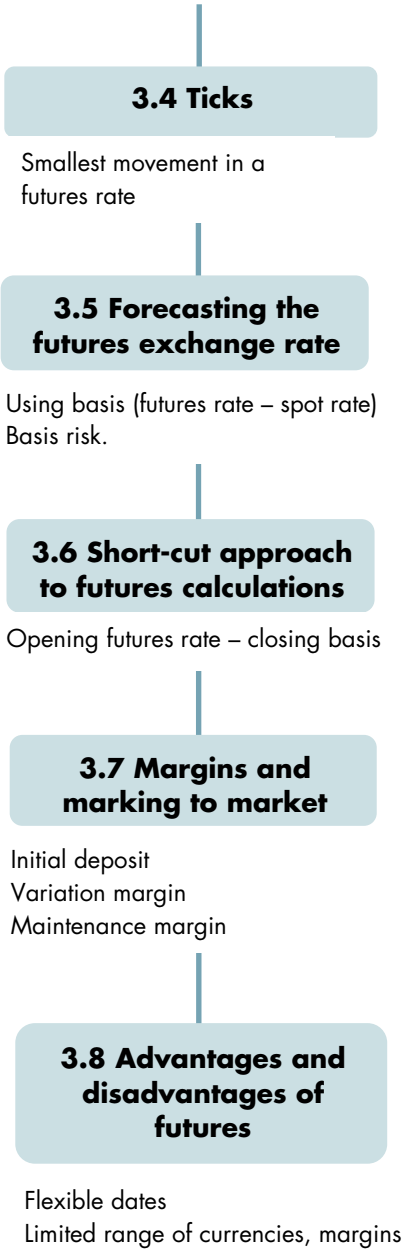

3.4 Ticks
Smallest movement in a futures rate
3.5 Forecasting the futures exchange rate
Using basis (futures rate – spot rate)
Basis risk.
3.6 Short-cut approach to futures calculations
Opening futures rate – closing basis
3.7 Margins and marking to market
Initial deposit
Variation margin
Maintenance margin
3.8 Advantages and disadvantages of futures
Flexible dates
Limited range of currencies, margins

Knowledge diagnostic

1. **Direct quote**

   This means that an exchange rate is quoted to one unit of the foreign currency.

2. **Indirect quote**

   This means that an exchange rate is quoted to one unit of the domestic currency.

3. **Basis**

   The difference between the future and the spot rate. This is used to forecast the closing futures rate on the assumption that basis decreases in a linear way over time.

4. **Basis risk**

   This is the risk that basis does not decrease in a linear way over time.

5. **OTC options**

   Fixed-date options offered by banks.

6. **Exchange-traded options**

   Flexible dates, offered by exchanges.

Further study guidance

Question practice

Now complete try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q20 Fidden plc

Q21 Curropt plc

Managing interest rate risk 13

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Evaluate, for a given hedging requirement, which of the following is most appropriate given the nature of the underlying position and the risk exposure: – Forward rate agreements – Interest rate futures – Interest rate swaps (and currency swaps from E2(b)) – Interest rate options	E3(a)

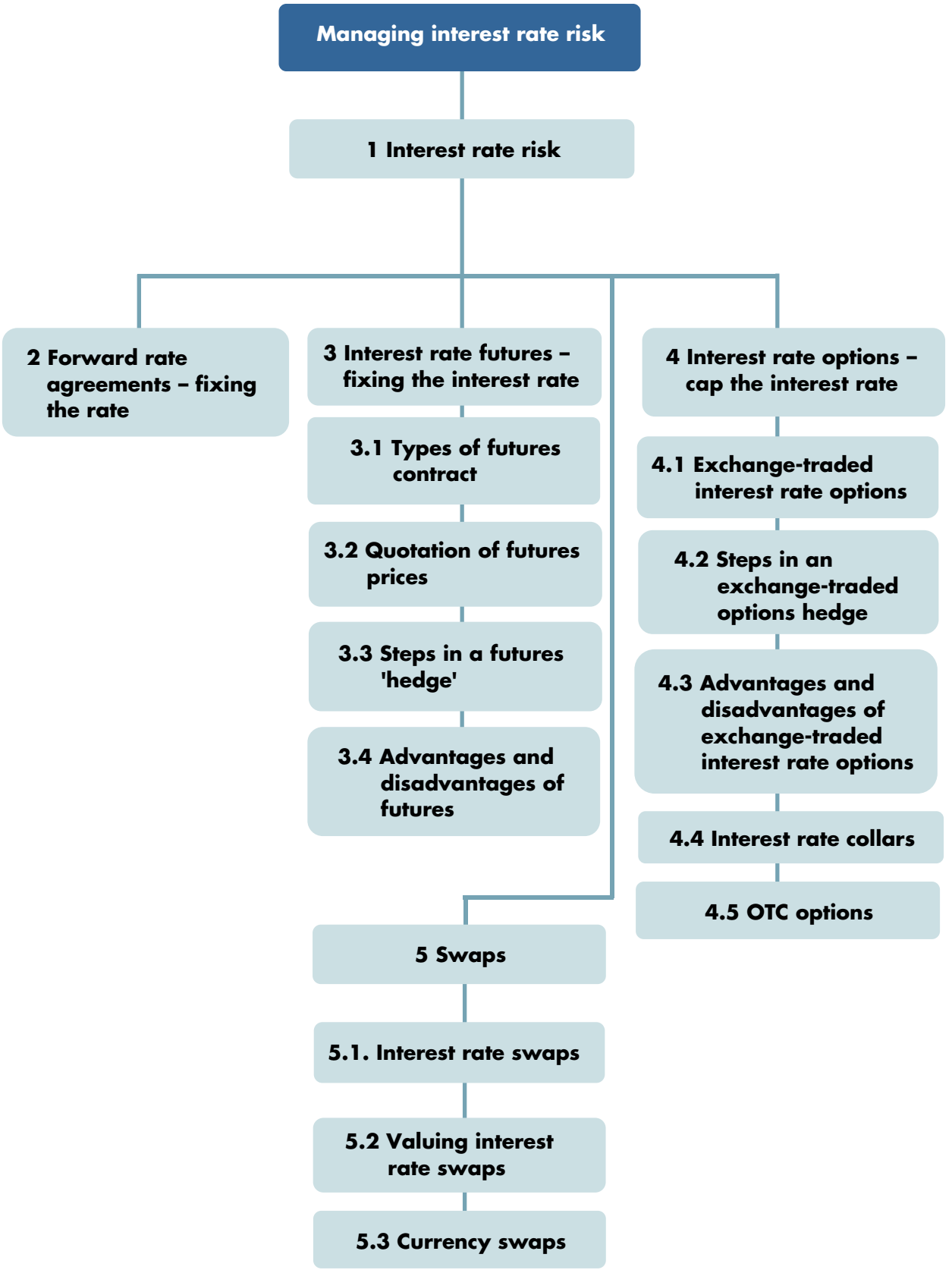
Exam context

This chapter completes **Section E** of the syllabus: '**Treasury and advanced risk management techniques**'.

Every exam will have a question that has a focus on syllabus Section E, which is most likely to focus mainly on Chapter 12 and/or Chapter 13.

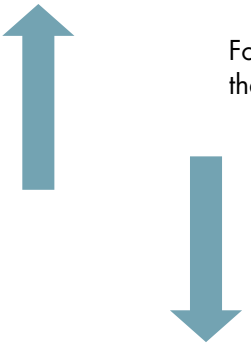
This chapter focuses on interest rate risk management.

Chapter overview



1 Interest rate risk

Interest rate risk is faced by both borrowers and lenders. It is the risk that the interest rate will move in such a way so as to cost a company, or an individual, money.



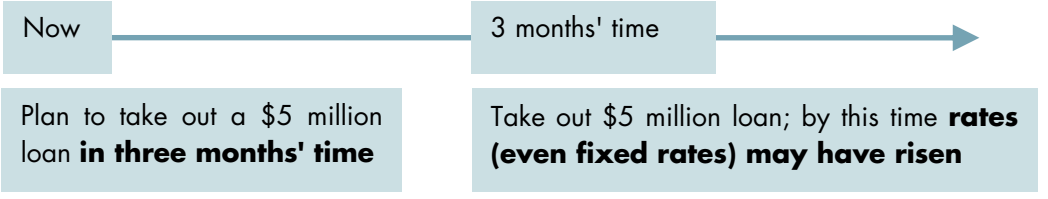
For a **borrower** the risk is that interest rates rise

For an **investor** the risk is that the interest rate falls

Note that a borrower will benefit from an interest rate fall and an investor (or lender) will benefit from an interest rate increase.

From the perspective of a company **borrowing** money, interest rate risk can be managed by '**smoothing**', ie using a prudent mix of fixed and floating rate finance. If the company is risk averse or expects interest rates to rise, then the emphasis will be on using fixed rate finance.

If, however, a major loan (or investment) is being planned in the **future**, then the risk is harder to manage; this is shown below:



This risk (for a borrower or an investor) can be managed by a variety of interest rate derivatives; these techniques can achieve one of two outcomes.

Fix the rate of interest

Forward rate agreements, futures

Cap the rate of interest

Options

Finally, swaps can be used to **adjust the mix** of fixed and variable rate and the currency of the finance.

Essential reading

See Chapter 13 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for a general introduction to interest rate risk.

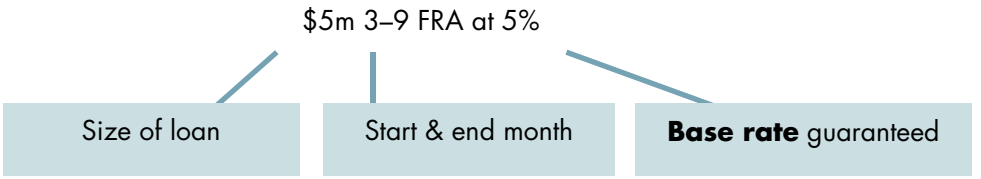
2 Forward rate agreements (FRAs) – fixing the rate

Key term

Forward rate agreement: a contract with a bank to receive or pay interest at a pre-determined interest rate on a notional amount over a fixed period in the future.

Like a currency forward, an FRA effectively **fixes** the rate. **Unlike** a currency forward, the FRA is a separate transaction, and is structured to create a fixed outcome by counterbalancing the impact that interest rate movements have on the actual transaction (ie a loan or an investment).

Quotation of forward rates



An FRA is over-the-counter agreement with an investment bank, it is separate from actual transaction allows a company to borrow (or invest) at a future date at the best rate available at that time.

Advantages of forward rates	Disadvantages of forward rates
• Simpler than other derivative agreements	• Fixed date agreements (the term of a 3–9 FRA is fixed in the FRA contract)
• Normally free, always cheap (in terms of arrangement fees)	• Rate quoted may be unattractive
• Tailored to the company's precise requirements (in terms of amount of cover needed).	• Higher default risk than an exchange-based derivative

Illustration 1

Altrak Co is planning to take out a six-month fixed rate loan of $5 million in three months' time. It is concerned about the base rate (LIBOR) rising above its current level of 5.25% per annum. Altrak has been offered a 3–9 FRA at 5.5%.

Altrak can borrow at about 1% above the base rate.

Required

Advise Altrak of the likely outcome if in three months' time the base rate rises to 5.75%.

Solution

FRA outcome

Bank pays compensation because interest rates have risen compared to the 5.5% that is fixed in the FRA.

The bank will therefore pay 5.75% – 5.5% = 0.25% to Altrak

In $s this is:

0.25 ÷ 100 × $5m × 6months (term of loan) ÷ 12 months (interest rate is annual) = $6,250

Actual loan

Altrak borrows at the best rate available, eg 5.75 + 1 = 6.75%

In $s this is 6.75 ÷ 100 × $5m × 6months ÷ 12 months = $168,750

Net outcome

Net costs = 6.75% – 0.25% = 6.5%

In $s this is $168,750 – $6,250 = $162,500

Activity 1: Technique demonstration

Altrak Co is planning to take out a six-month fixed rate loan of $5 million in three months' time. It is concerned about the base rate (LIBOR) rising above its current level of 5.25% per annum. Altrak has been offered a 3–9 FRA at 5.5%.

Altrak can borrow at about 1% above the base rate.

Required

Advise Altrak of the likely outcome if in three months' time the base rate falls to 4.5%.

Solution

FRA outcome

Actual loan

Net outcome

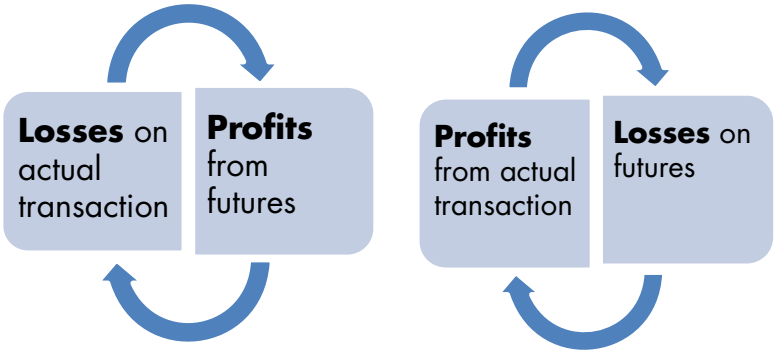
Note that this is the same outcome whether interest rates rise or fall; an FRA **fixes** the company's borrowing costs.

3 Interest rate futures – fixing the interest rate

Futures contracts were used in the previous chapter to hedge currency. The points made in that chapter about the general features of futures including standardised dates and amounts, margins and marking to market all apply to interest rate futures.

A key **difference** from currency futures is that interest rate futures have a **standardised period** of three months. This means that a company that is intending to borrow for, say, a six-month term and is worried about interest rates rising will only receive compensation from an interest rate future as if it has borrowed for three months (the standard term of the future). As a result two three-month contracts will be needed to cover a six-month loan.

Like FRAs, interest rate futures allow the **'fixing' of an interest rate.**



Key term

Interest rate future: an agreement with an exchange to pay or receive interest at a pre-determined rate on a **standard** notional amount over a fixed standard period (usually **three months**) in the future.

3.1 Types of futures contract

A company with a **cash surplus** over a period of time in the future will be worried about interest rates falling; a futures contract to **receive interest** is needed, this is a **contract to buy** (so called because buying assets results in interest being received).

A company needing to **borrow money** in future will be worried about interest rates rising; this requires a futures contract to **pay interest**, this is a **contract to sell** (borrowers would sell bonds, which creates an obligation to pay interest).

Key term

Companies that will have a cash flow surplus require **contracts to buy**.

Companies which will borrow require **contracts to sell**.

3.2 Quotation of futures contracts

Futures prices are quoted as follows:

December	94.75	*March*	94.65	*June*	94.55

The dates refer to the date at which the future expires eg a December future can be used at any time during the year until it expires at the end of December.

The price is in fact an **interest rate if it is subtracted from 100**, as follows:

December	100 – 94.75 = 5.25%
March	100 – 94.65 = 5.35%
June	100 – 94.55 = 5.45%

The easiest way of interpreting interest rate futures is to **convert them into percentages** and this is the method adopted in this chapter.

3.3 Steps in a futures 'hedge'

Step 1: Now	Contracts should be set in terms of **buying or selling interest** – choosing the closest standardised futures date **after** the loan begins, and **adjusting for the term of the loan compared to the three-month standard term of an interest rate future**
Step 2: In the future	Complete the **actual** transaction on the **spot market**.
Step 3: At the same time as Step 2	**Close out the futures contract** by doing the opposite of what you did in Step 1. Calculate net outcome.

Illustration 2

Altrak (see Illustration 1) is considering using the futures market.

It is 1 December, and an exchange is quoting the following prices for a standard $500,000 three-month contract. Contracts expire at the end of the relevant month. LIBOR is 5.25%.

Prices are as follows:

December 94.75 = 5.25% *March* 94.65 = 5.35% *June* 94.55 = 5.45%

Required

Illustrate the outcome of a futures hedge, assuming that a loan is taken out at LIBOR +1% fixed at the **start** of the loan and that LIBOR is 5.75% on 1 March.

Note. It is quicker to leave your answer in %, and to convert into $s as a final step.

Solution

Step 1: On 1 December

Contracts **to sell** are required as Altrak is borrowing.

Number of contracts:

$$= \$5\text{m loan} \div \$0.5\text{m contract size} \times \frac{6\,(\text{term of loan})}{3\,(\text{standard term of future})} = \textbf{20 contracts}$$

Date:

Cover is required until the loan begins because it is the interest rate at this point that determines the risk (assuming the loan taken out is at a fixed rate, interest rate changes after the loan is taken out do not have any effect on loan repayments).

Therefore a March future at 5.35% (which covers the start of the loan on 1 March) is required.

Altrak should enter into 20 March futures (to sell) at 5.35%.

Step 2: 1 March

Take out the actual loan: Altrak will borrow at LIBOR + 1% so this is 5.75 + 1 = 6.75%

Step 3: 1 March

Forecasting the futures price on 1 March (as for currency futures)

	Now to 1 Dec		*1 March*
March future	5.35		
LIBOR	5.25		
Basis	0.10	× 1/4 =	0.03
	4 months of time until end of future		1 month remaining

The March future rate is forecast to be 0.03% (or 3 basis points, where 0.01% = 1 basis point) above LIBOR on 1 March, so if LIBOR is 5.75% the future price should be 5.75 + 0.03 = **5.78**%

Close out the futures contract by doing the opposite of what you did in Step 1.

1 Dec contract to pay interest at	5.35%
1 March contract to buy receive interest at	5.78%
Difference	0.43%

This is profit as interest is received at a higher rate than it is paid; this net amount acts as compensation for interest rates rising.

Calculate net outcome.

As a percentage this is 6.75% (Step 2) minus 0.43% (Step 3) = 6.32%

In $s this is 0.0632 × $5 million × 6 months (term of loan) ÷ 12 months (interest rates are in annual terms) = $158,000

This is a better outcome than the FRA in Illustration 1.

Activity 2: Technique demonstration

Altrak (see Activity 1) is considering using the futures market. It is 1 December, and an exchange is quoting the following prices for a standard $500,000 three-month contract. Contracts expire at the end of the relevant month. LIBOR is 5.25%.

Prices are quoted **at (100 – annual yield)** in basis points, as follows:

December	94.75	*March*	94.65	*June*	94.55

Required

Illustrate the outcome of a futures hedge, assuming that a loan is taken out at LIBOR +1% fixed at the **start** of the loan and that LIBOR is 4.50% on 1 March.

Note. It is quicker to leave your answer in %, and to convert into £s as a final step.

Solution

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3.4 Advantages and disadvantage of futures

Advantage of futures	Disadvantages of futures
• Flexible dates, ie a September future can be used on any day until the end of September	• Only available in large contract sizes
• Lower credit risk because exchange-traded	• Margin may need to be topped up on a daily basis to cover expected losses
	• Basis may not fall in a linear way over time (basis risk)

4 Interest rate options – cap the interest rate

4.1 Exchange-traded interest rate options

The mechanics of exchange-traded interest options are **not** similar to exchange-traded currency options that were covered in the previous chapter.

In fact exchange-traded interest rate options are the same as interest rate futures contracts except that they only ever pay compensation, they never incur losses.

For this reason, exchange-traded interest rate options are often called '**options on futures**'.

A key **difference** from interest rate futures is that exchange-traded interest options involve the payment of a **premium**.

Key term

Exchange-traded interest rate option: an agreement with an exchange to pay or receive interest at a pre-determined rate on a **standard** notional amount over a fixed standard period (usually **three months**) in the future.

These are two types of option contract, calls and puts.

Key term

Put option: an option to **pay interest** at a pre-determined rate on a standard notional amount over a fixed period in the future.

Call option: an option to **receive interest** at a pre-determined rate on a standard notional amount over a fixed period in the future.

- **Call option** – a right to buy (receive interest)
- **Put option** – a right to sell (**P**ay interest)

4.2 Steps in an exchange-traded options hedge

The steps are almost identical to the futures hedge, **the differences are in bold**.

Step 1: Now

Contracts should be set in terms of **call or put options** – choosing the closest standardised **option** date after the loan begins, and adjusting for the term of the loan compared to the three-month standard term of an interest rate future.

Pay a premium for the option.

Step 2: In the future

Complete the actual transaction on the spot market.

Step 3: At the same time as step 2

Close out the options contract on the futures market by doing the opposite of what you did in Step 1 but **only if the option makes a profit**

Calculate net outcome.

Illustration 3

Altrak is considering using the options market. It is 1 December, and the exchange is quoting the following prices for a standard $500,000 three-month contract. Contracts expire at the end of the relevant month. LIBOR is 5.25%.

This the interest rate when subtracted from 100

This the premium as a %

Strike price	*Calls*		*Puts*	
	March	*June*	*March*	*June*
94.35	0.018	0.025	0.125	0.140
94.55	0.010	0.012	0.245	0.248

Required

Illustrate an option hedge at 5.45% (the rate closest to the current spot rate implying a strike price of 100 – 5.45 = 94.55), assuming a loan is taken out at LIBOR +1% and LIBOR on 1 March is 5.75%.

Note. It is quicker to leave your answer in %, and to convert into $s as a final step.

Solution

Step 1: On 1 December

Put options are required as Altrak is borrowing.

Number of contracts:

$$= \$5\text{m loan} \div \$0.5\text{m contract size} \times \frac{6\,(\text{term of loan})}{3\,(\text{standard term of future})} = \textbf{20 contracts}$$

Date: as for futures, cover is required until the loan begins.

Altrak should enter into 20 March put options (to sell) at 5.45%.

A premium of 0.245% is paid.

Step 2: 1 March

Complete the actual loan: Altrak will borrow at LIBOR + 1% so this is 5.75 + 1 = 6.75%

Step 3: 1 March

Forecasting the futures price on 1 March (as for interest rate futures)

	Now to 1 Dec		*1 March*
March future	5.35		
LIBOR	5.25		
Basis	0.10	× 1/4 =	0.03
	4 months of time until end of future		1 month remaining

The March future rate is forecast to be 0.03% above LIBOR on 1 March, so if LIBOR is 5.75% the future price should be 5.75 + 0.03 = **5.78%**

Close out the options by doing the opposite of what you did in Step 1 (if a profit is made).

1 Dec put options to pay interest at	5.45%
1 March contract to buy receive interest at	5.78%
Difference	0.33%

Opting to pay interest at 5.45% and receive interest at 5.78% gives a profit of 0.33%. This is paid to Altrak by the exchange as compensation for interest rates rising.

Calculate net outcome

As a percentage this is 0.245% (Step 1) + 6.75% (Step 2) minus 0.33% (Step 3) = 6.665%

In $s this is 0.0665 × $5 million × 6 months (term of loan) ÷ 12 months (interest rates are in annual terms) = $166,250.

This is a worse outcome than the FRA or the future as shown in Illustrations 1 and 2. This is due to the cost of the options (the premium), but if interest rates fall then the result of the options hedge will improve (but the forward and futures hedge both result in a fixed outcome and will not improve if interest rates fall).

Activity 3: Technique demonstration

Altrak is considering using the options market. It is 1 December, and the exchange is quoting the following prices for a standard $500,000 three-month contract. Contracts expire at the end of the relevant month. LIBOR is 5.25%.

Strike price	*Calls*		*Puts*	
	March	*June*	*March*	*June*
94.35	0.018	0.025	0.125	0.140
94.55	0.010	0.012	0.245	0.248

Required

Illustrate an option hedge at **5.45%**, again assuming a loan is taken out at LIBOR +1% and LIBOR on 1 March is 4.50%

Solution

4.3 Advantages and disadvantages of exchange traded interest rate options

Advantages of options	Disadvantages of options
• Flexible dates (like a future)	• Only available in large contract sizes
• Allow a company to take advantage of favourable movements in interest rates.	• Can be expensive due to the requirement to pay an up-front premium.
• Useful for uncertain transactions, can be sold if not needed	

4.4 Interest rate collars

A company can write and sell options to raise revenue to reduce the expense of an exchange traded interest rate options.

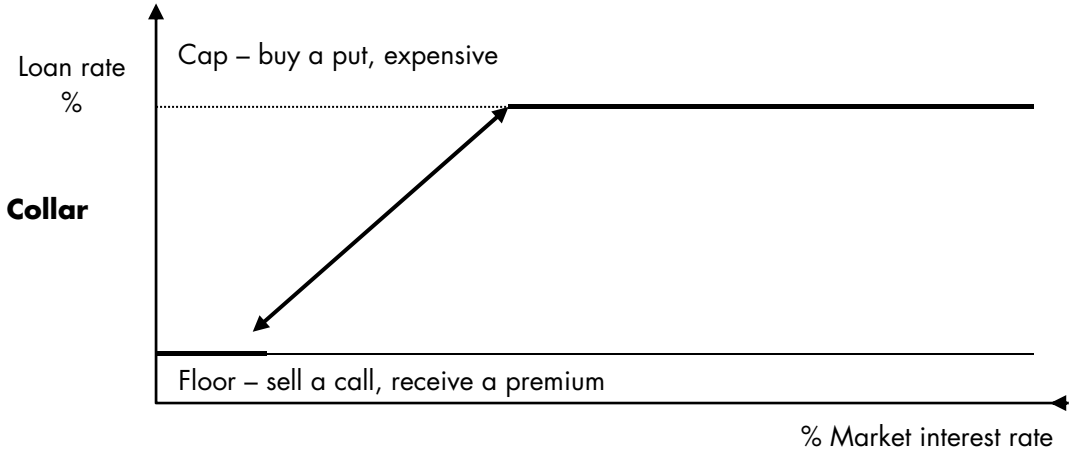
A combined strategy of buying and selling options is called a **collar**.

For a borrower a collar will involve buying a put option to cap the cost of borrowing and selling a call option at a lower rate to establish a floor (the borrower will not benefit if interest rates fall below this level).

If interest rates rise the borrower is protected by the cap.

If interest rates fall the borrower will benefit until the interest rate falls to the level of the floor. If interest rates fall below this then the borrower will have to pay compensation to the purchaser of the call option.

This is illustrated below.



For an investor a collar will involve **buying a call option** to establish a floor for the interest rate and **selling a put option** at a higher rate to establish a cap (the investor will not benefit if interest rates rise above this level).

If interest rates fall the investor is protected by the floor.

If interest rates rise the investor will benefit until the interest rate rises to the level of the cap. If interest rates rise above this then the investor will have to pay compensation to the purchaser of the put option.

Illustration 4

Altrak is considering using the options market. It is 1 December, and the exchange is quoting the following prices for a standard $500,000 three-month contract. Contracts expire at the end of the relevant month. LIBOR is 5.25%.

Strike	*Calls*		*Puts*	
Price	*March*	*June*	*March*	*June*
94.35	0.018	0.025	0.125	0.140
94.55	0.010	0.012	0.245	0.248
94.75	0.008	0.010	0.490	0.492

Required

Illustrate the outcome of a collar with a put at 5.45% and the call at 5.25% if LIBOR in three months is 5.75%

Note. It is quicker to leave your answer in %, and to convert into $s as a final step.

Solution

Step 1: On 1 December

Put options are required as Altrak is borrowing.

Number of contracts: as before = **20 contracts**

Date: as before, March.

Altrak should enter into 20 March put options (to sell) at 5.45% **and sell 20 March call options at 5.25%**.

A net premium of 0.245% – **0.008%** = 0.237% is paid.

Step 2: 1 March

Complete the actual loan: Altrak will borrow at LIBOR + 1% so this is 5.75 + 1 = 6.75%

Step 3: 1 March

As before, the March future rate is forecast to be 0.03% above LIBOR on 1 March, so if LIBOR is 5.75% the future price should be 5.75 + 0.03 = **5.78%**

Close out the options by doing the opposite of what you did in Step 1 (if a profit is made).

1 Dec put options to pay interest at	5.45%
1 March contract to buy receive interest at	5.78%
Difference	0.33%

Call options will not be exercised by the holder as interest rates have risen

Calculate net outcome

As a percentage this is 0.237% (Step 1) + 6.75% (Step 2) minus 0.33% (Step 3) = 6.657%

This is cheaper than simply buying put options if interest rates rise.

Activity 4: Technique demonstration

Activity 3 continued – Altrak's FD considers the options market to be too expensive.

Required

Illustrate the outcome of a collar with a put at 5.45% and the call at 5.25% if LIBOR in three months is 4.50%

Solution

Step 1 is unchanged, so only complete Steps 2 and 3.

4.5 Over-the-counter options

Options are also available directly from a bank. These are tailored to the precise loan size and timing required by a company, but will be more expensive and cannot be sold on if not needed.

5 Swaps

A swap is where two counterparties agree to pay each other's interest payments. This may be in the same currency (an interest rate swap) or in different currencies (a currency swap).

5.1 Interest rate swaps

Swaps enable a company to:

(a) **Manage interest rate risk** – for example, by swapping some of its **existing** variable rate finance into fixed rate finance a company can protect itself against interest rate rises; this may be cheaper than refinancing the original debt (which may involve redemption fees for early repayment and issues costs on new debt).

(b) **Reduce borrowing costs** – by taking out a loan in a market where they have a comparative interest rate advantage.

Usually **a bank will organise the swap** to remove the need for counterparties to find each other and to remove default risk.

Tutorial note

A useful approach to adopt in an exam for a swap organised by a bank is to assume – unless told otherwise – that the variable interest rate payment is at LIBOR. This is what normally happens in reality.

Illustration 5

Altrak is interested in the idea of using a swap arrangement to create a fixed rate for a long-term loan of $20 million that is also being arranged. The swap will be organised and underwritten by a bank which has found another company (Company A) willing to participate in a swap arrangement; the merchant bank will charge a fee of 0.20% to both companies.

Company A is a retailer with low levels of gearing; it has reviewed its balance of existing fixed and variable rate finance and wants to increase its exposure to variable rate finance.

The borrowing rates available to Altrak and to Company A are:

	Altrak	Company A
Fixed	6.50%	5.55%
Variable	LIBOR + 1.00%	LIBOR + 0.75%

Required

(a) Explain why Altrak wants a fixed rate loan at the same time as Company A wants a variable rate.

(b) Identify whether a swap could be organised to the benefit of both companies.

(c) If so, identify the reason(s) for this.

Solution

(a) Altrak could have

(i) Different expectations about the future direction of interest rates.
(ii) A different attitude to risk – Altrak's business risk or financial risk could be higher.

(b) **Step 1 – assess potential for gain from swap**

	Altrak	Company A	Difference
Fixed	6.50%	5.55%	0.95% Company A cheaper
Variable	LIBOR + 1.00%	LIBOR + 0.75%	0.25% Company A cheaper
			Difference of differences = 0.95% – 0.25% = 0.70%

If a swap uses company A's comparative advantage in fixed rate finance, as is suggested here, then a gain of 0.70% (before fees) is available. This falls to 0.70 – (2 × 0.20%) = 0.30% after fees. If this is split evenly it gives a gain of 0.15% to each party.

Step 2 – swap, variable rate at LIBOR, designed to splitting gain 50:50, ie 0.15% each

Position if no swap	6.50%		LIBOR + 0.75%
	Altrak		**Company A**
Actual loan	LIBOR + 1 %		5.55%
Fees	0.20%		0.20%
Swap: variable	(LIBOR)	←	LIBOR
Swap: fixed*	5.15%	→	(5.15%)
	6.35%		LIBOR + 0.60%
	0.15%	gain vs no swap	0.15% gain

* The fixed rate is a balancing figure designed to give the required gain to each party.

(c) The swap has worked by using Company A's access to cheap fixed rate finance to drive down finance costs. In addition it will have saved Company A the costs of redeeming fixed rate finance and organising new variable rate finance.

Activity 5: Swap example

Company A is investigating the possibility of an interest rate swap.

A bank would charge 0.1% fees to both parties for organising the swap.

	Company A	Company B
Fixed	8.00%	7.00%
Variable	LIBOR + 1.00%	LIBOR – 1.00%

Required

Show how a swap could benefit both companies.

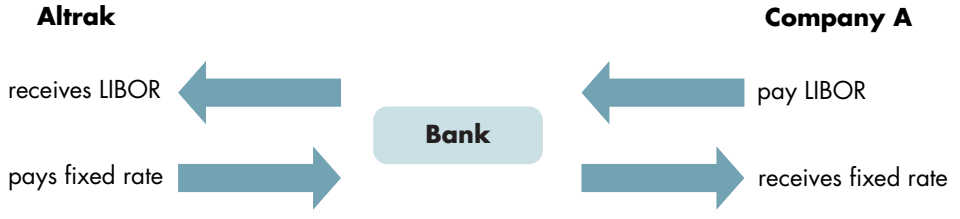
Solution

5.1.1 Swaps as a spread

Where a bank is operating as a middle-man in an interest rate swap, it will set up the swap by identifying the swap partners, and will set up the two legs of the swap (ie fixed and variable) so that the companies involved are entering into contracts with the bank and not directly with each other.

This helps to minimise default risk.

Using the two companies from Illustration 5, the role of the bank can be illustrated as:



Because the variable rate of a swap can be assumed to be at LIBOR **(unless otherwise stated in a question) then all** the bank has to establish is the rate to apply to the fixed rate **leg of the deal.**

The fixed rate can then be quoted by the bank as a **spread**, for example:

4.95%–5.35%

The lower rate of 4.95% (sometimes called the **bid price**) is the rate **a bank will pay** on the fixed rate leg.

The higher rate of 5.35% is sometimes called the **offer price or ask price**; it is the rate **the bank will receive** on the fixed leg part of a swap.

The bank makes its profit from the swap from the difference between these rates. Here the profit is 5.35 – 4.95 = 0.40%. This is another way of showing the fee of 0.2% to each company (0.40% in total) that is mentioned in Illustration 5.

If bid and ask prices are quoted like this then interest rate swap questions become simpler.

Illustration 6

This example draws from the scenario set up in Illustration 5 but presents the information relating to the swap in a different way.

Altrak is interested in using a swap to create a **fixed rate** for a loan of $20m. The swap will be organised and underwritten by a merchant bank.

The rate being quoted by the bank is 4.95%–5.35%.

The borrowing rates available to Altrak are:

	Altrak
Fixed	6.50%
Variable	LIBOR + 1.00%

Required

Calculate the net gain to Altrak from the swap.

Solution

Altrak
borrows at a variable rate LIBOR + 1%

Impact of the swap

Altrak
receives variable % (LIBOR)
pays fixed % 5.35%*

Total costs = **6.35%**

Potential gain (vs 6.5%) = **0.15%**

* This is rate **received** by the bank, and is the higher of the two rates offered in the spread.

This is the same outcome as Illustration 5.

Note that the other company involved in the swap will receive 4.95% on their fixed leg of the swap (the bank pays the lower of the two rates offered in the spread).

5.2 Valuing interest rate swaps

An interest rate swap can also be valued as the NPV of the net cash flows under the swap.

At the start of the swap the swap contract is designed to give an NPV of zero based on the current FRA rates (remember a zero NPV means that a project is delivering exactly the return required).

Illustration 7

Annual spot rates (from the yield curve) available to Steiner Co for the next three years are as follows:

One year	*Two years*	*Three years*
3.00%	4.10%	4.90%

This means that if Steiner wants to borrow for two years (for example) it will able to borrow at annualised rate of 4.1% per year for the two-year period.

Forward rates can be calculated from this data, as follows:

If Steiner wanted to have a FRA for one year this would be 3.0% (as above).

If Steiner wanted to have a FRA starting at the end of Year 1 and ending a year later this would be calculated by comparing the borrowing costs for two years to the borrowing costs for one year, ie:

$$\frac{1.041^2}{1.03} - 1 = 0.0521 = 5.21\%$$

If Steiner wanted to have a FRA starting at the end of Year 2 and ending a year later this would be calculated by comparing borrowing costs for three years to the borrowing costs for two years, ie:

$$\frac{1.049^3}{1.041^2} - 1 = 0.0652 = 6.52\%$$

Activity 6: Swap valuation

Annual spot rates (from the yield curve) available to Steiner Co for the next three years are as follows:

One year	*Two years*	*Three years*
3.00%	4.10%	4.90%

This means that if Steiner wants to borrow for two years (for example) it will able to borrow at annualised rate of 4.1% per year for the two-year period.

Forward rates have been calculated from this data (as shown in the previous illustration), as follows:

FRA for year two:	3.00%
FRA for year two:	5.21%
FRA for year three:	6.52%

Steiner Co has $100 million of variable rate borrowings repayable in three years' time and is concerned about interest rates rising.

A variable – fixed swap deal is being negotiated with a bank. This will be based on paying the bank a fixed rate over the three-year period in exchange for a variable rate less 0.50%.

Required

Estimate the fixed rate that will be paid as part of the swap.

Solution

5.3 Currency swaps

Currency swaps enable a company to:

(a) **Manage currency risk** – by swapping some of its **existing or new** domestic debt into foreign currency debt a company can match foreign currency cash inflows and assets to costs/liabilities in the same currency.

(b) **Reduce borrowing costs** – by taking out a loan in a (domestic) market where they have a comparative interest rate advantage.

Currency swaps are similar to interest rate swaps but normally involve the **actual transfer of the funds that have been borrowed** (the initial capital is swapped at the start and then back at the end to repay the original loans).

Illustration 8

Altrak Co intends to purchase a European company for €90 million with euro debt finance. Franco is a European company that is setting up operations in the US and wants to use $ debt finance. A bank has indicated that it can organise a swap for a fee of 0.2% to each party.

The principal amount will be exchanged and re-exchanged at the start and end of the swap. The exchange of principal will be at the rate of €0.90 to the $.

Variable rates	Altrak	Franco
$ %	6.25%	7.25%
€ %	4.50%	5.00%

Required

Estimate the gain or loss in % to both Altrak and Franco from entering into this swap.

Solution

Step 1 – assess potential for gain from swap

	Altrak	Franco	Difference
$ %	6.25%	7.25%	1.00%
			Altrak 1% cheaper
€ %	4.50%	5.00%	0.50%
			Altrak 0.5% cheaper
			Difference of differences
			= 1.00% – 0.50% = 0.50%

If a swap uses Altrak's comparative advantage in $ finance, as is suggested here, then a gain of 0.50% (before fees) is available. This falls to 0.5 – (2 × 0.20%) = 0.1% after fees. If this is split evenly it gives a gain of 0.05% to each party.

Step 2 – swap, variable rate at LIBOR, designed to splitting gain 50:50, ie 0.05% each

Position if no swap	4.50% in euros		7.25% in dollars
	Altrak		**Franco**
Actual loan	6.25%		5.00%
Fees	0.20%		0.20%
Swap: variable	(6.25)%	←	6.25%
Swap: fixed*	4.25%	→	(4.25%)
	4.45%		7.20%
	0.05%	gain vs no swap	0.05% gain

* The fixed rate is used a balancing figure designed to give the required gain to each party, other solutions are possible here as long as both companies gain by 0.05%.

5.3.1 Valuing a currency swap

A currency swap can be valued as the NPV of the net cash flows under the swap.

Activity 7: Technique demonstration

Steiner plc has a ten-year fixed rate loan of €8.8 million, which pays 5% p.a. interest at the end of each six-month period. The company is concerned about the risk of the euro strengthening against the pound over the next **two years** and is considering whether to use a currency swap or forward rates.

The available forward rates are (in terms of euros to the pound):

6 months	*12 months*	*18 months*	*24 months*
€1.201 to the £	€1.203 to the £	€1.205 to the £	€1.206 to the £

UK LIBOR is as follows:

6 months	*12 months*	*18 months*	*24 months*
3.25%	3.45%	3.50%	3.52%

The swap currently being proposed is €1.2032 to the £.

Required

(a) Estimate the present value of the gain or loss in £m from entering into this swap.
(b) Estimate the swap rate that would make it competitive with the use of forward rates.

Note. Use six-month time periods for the NPV analysis.

Solution

5.3.2 Swaptions

A 'swaption' is an option to enter into a swap in return for an up-front premium. For example, if there was any uncertainty over the proposed acquisition in the previous Activity, then a swaption could be used.

5.3.3 FOREX swaps

PER alert

One of the optional performance objectives in your PER is to advise on using instruments or techniques to manage financial risk. This chapter has looked at interest rate risk, which is an aspect of financial risk.

Key term

FOREX swap: a short-term swap made up of a spot transaction and a forward transaction which allows a company to obtain foreign currency for a short time period (usually within a week) and then to swap back into the domestic currency a short-time later at a known (forward) rate.

A FOREX swap is useful for hedging because it allows companies to shift temporarily into or out of one currency in exchange for a second currency without incurring the exchange rate risk of holding an open position in the currency they temporarily hold.

Illustration 9

An example of a FOREX swap is where an American company has a surplus cash balance in euros which is not required for any transactions in the next week.

If this company knows that they need to pay their manufacturers in US dollars in one week's time they could:

1 Sell some euros **at the spot rate** and buy US dollars to cover this expense
2 Then in one week buy euros and sell dollars to replenish their cash balance in euros

However, this exposes the company to transaction risk.

This can be avoided by:

1 Sell some euros **at the spot rate** and buy US dollars to cover this expense
2 **At the same time arrange a forward contract** to sell dollars for euros in one week

This combination of a simultaneous forward and spot transaction is called a FOREX swap.

Chapter summary

Managing interest rate risk

1 Interest rate risk

Both for borrowers and investors
Smoothing is a simple method
Risk on planned transactions is harder to manage

2 Forward rate agreements – fixing the rate

Notional OTC agreement
Fixes the interest rate

3 Interest rate futures – fixing the interest rate

Standardised three-month agreements

3.1 Types of futures contracts

Borrower: contract to sell
Investor: contract to buy

3.2 Quotation of futures

Interest rate = 100 – quoted price

3.3 Steps in a futures 'hedge'

1 Set up type, number (adjust for three-month contracts) and date of futures contracts
2 Actual transaction at spot rate
3 Close out future and net off

3.4 Advantages and disadvantages of futures

Flexible dates, exchange traded (lower default risk)
Standard amounts, margins

4 Interest rate options – cap the interest rate

4.1 Exchange-traded interest rate options

Standard amounts, flexible dates

4.2 Steps in exchange-traded interest options hedge

1 Set up type, number and date of options contracts and premium
2 Actual transaction at spot rate or option
3 Net off including premium, assess whether to exercise

4.3 Advantages and disadvantages of exchange-traded interest rate options

Flexible dates, can be sold on
Cost, standard contracts

5 Swaps

5.1 Interest rate swaps

Exploit comparative advantage/save issue and early redemption fees

Split gain, variable rate at LIBOR

Bid–offer spread (for fixed leg of swap)

5.2 Valuing interest rate swaps

Designed initially to generate an NPV of zero at current FRA rates

5.3 Currency swaps

Exploit comparative advantage/save issue and early redemption fees

Valuation using NPV

4.4 Interest rate collars

Borrower: buy puts and sell calls at a lower rate

Investor: buy calls and sell puts at higher rate

4.5 OTC options

Optional but fixed date

BPP LEARNING MEDIA

Knowledge diagnostic

1. **Forward rate agreements**

   Unlike currency forwards, interest rate FRAs are 'notional' derivative-style agreements.

2. **Interest rate futures**

   Unlike currency futures these are based on a standardised time period of three months; this influence the number of interest rate futures contracts that are needed.

3. **Interest rate options (exchange traded)**

   Unlike exchange traded currency options, these are closed out on the futures market.

4. **Interest rate swaps**

   Variable rate leg of the swap is at LIBOR.

5. **Bid–offer quotes for swaps**

   If given, this is the rate at which the fixed rate is being offered. As ever the company gets the worst part of the spread.

6. **Swap valuation**

   Uses FRA which can be derived from the yield curve.

Further study guidance

Question practice

Now complete try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q22 Shawter

Q23 Carrick plc

Q24 Theta Inc

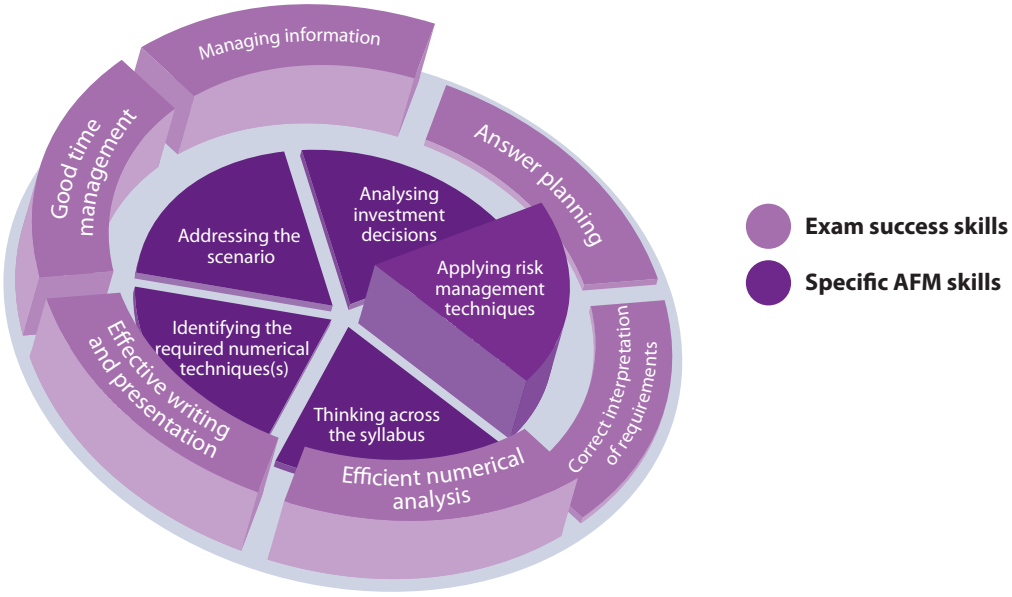
Further reading

There is are two Technical Articles available on ACCA's website, one called 'Currency swaps', and the other 'Determining interest rate forwards and their application to swap valuation'.

We recommend you read these articles as part of your preparation for the AFM exam. Both are written by a member of the ACCA AFM examining team.

SKILLS CHECKPOINT 4

Applying risk management techniques



Introduction

Section E of the AFM syllabus is 'treasury and advanced risk management techniques' and directly focusses on the skill of '**applying risk management techniques**'.

The AFM exam will always contain a question that will have a clear focus on this syllabus area, so this skill is extremely important.

Successful application of this skill will require a strong technical knowledge of this syllabus area, especially of setting up arrangements to manage risk using futures and options.

Additionally, you will need to be able to forecast the outcome of a technique quickly and efficiently under exam conditions.

Finally, as well as being able to apply the techniques numerically you need to be able to discuss the advantages and disadvantages of using them, the meaning of the numbers and their suitability given the scenario (as discussed in Skills Checkpoint 1).

Skills Checkpoint 4: Applying risk management techniques

AFM Skill: Applying risk management techniques

The steps in applying this skill are outlined below, and will be explained in more detail in the following sections as the question 'Phobos' is answered.

STEP 1:
Analyse the scenario and requirements. Make sure that you understand the nature of the risk being faced. Work out how many minutes you have to answer each part of the question. Don't rush in to starting any detailed calculations.

STEP 2:
Plan your answer. Double-check that you are applying the correct type of risk management analysis given the nature of the risk that is faced and the techniques mentioned in the scenario. Consider using a time-line in your answer plan. Identify a time-efficient approach.

STEP 3:
Complete your numerical analysis. Don't over-complicate your analysis, aim for a set of clear relevant numbers. Be careful not to overrun on time with your calculations.

STEP 4:
Explain the meaning of your numbers – relating your points to the scenario wherever possible.

Exam success skills

The following question is based on a past exam question, worth approximately 15 marks.

For this question, we will also focus on the following **exam success skills**:

- **Managing information**. In risk management questions it is crucial to have an accurate understanding of the nature of the risk. It is vital to allocate time to carefully reading the requirements and the scenario.
- **Efficient numerical analysis**. The key to success here is applying a sensible proforma for typical risk management calculations, this becomes easier with practice.
- **Effective writing and presentation**. Underline key numbers. Make sure that your numerical analysis is supported by an appropriate level of written narrative. It is often helpful to use key words from the requirement as headings in your answer as you do this.
- **Good time management**. Complete all tasks in the time available, this is a challenge in risk management questions and is a strong argument for not being over-ambitious in the scope of your numerical analysis.

Skill activity

STEP 1 Analyse the scenario and requirements. Make sure that you understand the nature of the risk being faced. Work out how many minutes you have to answer each part of the question. Don't rush in to starting any detailed calculations.

Requirement

Evaluate the outcome if the anticipated interest rate exposure is hedged:

(a) Using sterling interest rate futures
(b) Using options on short sterling futures
(c) Using an interest rate collar

Advise on which hedging method should be selected. **(15 marks)**

This is a 15-mark question and at 1.95 minutes a mark, it should take 29 minutes.

Assuming you spending approximately 20% of your time reading and planning, this time should be split approximately as follows:

- Reading and planning time – 6 minutes
- Performing the calculations and writing up your answer – 23 minutes

You can immediately see from the requirement that there three derivative techniques that need to be employed. As we have not yet looked at the scenario, you do not yet know whether the risk is that interest rates rise (risk for a borrower) or fall (risk for an investor), or the amounts or time periods involved. This is the next step, and requires a careful read through of the scenario.

Question – Phobos (15 marks)

Following a collapse in credit confidence in the banking sector globally, there have been high levels of volatility in the financial markets around the world. Phobos Co is a UK listed company and has a borrowing requirement of £30 million arising in two months' time on 1 March and expects to be able to make repayment of the full amount six months from now.

Nature of the risk

Phobos is a borrower so faces the risk of interest rates rising in two months' time when it needs to borrow £30 million.

The loan will be for four months (starting in two months' time and finishing in six months' time).

This can be illustrated as a time line on your answer plan (see later)

The governor of the central bank has suggested that interest rates are now at their peak and could fall over the next quarter. However, the Chairman of the Federal Reserve in the US has suggested that monetary conditions may need to be tightened, which could lead to interest rate rises throughout the major economies. In your judgement there is now an equal likelihood that rates will rise or fall by as much as 100 basis points depending upon economic conditions over the next quarter.

Nature of the risk

Further clarification of the risk is provided here.

LIBOR is currently 6.00% and Phobos can borrow at a fixed rate of LIBOR plus 50 basis points on the short-term money market but the company treasurer would like to keep the maximum borrowing rate at or below 6.6%.

Short-term sterling index futures (three-month contracts, contract size £500,000)

The current prices of three-month futures contracts are shown below.

March	93.880
June	93.940

You may assume that basis diminishes to zero at contract maturity at a constant rate.

Options on short sterling futures (three-month contracts, contract size £500,000)

The premiums (shown as an annual percentage) are as follows:

		Calls			*Puts*	
Exercise	*March*	*June*	*Sept*	*March*	*June*	*Sept*
93750	0.155	0.260	0.320	0.045	0.070	0.100
94000	0.038	0.110	0.175	0.168	0.170	0.205

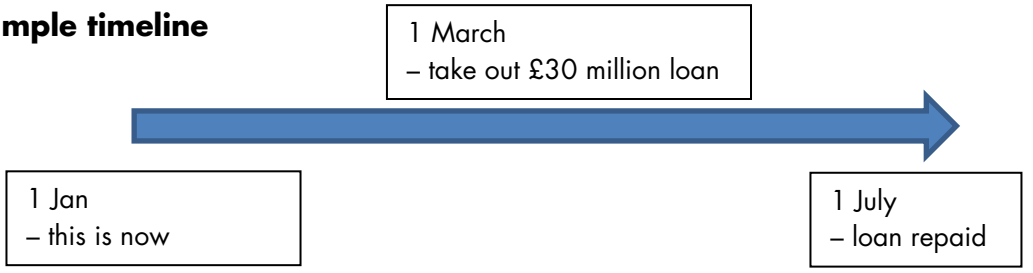
STEP 2

Double-check that you are applying the correct type of risk management analysis given the nature of the risk that is faced and the techniques mentioned in the scenario.

Consider using a timeline in your answer plan.

Identify a time-efficient approach.

Example timeline



Nature of risk

Phobos is a borrower – risk of interest rates rising when it takes out a £30m loan for a period of four months, starting in two months' time on 1 March.

Time-efficient approach

A collar, for a borrower, consists of buying **put options** at a higher rate (93750 or 6.25%) and selling call options at a lower rate (94000 or 6.00%) it will save time if we design the **options hedge** so that it is consistent with the collar ie choose to hedge using **put options** at 6.25%.

STEP 3 Complete your numerical analysis.

Don't over-complicate your analysis, aim for a set of clear relevant numbers.

Be careful not to overrun on time with your calculations.

As already noted, performing the calculations and writing up your answer should take 23 minutes. There are many ways of laying out an answer to this question, **one approach** is shown below.

Solution

(i) **Futures**

Set-up 1 January

This is where your understanding of the nature of the risk is crucial.

Failure to set up any hedge correctly will mean that **few if any** marks can be earned on this part of your answer

Type of future = **March** future with an opening price of 93.880

Number of contracts = $\frac{\text{Amount of exposure}}{\text{Contract size}} \times \frac{\text{Length of exposure}}{\text{Contract period}}$

$= \frac{£30 \text{ million}}{£500,000} \times \frac{4 \text{ months}}{3 \text{ months}}$ = **80 contracts**

Type of contract = contract **to sell** (as we are a borrower)

Basis

	1 January	1 March
March future	100 – 93.88 = 6.12%	
LIBOR	6.00%	
Basis (future – LIBOR)	0.12%	1/3 × 0.12% = 0.04%
Time remaining	Three months	One month

Outcome 1 March

Using the closing basis of 0.04%, the estimated closing futures prices at 1 March =

LIBOR rate at close-out	7%	5%
Closing futures	7.04%	5.04%

Setting up a column for each outcome saves time.

Leave calculations as % also saves time.

Outcome if interest rate (a) increases, or (b) decreases by 100 basis points

	(a)	**(b)**
LIBOR rate at close-out	(7%)	(5%)
Actual loan rate	(7.50%)	(5.50%)
Futures opening rate (to sell)	6.12%	6.12%
Futures closing rate (to buy)	7.04%	5.04%
Profit or (loss on future)	0.92%	(1.08%)
Actual loan + future position in %	**(6.58%)**	**(6.58%)**
In £s (× £30m × 4/12)	**(658,000)**	**(658,000)**

Only analyse one of the options to use time efficiently.

Justify your choice briefly.

As already noted, the choice of 6.25% will save time when the collar is analysed.

(ii) **Traded options**

Set-up 1 January

Type of option = March put option

Chosen rate 93750 = 6.25%

This is justified as the cheapest, minimising transaction costs

Number of contracts = 80 (see earlier)

Premium = **0.045%** (from table)

Outcome 1 March

	(a)	**(b)**
LIBOR rate at close-out	(7%)	(5%)
Actual loan rate	(7.50%)	(5.50%)
Put option outcome (as before)	6.25%	6.25%
Futures closing rate (to buy)	7.04%	5.04%
Profit or (loss on future)	0.92%	(1.08%)
		Don't exercise
Option premium	(0.045%)	(0.045%)
Outcome in %	**(6.625%)**	**(5.545%)**
In £s (× £30m × 4/12)	**(662,500)**	**(554,500)**

(iii) **Collar**

Set-up 1 January

Type of options

= Buy March put option at 6.25%, sell March call option at 6.00%

Number of contracts = 80 (see above)

Premium = 0.045% (from table) – 0.038% = **0.007%**

Outcome 1 March

Time has been saved because the put option of 6.25% was used in the options hedge.

Note that the loss to Phobos on the call option is the hardest part of the analysis and it is not necessary to get this right to score a good pass answer.

	(a)	**(b)**
LIBOR rate at close-out	(7%)	(5%)
Actual loan rate	(7.50%)	(5.50%)
Put option (as before)	0.92%	Don't exercise
Call option rate (holder has right to receive interest)	6.00%	6.00%
Futures closing rate	7.04%	5.04%
Profit or (loss on future)	Don't exercise	(0.96%)
		Exercised against Phobos by the holder of the option
Option premium	(0.007%)	(0.007%)
Outcome in %	**(6.587%)**	**(6.467%)**
In £s (× £30m × 4/12)	**(658,700)**	**(646,700)**

STEP 4 Write up your answer using key words from the requirements as headings.

Write your answer, explaining the meaning of your numbers - relating your points to the scenario wherever possible.

Narrative element to the solution

Use wording from the requirement

Evaluation – summary

Outcome in %	(a)	(b)	Average
Future	6.58%	6.58%	6.58%
Option (6.25%)	6.625%	5.545%	6.085%
Collar	6.587%	6.467%	6.527%

Summary table saves time and adds clarity.

Then explain the meaning of your numbers.

If interest rates rise, a future will provide the lowest borrowing cost; however, the option and the collar are only marginally more expensive.

If interest rates fall, an option will provide the lowest borrowing cost by a significant margin.

Considering the equal likelihood of an interest rate rise or fall, looking at an average expected cost is relevant and on this basis the option is recommended as it provides a significantly lower average cost.

There is a danger that the objective, to achieve a maximum borrowing rate of 6.6%, is breached if interest rates rise and options are used. However, this breach is marginal and if interest rates fall this approach will be significantly cheaper than any other. So, the advice here is to hedge the risk using interest rate options.

Relate your answer using the details given in the scenario.

End with 'advice' as per the requirement.

Exam success skills diagnostic

Every time you complete a question, use the diagnostic below to assess how effectively you demonstrated the exam success skills in answering the question. The table has been completed below for the Phobos activity to give you an idea of how to complete the diagnostic.

Exam success skills	Your reflections/observations
Managing information	Did you understand the nature of the risk facing the company before starting your calculations?
Efficient numerical analysis	Did you spend too much time on the calculations, could you have taken any short-cuts? Did your answer present neat workings in a form that would have been easy for a marker to follow?
Effective writing and presentation	Did you explain the meaning of the numbers?
Good time management	Did you allow yourself time to address all requirements?
Most important action points to apply to your next question	

Summary

Each AFM exam will contain a question that focusses on risk management.

This is an important area to revise and to ensure that you understand the variety of techniques available (including their limitations).

It is also important to be aware that in the exam, it is more important that you limit your numerical analysis and produce a concise meaningful analysis.

In the exam you are dealing with complicated calculations under timed exam conditions and time-management is absolutely crucial. So you need to ensure that you:

- Show clear workings and score well on the easier parts of the question
- Make a reasonable attempt at the harder calculations while accepting that your answer is unlikely to be perfect

Remember that there are no optional questions in the AFM exam and that this syllabus section (risk management) will definitely be tested!

14 Financial reconstruction

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Assess an organisational situation and **determine whether a financial reconstruction is an appropriate strategy** for a given business situation	D1(a)
• **Assess the likely response** of the capital market and/or individual suppliers of capital to any reconstruction scheme and the impact their response is likely to have on the value of the organisation	D1(b)

Exam context

Chapters 14 and 15 cover Section D of the syllabus 'Corporate reconstruction and reorganisation'.

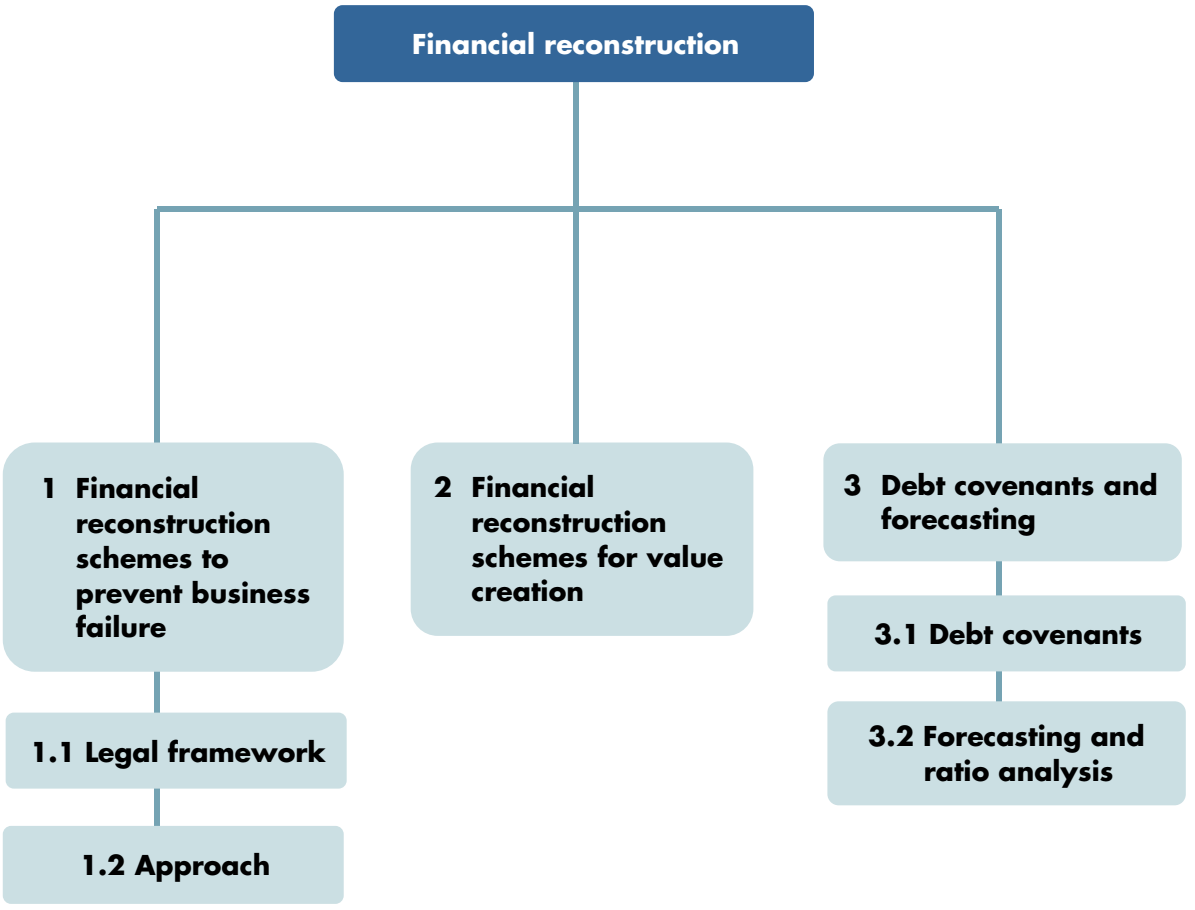
The chapter starts by discussing how to approach an evaluation of a reconstruction scheme designed to avoid business failure.

The chapter then moves on to consider other types of reconstruction schemes which are designed to increase value.

In either case debt covenants may be relevant, and the chapter ends by discussing the importance of forecasting in assessing whether debt covenants are likely to be breached; this relates to financial ratio analysis, which has been introduced in Chapter 2 and Chapter 10.

Exam questions in this area are also likely to link to business reorganisation (covered in the next chapter) because companies that are in financial difficulties often need to consider **both** financial reconstruction **and** business reorganisation.

Chapter overview



1 Financial reconstruction schemes to prevent business failure

A company might be on the brink of becoming insolvent due to a high interest burden or severe cash flow problems in the short term, but may have plans that it believes hold out a good promise of profits in the future.

In such a situation, the company might be able to attract fresh capital and to persuade its creditors to accept some shares (or new debt) in the company as 'payment', and achieve a reconstruction which allows the company to carry on in business.

Existing shareholders are likely to see a large dilution of their holding as reconstructions often involve issuing many new shares to creditors.

1.1 Legal framework

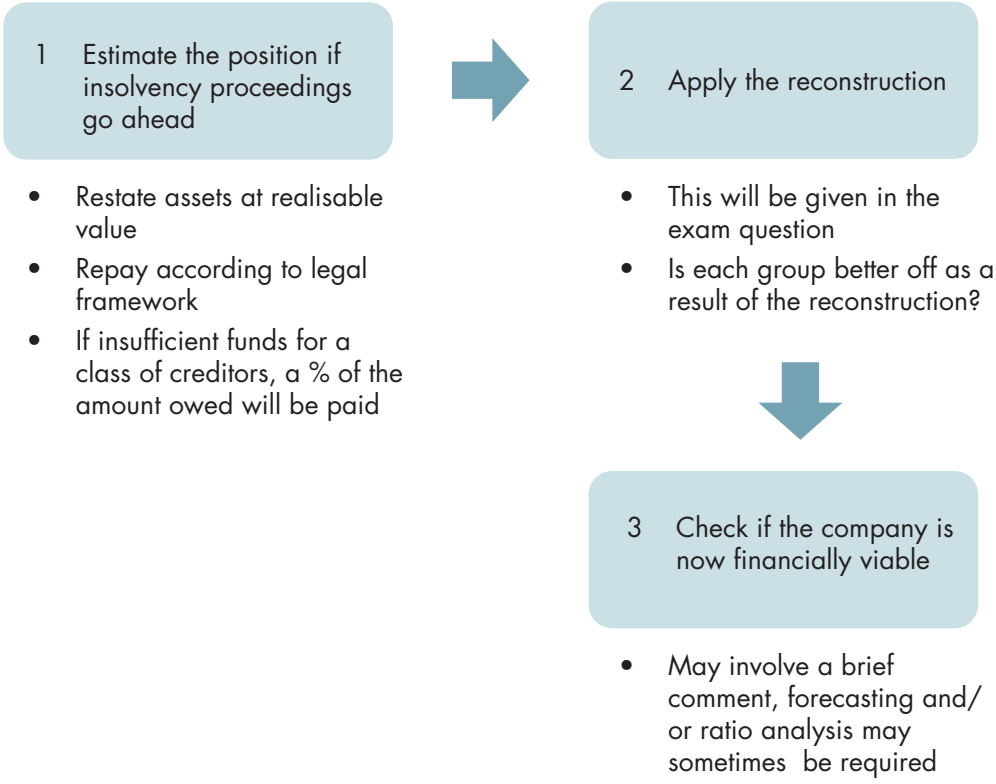
In insolvency proceedings the proceeds from selling the assets are shared out to repay creditors and investors in a predetermined rank:

1 Creditors with a fixed charge on a specific asset
2 Creditors with a floating charge on the company's assets in general or a class of assets
3 Unsecured creditors
4 Preference shareholders
5 Ordinary shareholders

In addition there may be amounts due to other parties, such as tax authorities and employees. The rank of these parties, in terms of order of repayment, will be specified in an exam question.

The proposed reconstruction must be agreed by all parties – classes of creditors should meet separately, every class must vote in favour for the scheme to succeed.

1.2 Approach



Activity 1: Evaluating a reconstruction

Nomore Ltd, a private company that has for many years been making mechanical tools, is faced with rapidly falling sales. Its bank overdraft (with M A Bank) is at its limit of $1,200,000.

The company has just lost another two major customers.

STATEMENT OF FINANCIAL POSITION (EXTRACT)

	31.3.X2 Projected
Non-current assets	$'000
Freehold property	5,660
Plant and machinery	3,100
Motor vehicles	320
Current assets	1,160
Total assets	10,240
Ordinary shares of $1	5,600
Accumulated reserves/(deficit)	(6,060)
Total equity	(460)
Non-current liabilities	
10% loan 20X8 (secured on freehold property)	1,600
Other loans (VC bank, floating charges)	4,800
	6,400
Current liabilities	
Trade payables	3,100
Bank overdraft (MA bank, unsecured)	1,200
Total equity and liabilities	10,240

Other information:

1 The freehold property has a market value of about $5,750,000.

2 It is estimated that the break-up value of the plant at 31 March 20X2 will be $2,000,000.

3 The motor vehicles owned at 31 March 20X2 could be sold for $200,000.

4 In insolvency, the current assets at 31 March 20X2 would realise $1,000,000.

5 Insolvency proceeding costs would be approximately $500,000, this will rank first for repayment.

The company believes that it has good prospects due to the launch next year of its new Pink Lady range of tools and has designed the following scheme of reconstruction:

1 The existing ordinary shares to be cancelled and ordinary shareholders to be issued with $2,000,000 new $1 ordinary shares for $1.00 cash.

2 The secured loan to be cancelled and replaced by a $1,250,000 10% secured bond with a six-year term and $600,000 of new $1 ordinary shares.

3 VC Bank to receive $3,200,000 13% loan secured by a fixed charge and 1,100,000 $1 new ordinary shares.

4 MA bank to be repaid the existing overdraft and to keep the overdraft limit at $1,200,000 secured by a floating charge.

If this plan is implemented, the company estimates that its profits before interest and tax will rise to $1.441 million and its share price will rise to $1.50.

Required

Evaluate whether the suggested scheme of reconstruction is likely to succeed.

Solution

Step 1 Estimate the position if insolvency proceedings go ahead.

Step 2 Apply the reconstruction and evaluate the impact on affected parties.

(a) **Secured loan**

(b) **VC**

(c) **MA bank**

(d) **Ordinary shareholders**

Step 3 Check if the company is now financially viable.

Conclusion

2 Financial reconstruction schemes for value creation

Reconstruction schemes may also be undertaken by companies which are not in difficulties as part of a strategy to create value for the owners of the company.

The management of a company can try to improve operations and increase the value of the company, by:

(a) Returning cash to shareholders using a share repurchase scheme.

(b) A significant injection of further capital, either debt or equity, to fund investments or acquisitions.

(c) A leveraged buy-out: where a publicly quoted company is acquired by a specially established private company which funds the acquisition by substantial borrowing.

This is a mechanism for taking a company private which is sometimes seen as being desirable because it avoid the costs of a listing and potentially allows a company to **concentrate** on the **long-term needs** of the business rather than the short-term expectations of shareholders.

Essential reading

See Chapter 14 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of taking a company private.

3 Debt covenants and forecasting

3.1 Debt covenants

Debt finance often involves 'covenants' – these are conditions that the borrower must comply with and, if they do not, the loan can be considered to be in default and the bank can demand repayment.

3.1.1 Positive covenants

These involve taking positive action to achieve an objective. This could involve achieving certain levels for particular financial ratios eg gearing, interest cover. In addition, it may also include the need to provide the bank with regular financial statements/forecasts, to maintain assets used as security and to insure key assets and staff.

3.1.2 Negative covenants

These place restrictions on the borrower's behaviour.

For example, they may prevent borrowing from another lender, disposal of key assets, paying dividends above a certain level, or making major investments.

3.2 Forecasting and ratio analysis

In any type of financial reconstruction care will need to be taken that debt covenants are not breached. In order to assess whether a positive covenant relating to financing ratios has been broken, you may be required to forecast a company's profits and statement of financial position.

Ratio analysis has been covered in earlier chapters.

3.2.1 Forecast profit statement

It makes sense to start with the profit forecast. This will allow the following to be identified:

Measure	Explanation of possible use
Profits before interest and tax	Required for interest cover calculation
Interest	Required for interest cover calculation
Profits after interest and tax	Required for earnings per share calculation
Retained earnings	Affects the book value of equity

3.2.2 Forecast statement of financial position (SOFP)

Next, the SOFP can be forecast (which will be impacted by the profit forecast which will have forecast the level of retained earnings).

The format of the SOFP is likely to be given in the exam question, and in any case a precise pro-forma will not be required.

Measure	Explanation of possible use
Book value of equity (Share capital plus retained earnings)	Required for gearing calculation
Non-current liabilities	Required for gearing calculation
Current assets and liabilities	Required for liquidity ratios (eg current ratio)

There is a numerical exercise on forecasting in the next chapter.

Chapter summary

Financial reconstruction

1 Financial reconstruction schemes to prevent business failure

1.1 Legal framework

1 Creditors with a fixed charge on a specific asset

2 Creditors with a floating charge on the company's assets

3 Unsecured creditors

4 Preference shareholders

5 Ordinary shareholders

The deal must be agreed by all parties – classes of creditors should meet separately, every class must vote in favour for the scheme to succeed.

1.2 Approach

1 Estimate the position if insolvency occurs

2 Apply reconstruction scheme and check position of each party

3 Assess if the company is viable

2 Financial reconstruction schemes for value creation

(a) Returning cash to shareholders using a share repurchase scheme

(b) A significant injection of capital (debt or equity)

(c) A leveraged buy-out. A mechanism for taking a company private (avoiding the costs of a listing and allowing a company to **concentrate** on the **long-term needs** of the business)

3 Debt covenants and forecasting

3.1 Debt covenants

Positive covenants

- Involve taking positive action to achieve an objective eg gearing, interest cover

Negative covenants

- These place restrictions on the borrower's behaviour

3.2 Forecasting and ratio analysis

1 Forecast profit

2 Forecast SOFP

Use ratio analysis to evaluate (see earlier chapters)

Knowledge diagnostic

1. **Order of repayment**

   In insolvency proceedings, ordinary shareholders rank behind all other claims.

2. **Schemes to increase value**

   These include share repurchase schemes, and issues of new capital.

3. **Taking a firm private**

   Can be viewed as a means of reducing listing expenses and increasing the ability of a firm to take a long-term view.

4. **Positive debt covenants**

   These require positive action, eg to attain an objective.

5. **Negative debt covenants**

   These place restrictions on management behaviour.

Further study guidance

Question practice

Now try the question below from the Further question practice bank (available in the digital edition of the Workbook):

Q25 Brive Inc

Business reorganisation 15

Learning objectives

	Syllabus reference no.
Having studied this chapter you will be able to:	
• Recommend, with reasons, **strategies for unbundling** parts of a quoted company	D2(a)
• Evaluate the likely financial and other **benefits of unbundling**	D2(b)
• Advise on the financial issues relating to **a management buy-out and buy-in**	D2(c)

Exam context

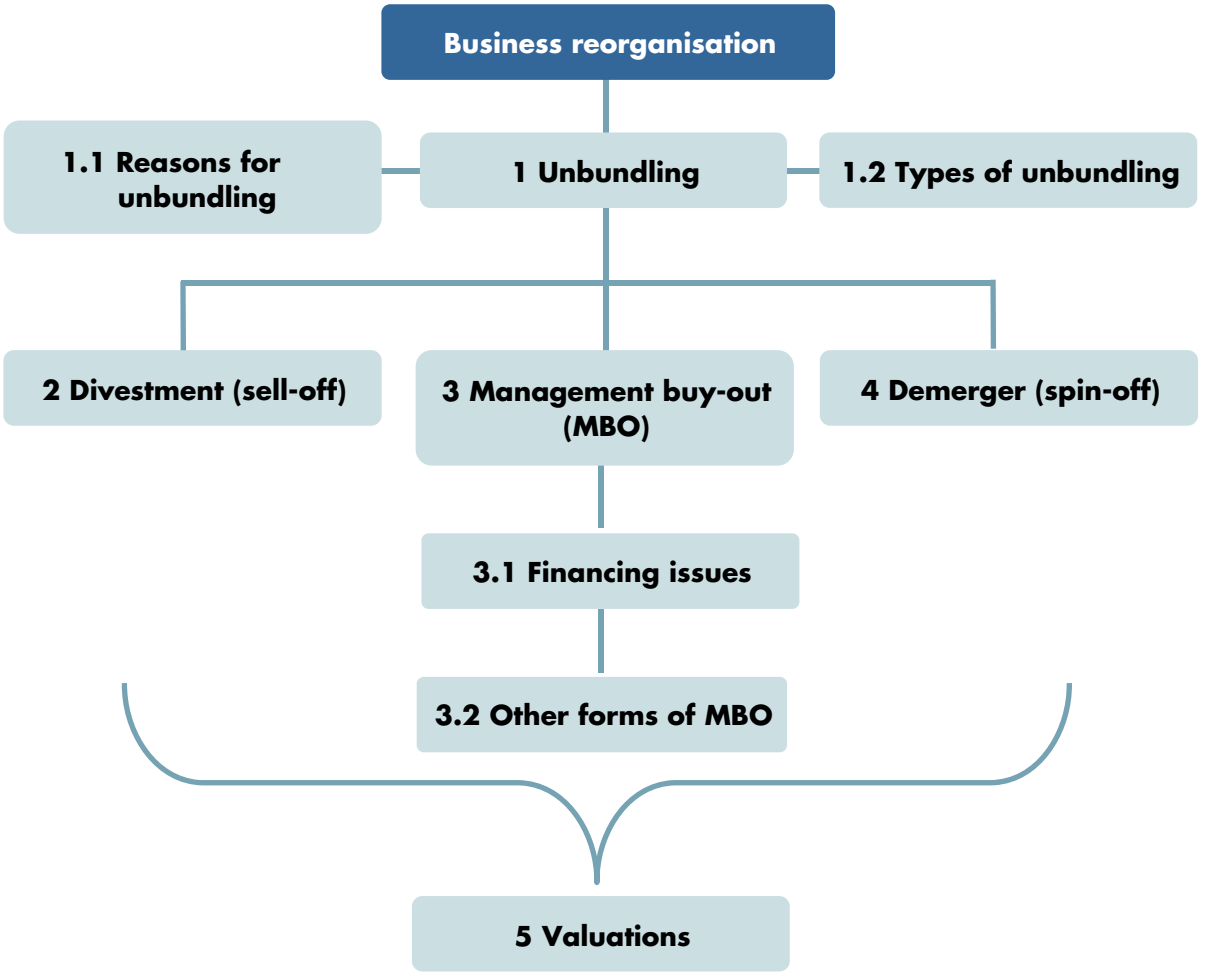
Chapters 14 and 15 cover Section D of the syllabus 'Corporate reconstruction and re-organisation'.

In this chapter we discuss methods of business reorganisations, concentrating primarily on methods of unbundling companies.

Exam questions in this area are also likely to link to **financial reconstructions** (covered in the previous chapter) because companies that are in financial difficulties often need to consider **both** financial reconstruction **and** business reorganisation.

There is also a strong link between this chapter and business valuations (Chapter 8), partly because there may be a need to value a part of a business that is being 'unbundled', and partly because business re-organisation can be viewed as an aspect of **portfolio restructuring** ie the **acquisition** of companies, or **disposals** via divestments, demergers, spin-offs, MBOs and MBIs.

Chapter overview



BPP LEARNING MEDIA

1 Unbundling

Key term

Unbundling: involves restructuring a business by reorganising it into a number of separate parts.

1.1 Reasons for unbundling

Unbundling may be considered for financial and strategic reasons.

Motives	Explanation
Financial	Selling off a division may allow cash to be raised to: • Ease the group's **liquidity problems**; • Reduce the group's **gearing**; or • Reinvest elsewhere in the business to earn a **higher return**.
Strategic	There may be divisions within of a business where the current organisation structure is not adding value. For example, a division may have been neglected because it is **not** seen as being **core** to the group's strategy. If this division existed outside the group it may have a more efficient management structure and take quicker, more effective decisions. If the stock market believes that the organisation structure is not adding-value, then it is possible that the market value of the company will be lower than the sum of the value of its individual divisions; this is called a **conglomerate discount**. Finally, to **protect the rest of the business from takeover**, it may choose to split off a part of the business which is particularly attractive to a buyer.

1.2 Types of unbundling

There are a number of different types of unbundling.

Types	Definition
Divestment (sell-off)	Sale of a part of a company to a third party (ie another company).
Management buy-out (MBO)	A form of divestment involving selling a part of the business to its management team (different forms of MBO are discussed in section 3).
Demerger (spin-off)	A demerger is the opposite of a merger. It is the splitting up of a corporate body into two or more separate and independent bodies.

The type of unbundling that is appropriate will depend on the motive(s) for the strategy.

If the motive is financial then a demerger would not be considered as it **does not** directly raise cash.

2 Divestment (sell-off)

The sale of a division to a third party will add value if the estimated sale price exceeds the present value of lost cash flows (including economies of scale lost as a result of the sell-off).

A **buyer** may be prepared to pay an amount that is greater than the present value of the cash flows of the division because under **their ownership** the division is **worth more** eg due to synergies with the buyer's other business operations.

To value a division, a **cost of capital** that reflects the risk of the division will be required. This is discussed in Section 5.

3 Management buy-out (MBO)

This is **another form of sell-off** but may be preferred to a divestment because:

- It allows a division to be sold with the co-operation of divisional management, and a lower risk of redundancies
- It will be less likely to attract the attention of the competition authorities than a sale to another company

As with a divestment, an MBO will add value if the estimated sale price exceeds the existing present value of lost cash flows (including economies of scale lost as a result of the sell-off).

The management team may be prepared to pay an amount that is greater than the present value of the cash flows of the division because under **their ownership** the division will be **worth more** eg the division achieves better performance because of **greater personal motivation, quicker decision making and savings in overheads** (eg head office costs).

To value a division, a **cost of capital** that reflects the risk of the division will be required. This is discussed in Section 5.

3.1 Financing issues

Typically an MBO will be **mainly financed** by a **mixture** of equity (referred to as private equity as the MBO will be unlisted), debt and mezzanine finance.

If an MBO is mainly financed (80%+) by debt, this may be referred to as a leveraged buy-out (LBO) and has been discussed in the **previous chapter** (note that this term is also used to describe any highly leveraged takeover, whether linked to an MBO or not).

The **equity and mezzanine finance element** will be mainly provided by **a venture capital/private equity firm**, although venture capital investors will usually want to see that managers are financially committed to the venture as well, so an element of the equity will be provided by managers.

3.1.1 Venture capital/private equity finance

The type of finance offered by the private equity company will normally **be in the form of an injection of equity and mezzanine finance**.

Key term

Mezzanine finance: finance that had some of the characteristics of both debt and equity.

Convertible debt and convertible preference shares are forms of **mezzanine finance** as they have characteristics of both debt (eg a fixed return is expected) and also equity (the investor can convert into ordinary shares if the venture is successful).

A private equity company that is concerned about the risk of an MBO will **increase the proportion of their investment provided as mezzanine finance** (ie loans/convertibles etc).

3.1.2 Venture capital/private equity – other issues

In addition to providing finance, venture capitalists can also be a source of **strategic advice** and **business contacts.**

Private equity/venture capital groups will normally expect to exit their investment either by a flotation or sale to another firm. Much of the gain expected by the venture capitalist will be through selling their interests and making a substantial capital gain.

In order to make sure that an MBO is on track to deliver this, the venture capitalist will set demanding financial targets. Failure to hit targets set by the private equity provider/venture capitalist can lead to extra shares being transferred to their ownership at no additional cost (an **equity ratchet**), or the venture capitalist having the right to make new appointments to the board.

Activity 1: Financing issues

Lomax Co has decided to sell one of its subsidiaries (free of debt). The managers of the subsidiary are attempting to purchase it through a leveraged MBO to form a new company, Retro. The cost of $52.5m would come from $7.5m of equity invested equally by the venture capitalist, VC, and the management team and $15m of mezzanine finance, provided by VC, and a $30m bank loan.

The mezzanine finance is unsecured convertible debt, redeemable at nominal value in five years' time and paying a fixed interest rate of 18% per year. The conversion rights would allow VC to convert $100 of debt into 10 Retro shares at any time after three years from the date the loan is agreed.

The bank loan is at a fixed rate of 8%, for a period of three years. Interest is payable annually on the amount outstanding at the start of the year and the loan will be repaid in three equal annual instalments (see the Appendix below). The loan will be secured against Retro's land and buildings.

A condition of the loan is that gearing, measured by the book value of total loans to equity, is no more than 200% by the end of year 2. If this condition is not met the bank has the right to call in its loan at one month's notice. Another condition is that no dividends can be paid in the first two years.

Most recent statement of profit or loss for the subsidiary

	$'000
Revenue	33,899
Operating costs	(18,749)
Central overhead payable to Lomax	(6,000)
Interest paid	(3,750)
Taxable profit	5,400
Taxation (20%)	(1,080)
Retained earnings	4,320

Lomax will continue to provide central accounting, personnel and marketing services to Retro for a fee of $4.5 million per year, with the first fee payable in year one. All revenues and cost (excluding interest) are expected to increase by approximately 5% per year.

Appendix

To calculate the loan repayment each year we need the annuity factor for 8% over three years; this is 2.577. The annual repayments (in $'000s) are therefore $30,000/2.577 = **$11,641**.

The element of this repayment that represents interest is therefore:

	Year 1	*Year 2*	*Year 3*
Loan brought forward	30,000	20,759	10,779
Interest due (8% × b/f)	2,400	1,661	862
Repayment	(11,641)	(11,641)	(11,641)
Loan carried forward (b/f + interest due – repayment)	20,759	10,779	0

Required

Evaluate whether the bank's gearing restriction in **two years' time** is likely to be a problem.

Solution

1 Forecast statements of profit or loss

	Year 1 $'000	*Year 2* $'000
Revenue		
Operating costs		
Direct operating profit		
Central services from Lomax		
VC loan interest at 18% on $15m		
Bank loan at 8%		
Year 1		
Year 2		
Profit before tax		
Tax at 20%		
Profit after tax		
Retained earnings		

2 Forecast levels of debt and equity

Reserves b/f		
Reserves c/f		
Share capital + closing reserves		
Total debt at end of year (see workings)		
Gearing: debt/equity		

Workings

3.2 Other forms of management buy-out

3.2.1 Management buy-in

A management buy-in is when a team of **outside managers**, as opposed to managers who are already running the business, mount a takeover bid and then run the business themselves.

An MBI might occur when a business venture is running into trouble, and a group of outside managers see an opportunity to take over the business and restore it to profitability.

Alternatively, research suggests that buy-ins often occur when the major shareholder of a small family company wishes to retire.

Many features are common to MBOs and MBIs, including **financing**.

Buy-ins work best for companies where the existing managers are being replaced by managers of **much better quality**. However, managers who come in from outside may take **time** to get used to the company, and may encounter **opposition** from employees if they seek to introduce significant changes.

3.2.2 Buy-in management buy-out

Sometimes the management team will be a combination of an MBO (ie existing management) and new managers (with specialist skills that the existing management team do not have, eg finance).

This is sometimes referred to as a buy-in management buy-out (**BIMBO**).

4 Demerger (spin-off)

A demerger is the opposite of a merger. It is the splitting up of a corporate body into two or more separate and independent bodies, it does not raise finance.

The motives for a demerger are likely to be strategic. For example, the removal of a conglomerate discount/possible takeover defence.

The aims of a demerger are to create a **clearer management structure** and to allow **faster decision making**. A spin-off may facilitate a **future merger or takeover**.

A demerger risks **losing synergies** between different parts of the group. It is also an expensive and time-consuming process. Assets and liabilities will have to be clearly segregated between the demerged units.

To value a demerged operation, a cost of capital that reflects the risk of the division will be required, this is discussed in the next section.

Essential reading

See Chapter 15 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of demergers.

5 Valuations

To value a divestment, a MBO, or a demerged operation, a cost of capital that reflects the risk of the division will be required. This means that a project-specific cost of capital will need to be calculated.

This topic has already been covered in Chapter 6 where we looked at investments that change business risk and also in Chapter 8 where business valuations have been considered.

We have seen that when a company is moving into a new business area it can use the beta of a company in that sector (a comparable quoted company, or CQC) and ungear the equity beta to establish the asset beta which measures the risk of the new business area. This approach can also be applied in valuing a specific business unit that a company is planning to unbundle.

Alternatively you may be given the asset beta, or you may be told that a division represents a given percentage of a company's value in which case you can calculate the asset beta of a division from the asset beta of a company.

Illustration 1

Company X has an asset beta of 0.94.

Company X has two divisions, division A and division B; it is planning to unbundle division B.

The asset beta of division A has been estimated as 1.06 and division A represents 70% of the value of Company X.

Required

Estimate the asset beta of division B

Solution

Division B's asset beta can be estimated by laying out the workings for Company X's overall asset beta:

Division A asset beta × 70% + Division B asset beta × 30% = 0.94

So

1.06 × 0.70 + Division B asset beta × 0.30 = 0.94

So

0.742 + Division B asset beta × 30% = 0.94

So

Division B asset beta × 0.30 = 0.94 – 0.742 = 0.198

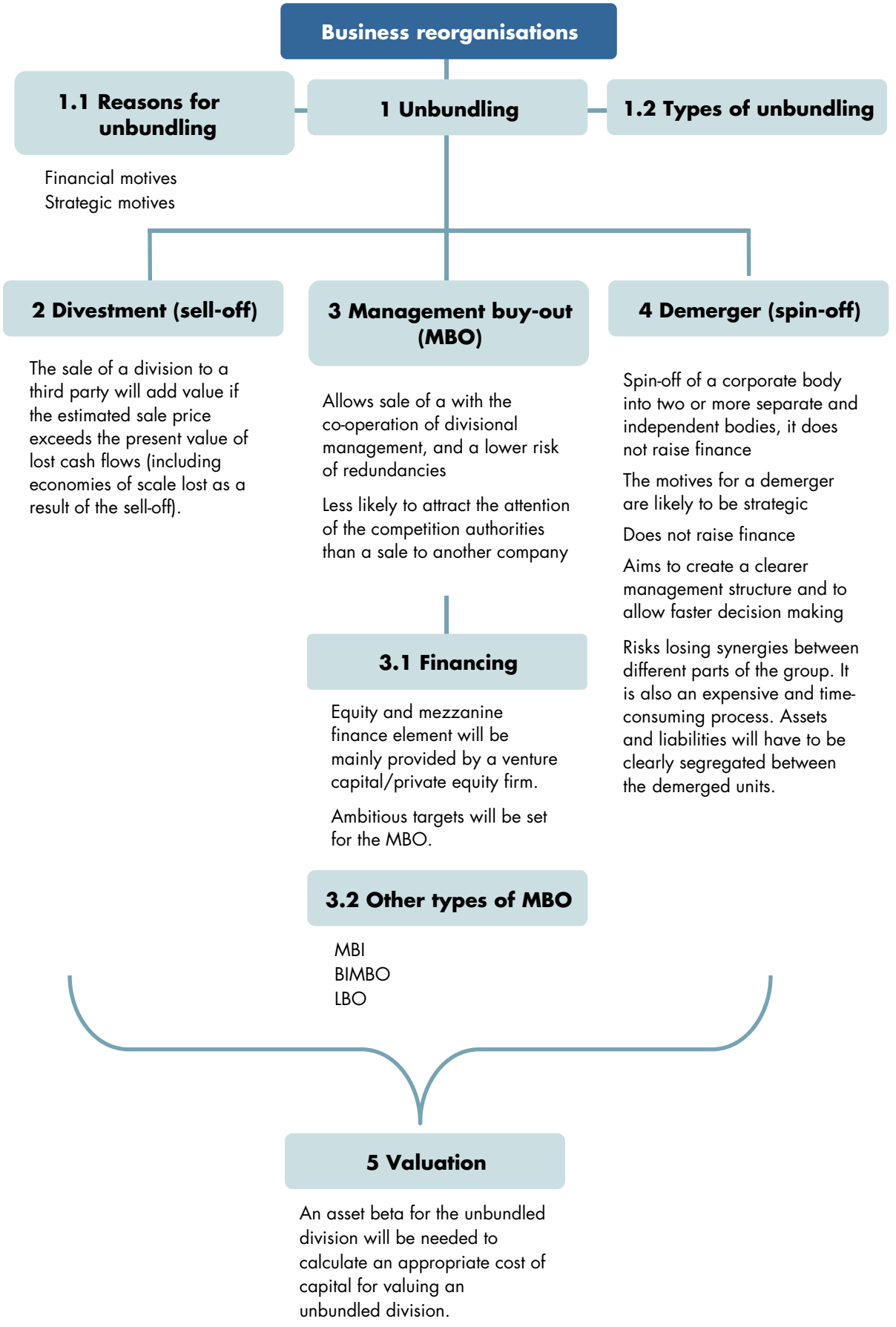
So

Division B asset beta = 0.198 ÷ 0.30 = 0.66

Once an asset beta of the specific business has been calculated then a cash flow valuation of the unbundled entity can be made as follows (recap of Chapter 8).

Approach	
1	Calculate the asset beta of the division being demerged
2	Regear the beta to reflect the gearing of the division being unbundled
3	Calculate the division's new WACC
4	Discount the division's post-acquisition free cash flows at this WACC
5	Calculate the revised NPV of the division and subtract debt to calculate the value of the equity

Chapter summary



Knowledge diagnostic

1. **Types of unbundling**

   These include divestment, management buy-out and demerger.

2. **Types of management buy-out**

   These also include leveraged buy-outs, management buy-ins, and buy-in management buy-outs.

3. **Mezzanine finance**

   This is finance with the characteristics of debt and equity, and is commonly used by venture capitalists to finance MBOs.

4. **Drawbacks of demergers**

   Cost, time and risk of losing synergies/economies of scale.

5. **Valuing an unbundled entity**

   This is likely to require a cash-based valuation using a cost of capital based on the asset beta for the unbundled entity which has been regeared to reflect the gearing of the unbundled entity.

Further study guidance

Question practice

Now try the questions below from the Further question practice bank (available in the digital edition of the Workbook):

Q26 BBS Stores

Q27 Reorganisation

16 Planning and trading issues for multinationals

Learning objectives

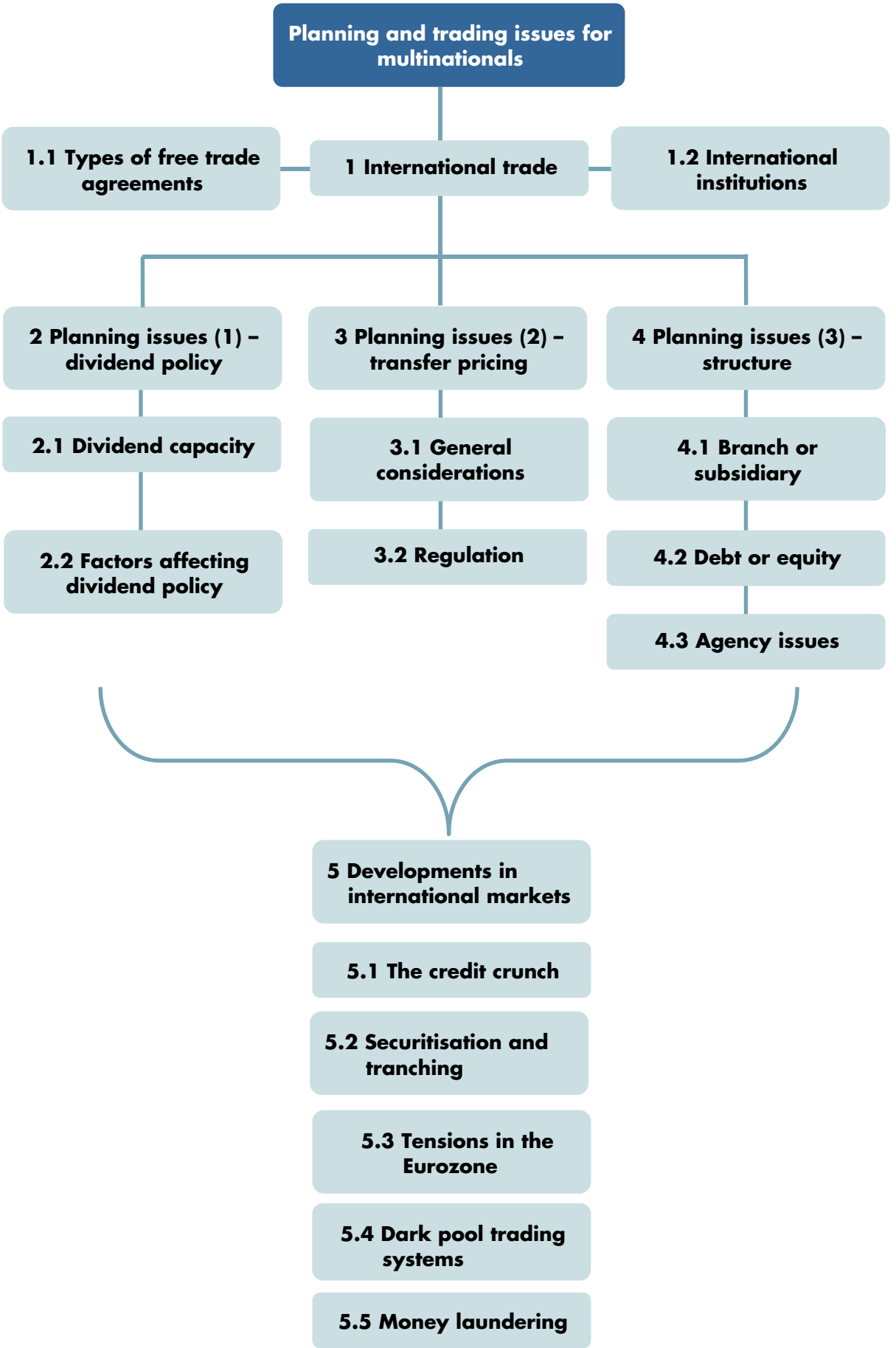
	Syllabus reference
Having studied this chapter you will be able to:	
• Advise on the theory and practice of free trade and the management of barriers to trade	A4(a)
• Demonstrate an up-to-date understanding of the major trade agreements and common markets and, on the basis of contemporary circumstances, advise on their policy and strategic implications for a business	A4(b)
• Discuss how the actions of the WTO, IMF, World Bank and Central Banks can affect a multinational. Discuss the role of the Fed, Bank of England, ECB and Bank of Japan	A4(c), A4(d)
• Assess the role of international financial markets in the management of global debt, financial development of emerging economies and maintenance of global financial stability	A4(e), A4(f)
• Discuss the significance to the company of the latest developments in world financial markets, eg causes and impact of the recent financial crisis, growth and impact of dark pool trading systems, removal of barriers of free movement of capital and international regulations on money laundering. Demonstrate an awareness of new developments in the macroeconomic environment, establishing their impact on the firm, and advising on the appropriate response	A4(g)
• Advise on the development of a financial planning framework, eg compliance with national governance requirements, the mobility of capital, limitations on remittances and transfer pricing, economic and other risk exposures in different national markets, agency issues in the co-ordination of overseas operations and balancing of local financial autonomy with effective central control	A5(a)
• Determine a firm's dividend capacity and its policy given its reinvestment strategy, the impact of any other capital reconstruction programmes on FCFE, eg share repurchases, new capital issues, the availability and timing of central remittances and the corporate tax regime within the host jurisdiction. Advise, in the context of a specified investment programme, on a firm's current and projected dividend capacity	A6(a), A6(b)
• Develop company policy on the transfer pricing of goods and services across international borders and be able to determine the most appropriate transfer pricing strategy in a given situation, reflecting local regulations and tax regimes	A6(c)

Exam context

This chapter is drawn from Section A of the syllabus, but works well as a final chapter because it summarises a number of practical business issues faced by multinationals, many of which have already been introduced in earlier chapters.

This syllabus area contains a large number of learning objectives but actually has not featured heavily in exam questions, reflecting the largely **factual nature** of the subject matter. The Workbook identifies the **key facts** and **additional factual background** is provided via the Essential reading section, available in Appendix 2 of the digital edition of the Workbook.

Chapter overview



1 International trade

1.1 Types of free trade agreement

Multinational companies will encounter a variety of **different types** of international trade agreements.

These may provide protection to the company in the sense that competitors operating outside these areas may find it difficult to enter the market, or may create problems if the company is itself operating outside these areas and creates **barriers to trade** as they try to enter these markets.

1.1.1 Free trade area and customs unions

This exists when there is no restriction on the movement of **goods and services** between countries, but individual member countries impose their **own restrictions on non-members** – eg North American Free Trade Agreement (NAFTA).

A **customs union** involves a free trade area between member countries and, in addition, **common external tariffs** applying to imports from non-member countries (eg Mercosur in South America).

1.1.2 Common and single markets

A **common market** encompasses the idea of a customs union but in addition there are moves towards creating free markets in each of the **factors of production** (eg labour, capital) and a move to **standardise market regulations** (eg safety rules).

Eventually a common market becomes a **single market with no restriction of movement** in each of the **factors of production** and **no regulatory differences** (eg a citizen in the European Union (EU) has the freedom to work in any other country of the EU).

1.1.3 Economic Union

A common/single market may eventually evolve into **economic and monetary union** which will also **involve a common Central Bank, a common interest rate and a single currency.**

Activity 1: Idea generation

Degli Co is a small manufacturing company based in a country that is applying for entry to the European Union (EU). Degli Co produces high-quality parts for aerospace companies, for domestic customers and also for companies that are based in the European Union.

Required

Discuss possible economic benefits to Degli Co of operating in a country that is within the EU.

(5 marks)

Solution

Essential reading

See Chapter 16 Section 1 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of general trading issues for multinationals.

1.2 International institutions

The activities of multinationals will be impacted by a number of different international institutions.

Types	Definition
World Trade Organisation (WTO)	**Supports the development of international trade,** the WTO provides a mechanism for **identifying and reducing trade barriers and resolving trade disputes.** The WTO will impose fines if members are in breach of their rules. Unless otherwise bound by free trade agreements, members trade under WTO rules, ie they can't selectively reduce tariffs for one country without offering this to all other WTO members (this is the **most-favoured nation principle)**.
International Monetary Fund (IMF)	Supports the stability of the international monetary system by providing medium-term (3–5 year) loans **to countries with balance of payments problems,** such as problems in making debt repayments to international creditors, and provides advice on the **economic development** of countries. IMF loans come with stringent conditions. Countries must take **effective action to improve their balance of payments, eg reducing aggregate demand to** reduce imports and encourage firms to increase production for export markets. It has been suggested that the strict terms attached to IMF loans can lead to **economic stagnation** as countries struggle to repay these loans.
World Bank	**Lends** to creditworthy governments of developing nations to finance projects and **policies that will stimulate economic development and alleviate poverty**. The World Bank consists of two institutions: • The International Bank for Reconstruction and Development (IBRD) which focuses on middle-income and creditworthy poorer countries • The International Development Association (IDA) which focuses exclusively on the world's poorest countries Both provide finance for projects which are likely to have an impact on poverty. Loans are normally interest-free and have a maturity of up to 40 years. The World Bank directly **affects multinational companies** by **helping to finance infrastructure projects** in developing economies. This creates a platform for other investment by multinationals (once reliable infrastructure is in place).
Central banks	Central banks normally have **control over interest rates** and **support the stability** of the financial system (eg by managing the risk of financial contagion). **Financial contagion** is where a crisis in one country spills to many other countries. One of the roles of central banks is to monitor the risk of financial contagion carefully and to increase their stimulus programmes where necessary.

Essential reading

See Chapter 16 Section 2 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of individual central banks and international financial markets.

2 Planning issues (1) – dividend policy

2.1 Dividend capacity

Dividend capacity has been introduced in Chapters 1 and 8 as **'free cash flow to equity'** – it is a measure of **what is available for payment as dividend** after providing for capital expenditures to maintain existing assets and to create new assets for future growth.

Dividend capacity
Profits after interest, tax and preference dividends
less
debt repayment, investment in assets
plus
depreciation, any capital raised from new share issues or debt

In a multinational context, an additional complication is that dividend may be paid by foreign subsidiaries to the parent company, and in addition:

- Extra tax may be payable on the profits made by foreign subsidiary; and
- Withholding tax may be due on dividends paid by the foreign subsidiary.

Activity 2: Tax issues

DX Co, based in Country D, has estimated its dividend capacity from its domestic operations to be $14 million.

A subsidiary of DX Co, based in Country F, is forecast to make profits before tax of $3 million. It is proposed that the subsidiary should remit 75% of its post-tax profits as a dividend to DX Co.

The rate of corporation tax is 24% in Country D and 20% in Country F. A withholding tax of 10% is charged on any dividends remitted. The tax authorities in Country D base charge corporation tax on profits made by subsidiaries but give full credit for any foreign corporation tax already paid.

Required

Adjust the estimated dividend capacity of DX Co for the impact of the foreign subsidiary.

Solution

2.2 Factors affecting dividend policy

General factors affecting dividend policy have already been covered in Chapter 1. For a multinational, there are a few additional factors to consider.

Types	Definition
Financing	The financing needs of the parent company, eg dividend payments to external shareholders and capital expenditure in the home countries.
Agency issues	Dividend payments restrict the financial discretion of foreign managers and allow greater control over their behaviour (see Section 4).
Timing	A subsidiary may adjust its dividend payments in order to benefit from expected movements in exchange rates, collecting earlier (lead) payments from currencies vulnerable to depreciation and later (lag) from currencies expected to appreciate.
Tax	If tax liabilities are triggered by repatriation, these can be deferred by reinvesting earnings abroad. This is more of an issue for subsidiaries in low-tax countries, whose dividends trigger significant parent tax obligations.
Exchange controls	Controls involve suspending or banning the payment of dividends to foreign shareholders, such as parent companies in multinationals, who will then have the problem of **blocked funds** (see Section 3 Chapter 5).

3 Planning issues (2) – transfer pricing

3.1 General considerations

In deciding on their transfer pricing policies, multinationals take into account many factors:

Consideration	Achieved by
Goal congruence	Encourage local decision-making that will also improve the profit of the company as a whole.
Performance evaluation	Preventing an unfair impact on performance.
Financing	Transfer pricing may be used to boost the profits of a subsidiary, to make it easier for it to obtain funds in the host country.
Taxation	Channelling profits out of high tax rate countries into lower ones.

3.2 Regulation

Transfer pricing is a normal and legitimate activity. **Transfer price manipulation**, on the other hand, exists when transfer prices are used to evade or avoid payment of taxes and tariffs.

The most common solution that tax authorities have adopted to reduce the probability of transfer price manipulation is to develop particular transfer pricing regulations based on the concept of the **arm's length standard**, which says that all MNC intra-firm activities should be priced as if they took place between unrelated parties acting at arm's length in competitive markets.

Key term

Arm's length standard: this means that intra-firm trade of multinationals should be priced as if they took place between unrelated parties acting at arm's length in competitive markets.

The main method of establishing 'arm's length' transfer price is the **comparable uncontrolled price (CUP) method** which looks for a comparable product to the transaction in question, either in terms of a similar product being bought or sold by the multinational in a comparable transaction with an unrelated party or a similar product being traded between two unrelated parties.

3.2.1 Market-based transfer pricing

A market-based transfer price is likely to be acceptable to regulatory authorities, and (if there is a clear market price) it will also reduce the likelihood of disputes between divisions over the level of the transfer price.

In addition, if the supplying division is at full capacity then the revenue it loses as a result of an internal transfer shows the **true cost (revenue foregone) to the division of an internal transfer**.

However, if a division would have to incur marketing costs to sell externally then the market price should be **adjusted** to reflect the fact that an internal transfer would not incur this cost, so the transfer price becomes lower (ie market price less marketing costs saved).

Essential reading

See Chapter 16 Section 3 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further discussion of transfer pricing.

4 Planning issues (3) – structure

4.1 Branch or subsidiary

Firms that want to establish a definite presence in an overseas country may choose to establish a **branch** rather than a subsidiary. In many instances a multinational will establish a branch and utilise its initial losses against other profits, and then turn the branch into a subsidiary when it starts making profits.

A subsidiary is a separate legal entity and gives the impression of a long-term commitment. The parent company benefits from limited liability. The normal structure of many multinationals consists of a parent company (a holding company) with subsidiaries in several countries. The subsidiaries may be wholly owned or just partly owned.

4.2 Debt or equity

The **method of financing** a subsidiary will give some indication of the **nature and length of time** of the investment that the parent company is prepared to make.

A sizeable equity investment (or long-term loans from the parent company to the subsidiary) would indicate a long-term investment by the parent company.

Because subsidiaries may be operating with a guarantee from the parent company, higher gearing structures may be possible. As we have seen in Chapters 5 and 6, higher gearing can help to **reduce tax and to manage risk**.

In addition, local governments may directly or indirectly offer **subsidised debt finance**.

Types	Impact of overseas debt finance
Direct	Low cost loans may be offered to encourage multinational investment Other incentives may include exchange control guarantees, grants, tax holidays etc
Indirect	Local governments may reduce the interest rates to stimulate the local economy

So it may be **desirable for a subsidiary to operate with higher levels of debt, especially if it is operating in a high tax regime**.

4.2.1 Thin capitalisation

However, many countries have rules that disallow interest deductions above a certain level when the entity is considered to be too highly geared. A company is said to be **thinly capitalised** when its capital is made up of a much greater proportion than usual of debt than equity.

Tax authorities may place a limit on the amount that a company can claim as a tax deduction on interest (for example as a percentage of EBIT), or may judge that a subsidiary contains artificially high gearing if its gearing level is higher than the group's gearing.

4.2.2 Local regulations

Where overseas equity is preferred, a listing on an overseas stock exchange may be considered. If so, it will be important to conform to local regulations.

For example, the London Stock Exchange requires at **least three** years of audited published accounts and for at least **25%** of the company's shares to be in public hands. A **prospectus** must be published containing a forecast of expected performance and future plans. The company will also have to be introduced by a **sponsoring firm** and to comply with the local **corporate governance requirements** (such as splitting the roles of Chairperson and CEO, and maintaining independent audit, remuneration and nomination committees).

A company must also show that it has enough working capital for at least the next 12 months.

4.3 Agency issues

Agency relationships exist between the **managers** at the **headquarters** of **multinational corporations (principals)** and the managers that run the **subsidiaries** of **multinational corporations (agents)**.

The **agency relationships** are created between the headquarters and subsidiaries of multinational corporations because the interests of the managers at the headquarters who are responsible for the performance of the whole organisation can be considerably different from the interests of the managers who run the subsidiaries.

The incongruence of interests between a multinational's headquarters and subsidiaries can arise not only due to concerns that can be seen in any parent-subsidiary relationship, but also due to the fact that the multinational's headquarters and subsidiaries operate in different cultures and have divergent backgrounds.

This **can be managed by**:

- The parent company ratifying key decisions taken by the subsidiary
- Managerial compensation packages tied in to the performance of the group
- High dividend payouts to reduce the funds available to local management
- High gearing increases the discipline on local management to manage cash flows effectively

PER alert

As part of the fulfilment of the performance objective 'evaluate investment and financing decisions' you are expected to be able to identify and apply different finance options to single and combined entities in domestic and multinational business markets. This section looks at the financing options available to multinationals which you can put to good use if you work in such an environment.

5 Developments in international markets

5.1 The credit crunch

A **credit crunch** is a crisis caused by banks being too nervous to lend money, even to each other

Between 2007–08 turmoil hit the global financial markets causing the failure of a number of high-profile financial institutions (eg Northern Rock in the UK, Lehman Brothers in the US). The crisis was caused by a number of factors:

- **Years of lax lending** by banks inflated a huge debt bubble: people borrowed cheap money and invested it in property. In the US, billions of dollars of 'Ninja' mortgages (no income, no job) were sold to people with weak credit ratings (sub-prime borrowers).
- Massive **trade surpluses** in some countries (eg China) led to a flood of investment into countries with deficits (notably the US) which contributed to the asset price bubble that contributed to the **credit crunch**.
- The US banking sector packaged sub-prime home loans into mortgage-backed securities known as **collateralised debt obligations** (CDOs). These were sold on to investment banks as securities. The **credit risk rating** on these securities often reflected the selling bank's AA+ rating and not the real risk of default. When borrowers started to default on their loans, the value of these investments plummeted, leading to **huge losses by banks on a global scale**.
- In the UK, many banks had invested large sums of money in these assets and had to **write off billions of pounds in losses**. In addition some investment banks underwrote bond issues without fully understanding the risk – and were left holding the credit risk as the bonds defaulted. As banks' confidence was at an all-time low, they stopped lending to each other, causing a massive liquidity problem – a credit crunch. With bank lending so low, businesses were **unable to obtain funding for investments**, resulting in large reductions in output.

5.2 Securitisation and tranching

5.2.1 Securitisation

Key term

Securitisation: the process of converting illiquid assets into marketable securities.

Securitisation involves banks transfer lending such as mortgages to 'special purpose vehicles' (SPVs) which are then sold as collateralised debt obligations (CDOs). By securitising the loans, the bank removes the risk attached to its future cash receipts and converts the loan back into cash, which it can lend again.

5.2.2 Tranching

CDOs are a way of repackaging the risk of a large number of risky assets such as sub-prime mortgages. Unlike a bond issue, where the risk is spread thinly between all the bond holders, CDOs concentrate the risk into investment layers or 'tranches', so that some investors take proportionately more of the risk for a bigger return – and others take little or no risk for a much lower return.

Each tranche of CDOs is securitised and 'priced' on issue to give the appropriate yield to the investors. The 'investment grade' tranche will be the most highly priced, giving a low yield but with low risk attached; this is sometimes referred to as a senior tranche. Typical investors of **senior tranches** are insurance companies, pension funds and other risk-averse investors.

At the other end, the 'equity' tranche carries the bulk of the risk – it will be priced at a low level but has a high potential (but very risky) yield. These **junior tranches** (or subordinated debt) are **higher risk**, as they are not secured by specific assets. These tranches tend to be bought by hedge funds and other investors looking for higher risk–return profiles.

Illustration 1

A bank is proposing to sell $100 million of mortgage loans by means of a securitisation process. The mortgages have a 10 year term and pay a return of 8% per year. The bank will use 90% of the value of the mortgages as collateral.

- 60% of the collateral value will be sold as tranche A: senior debt with a credit rating of A. This will pay interest of 7%.
- 30% of the collateral value will be sold as tranche B: less senior debt with a credit rating of B. This will pay interest of 10%.
- 10% will be sold as subordinated debt with no credit rating.

The estimated cash flows would be:

Cash inflows

$8m is expected to be repaid by the mortgage holders ($100m × 8%).

Cash outflows

Tranche A is the first to be paid and receive $100m × 0.90 × 0.6 × 0.07 = $3.78m.

Tranche B is the next to be paid and receives $100m × 0.90 × 0.3 × 0.1 = $2.7m.

The cash paid to the tranches with security (ie tranches A and B) is $6.48m ($3.78m + $2.7m). The difference between cash received ($8m) and cash paid to these tranches ($6.48m) is $1.52m.

This is paid to the holders of the subordinated debt who therefore receive a return of $1.52m on an investment of $9m ($100m × 0.90 × 0.1). This is a return of 1.52/9 = 16.9%.

If there are any mortgage defaults, cash inflows would fall and this would lead to lower returns for the holders of subordinated debt.

Only if cash inflows fell below $6.48m will the holders of tranche B be affected, and only if the income fell below $3.78m would the holders of tranche A be affected.

5.3 Tensions in the Eurozone

After the euro came into circulation in 2002, there was a rapid fall in interest rates (due to low interest rates in Germany, the dominant economy) which **led to a rapid increase in consumer spending.**

German economic policy continued to focus on export-led growth. The accumulation of surplus funds in Germany helped to finance excessive borrowing in Southern European economies. This, combined with low interest rates, led to **a sharp increase in the price of assets such as houses and shares** and thus reinforced a boom into a bubble.

Following the **credit crunch of 2007–08**, asset prices in Southern Europe tumbled. In a number of European economies, it was **the bursting of the house price bubble**, not lax spending policies by the government, that led to a recession. Government borrowing ballooned **after** the 2008 global financial crisis because, for example, governments have had to fund bank bailouts.

Parts of Southern Europe have since faced nasty recessions, because no-one wants to spend. Companies and mortgage borrowers were too busy repaying their debts to spend more, and governments were drastically cutting their spending back as well.

5.4 Dark pool trading systems

Since 2007, when legislation removed the monopoly status of European stock exchanges, there has been a rapid growth in trading systems for shares, especially off-exchange venues known as '**dark pools**' where large orders are matched in private.

Dark pools allow large shareholdings to be disposed of without prices and order quantities being revealed until **after** trades are completed. Traditionally, when an investor wished to buy or sell securities on a stock market they would be **publicly identifiable once the order to buy or sell was made**.

One **impact of dark pools** has been to reduce transaction fees and to improve the prices that large institutional shareholders can obtain when they buy/sell shares.

However, because dark pools normally use information technology to keep the orders secret until after they've been executed, there is a **reduction in the availability of information and a threat to the efficiency of the stock markets**.

5.5 Money laundering

Key term

Money laundering: constitutes any financial transactions whose purpose is to conceal the identity of the parties to the transaction.

One effect of the free movement of capital has been the growth in **money laundering.**

Money laundering is used by organised crime and terrorist organisations but it is also used in order to avoid the payment of taxes or to distort accounting information.

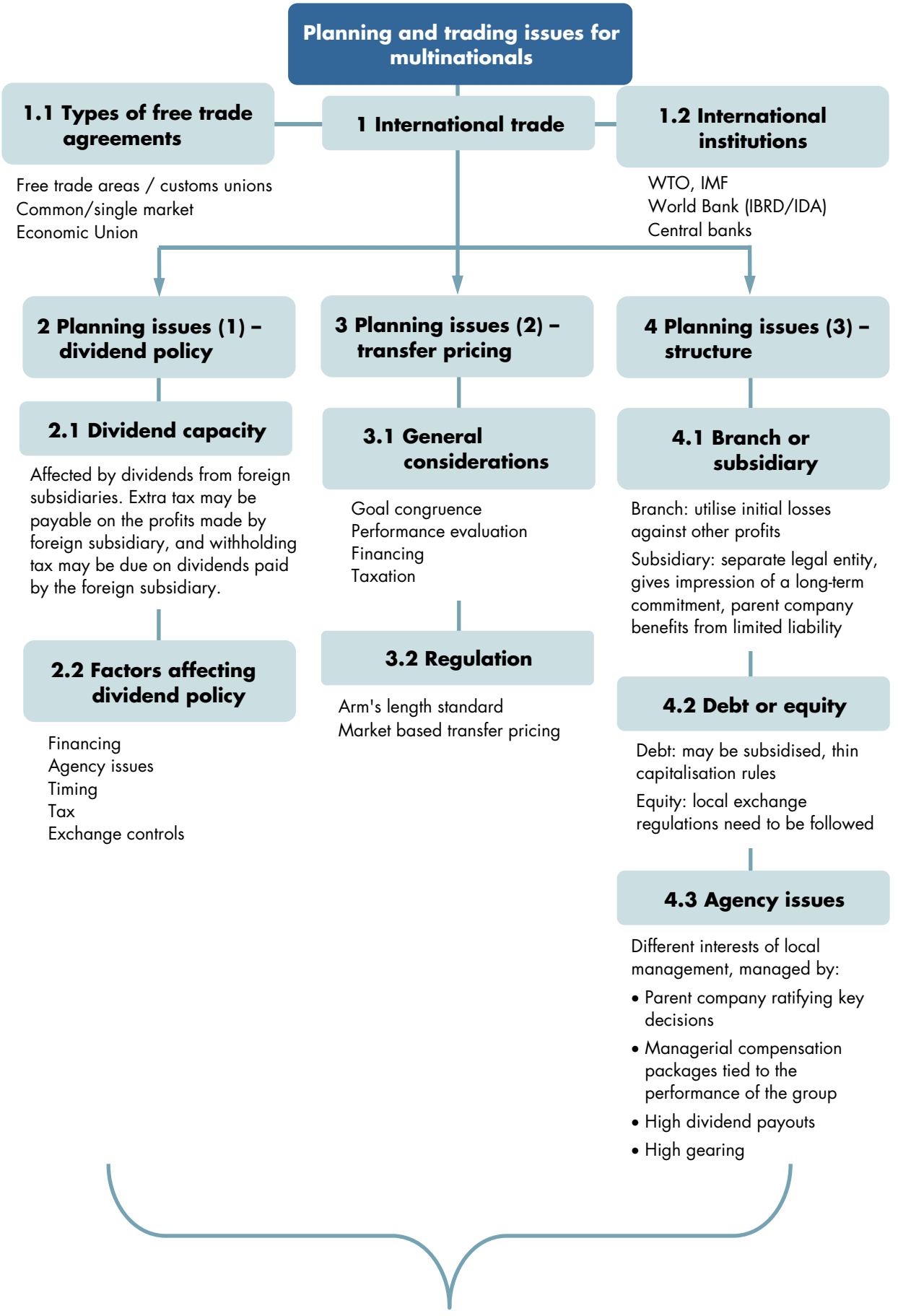
Regulations differ across various countries but it is common for regulation to require **customer due diligence** ie to take steps to check that new customers are who they say they are. An easy way to do this is to ask for official identification. If customers are acting on behalf of a third party, it is important to identify who the third party is.

Staff should be suitably trained and a **specific member of staff** should be nominated as the person to whom any suspicious activities should be reported. Full documentation of anti-money laundering policies and procedures should be kept. Regulations may require that historic records including receipts, invoices and customer correspondence are kept.

Essential reading

See Chapter 16 Section 4 of the Essential reading, available in Appendix 2 of the digital edition of the Workbook, for further developments in world markets.

Chapter summary



5 Developments in international markets

5.1 The credit crunch

Triggered in 2007 by massive losses on CDOs

5.2 Securitisation and tranching

Each tranche of CDOs is securitised and 'priced' on issue to give the appropriate yield to the investors. Typical investors of **senior tranches** are insurance companies, pension funds and other risk-averse investors. At the other end, the 'equity' tranche carries the bulk of the risk – these **junior tranches** tend to be bought by hedge funds and other investors looking for higher risk–return profiles.

5.3 Tensions in the Eurozone

Continued downturn on some parts of the Eurozone after the credit crunch

5.4 Dark pool trading systems

Allow large shareholdings to be disposed of without prices and order quantities being revealed until **after** trades are completed

5.5 Money laundering

Regulation requires **customer due diligence** ie taking steps to check that your customers are who they say they are

BPP LEARNING MEDIA

Knowledge diagnostic

1. **Free trade zones**

   Depending on the form these take can potentially benefit a multinational by offering frictionless trade and common regulatory standards.

2. **International institutions**

   The IMF, the World Bank and the WTO all bring order and stability to the international financial system and provide benefit to multinationals as a result.

3. **Dividend capacity**

   Dividends remitted by overseas subsidiaries will increase the dividend capacity of the parent company – but extra tax may be payable.

4. **Transfer pricing**

   Methods need to be in line with requirements for an 'arm's length standard'.

5. **Agency issues**

   Local subsidiary management may not act in the best interests of the 'group'.

6. **Tranching**

   This is the pricing of CDOs in different 'investment layers'; each tranche of CDOs is securitised and 'priced' on issue to give the appropriate yield to the investors.

Further study guidance

Question practice

Now try the question below from the Further question practice bank (available in the digital edition of the Workbook):

Q28 Transfer prices

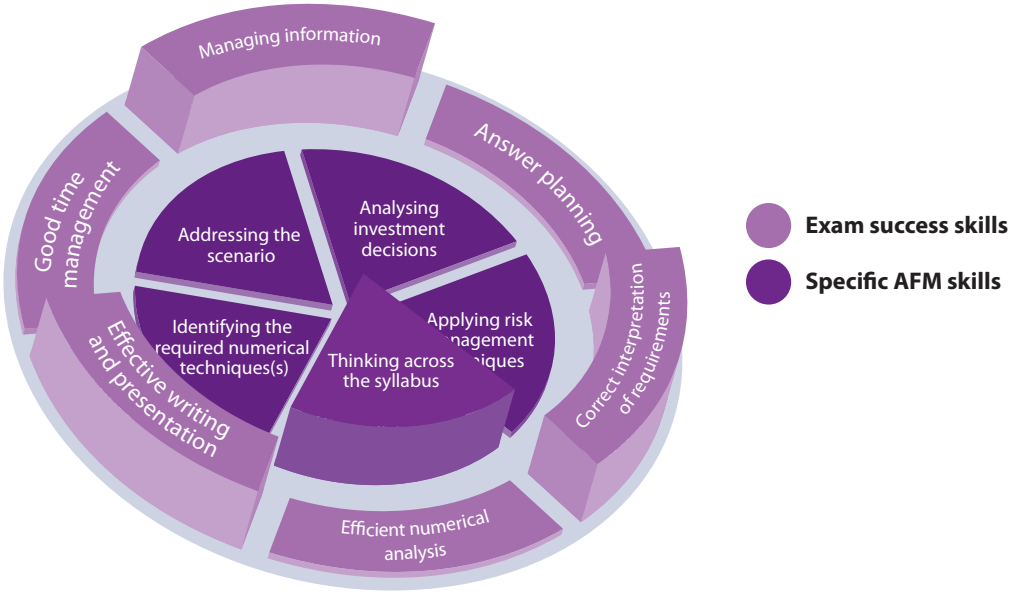
Further reading

There is a Technical Article available on ACCA's website, called 'Securitisation and tranching'. This article examines behavioural finance and is written by a member of the AFM examining team.

We recommend you read this article as part of your preparation for the AFM exam.

SKILLS CHECKPOINT 5

Thinking across the syllabus



Introduction

A common cause for failure in the AFM exam is that students focus on mastering the key numerical parts of the syllabus (typically investment appraisal, valuation techniques and risk management) but leave **gaps in their knowledge**, in two senses:

- Failing to carefully revise discussion areas within a given syllabus section; for example, being able to compute the value of a real option but not being able to discuss the factors used by the model to compute this value
- Neglecting some syllabus sections entirely; for example, syllabus Sections A (role of the senior financial adviser) and D (corporate reconstruction and reorganisation) are often neglected because they do not contain complex numerical techniques

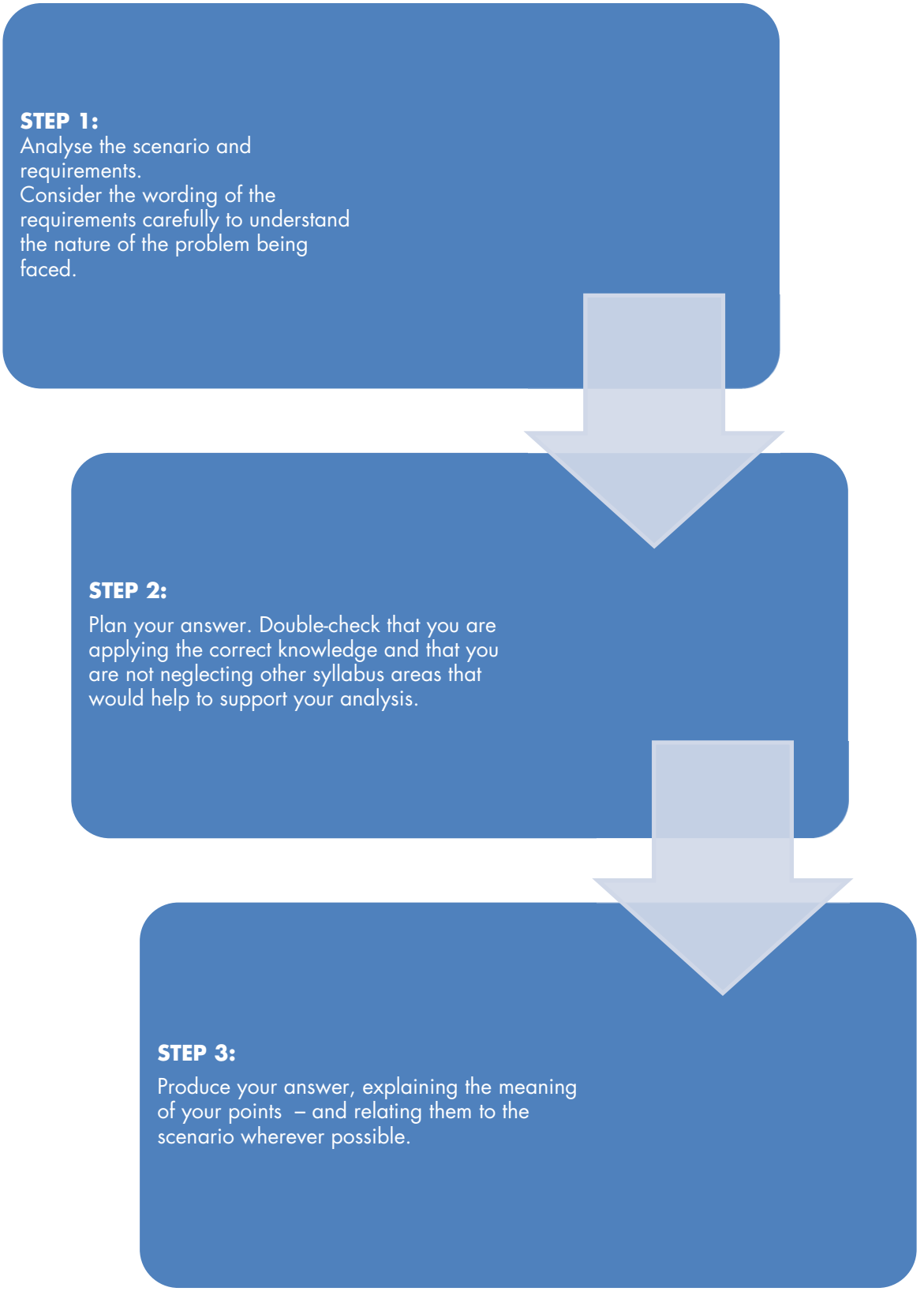
The structure of the AFM exam exposes students that have knowledge gaps because:

- Exams are designed so that question-spotting does not work (a topic examined in one sitting is often examined in the next sitting too to penalise question-spotting).
- The 50 mark question is structured to test multiple syllabus areas (and will span at least two syllabus sections)
- The 25 mark questions, although often focusing on a specific syllabus section, normally contain three requirements which often means that a wide variety of topics within this syllabus area is being tested.
- There are no optional questions.

It is therefore crucial that you prepare yourself for the exam by revising across the whole syllabus, even if your knowledge is deeper in some areas than others there must not be any 'gaps', and that you practice questions that force you to address a problem from a variety of perspectives. This skill will often involve thinking outside the confines of one specific chapter of the Workbook and **thinking across the syllabus**.

AFM Skill: Thinking across the syllabus

The steps in applying this skill are outlined below, and will be explained in more detail in the following sections as the question 'AIR' is answered.



Exam success skills

The following question is worth 19 marks.

For this question, we will also focus on the following **exam success skills**:

- **Managing information**. The requirements of a question will give a good indication of the range of syllabus areas being tested and can help focus your mind on the nature of the question before reading through the scenario.

  Focus on the requirement, underlining key verbs to ensure you answer the question properly. Then read the rest of the question, underlining and annotating important and relevant information, and making notes of any relevant technical information you think you will need, making sure that you do not constrain your thinking to a single syllabus area.

- **Correct interpretation of requirements**. At first glance, it looks like the following question is about management buyouts (syllabus Section D), however careful reading of the requirement should reveal that this is not actually the case.

- **Effective writing and presentation**. Make sure that your numerical analysis is supported by an appropriate level of written narrative drawn from a wide variety of syllabus areas where appropriate.

Skill Activity

STEP 1 Analyse the scenario and requirements. Consider the wording of the requirements carefully to understand the nature of the problem being faced.

Required

Prepare an evaluation for the managers of the proposed new company AIR which:

(a) Analyses the advantages and disadvantages of the proposed financing of the MBO **(9 marks)**

(b) Evaluates whether or not EPP Bank's gearing restriction in four years' time is likely to be a problem **(10 marks)**

(Total = 19 marks)

This is a 19-mark question and at 1.95 minutes a mark, it should take 37 minutes.

Assuming you spending approximately 20% of your time reading and planning, this time should be split approximately as follows:

- Reading and planning time – 7 minutes
- Performing the calculations and writing up your answer – 32 minutes

Although part (a) mentions management buy outs (MBOs), careful reading of the requirement shows that the question actually requires an evaluation of the finance mix that is proposed for the MBO; not of the MBO itself.

Part (b) looks like it will involve forecasting, which is a part of syllabus section D (corporate reconstruction and reorganisation) but an area of the syllabus section that is often neglected. Again this reinforces the need for broad syllabus knowledge.

Now carefully read through the scenario.

Question – AIR (19 marks)

The directors of ER have decided to concentrate the company's activities on three core areas, bus services, road freight and taxis. As a result, the company has offered for sale a regional airport that it owns.

The existing managers of the airport, along with some employees, are attempting to purchase the airport through a leveraged management buyout (MBO), and would form a new unquoted company, AIR. The total value of the airport (free of any debt) has been independently assessed at $35 million.

The managers and employees can raise a maximum of $4 million towards this cost. This would be invested in new ordinary shares issued at the nominal value of 50c per share. ER, as a condition of the sale, proposes to subscribe to an initial 20% equity holding in the company, and would repay all debt of the airport prior to the sale.

EPP Bank is prepared to offer a floating rate loan of $20 million to the management team, at an initial interest rate of LIBOR plus 3%. LIBOR is currently at 10%. This loan would be for a period of seven years, repayable upon maturity, and would be secured against the airport's land and buildings. Another condition of the loan is the no dividends would be payable for the next four years.

A condition of the loan is that gearing, measured by the book value of total loans to the book value of equity, is no more than 100% at the end of 4 years. If this condition is not met the bank has the right to call in its loan at one month's notice. AIR would be

This part of the question is looking at the financing – which is the focus of part (a). You need to assess the pros and cons of this financing mix.

This is the main focus of part b and indicates that a forecasting exercise is required. The forecast will be affected by the impact of the financing mix.

able to purchase a 4-year interest rate cap at 15% for its loan from EPP Bank for an upfront premium of $800,000.

A venture capital company, AV, is willing to provide up to $15 million in the form of unsecured mezzanine debt with attached warrants. This loan would be for a 5-year period, with principal repayable in equal annual instalments, and have a fixed interest rate of 18% per year.

This part of the question is again looking at financing ie part (a). You need to assess the pros and cons of this financing mix. So don't panic here, it is a discussion point in part a and a possible complication in part (b).

The warrants would allow AV to purchase 10 AIR shares at a price of 100 cents each for every $100 of initial debt provided, at any time after 4 years from the date the loan is agreed. The warrants would expire after five years.

Most recent

STATEMENT OF PROFIT OR LOSS FOR THE AIRPORT

This proforma may be useful for your forecast in part (b).

	$'000
Landing fees	14,000
Other revenues	8,600
	22,600
Labour	5,200
Consumables	3,800
Central overhead payable to ER	4,000
Other expenses	3,500
Interest paid	2,500
	19,000
Taxable profit	3,600
Taxation (33%)	1,188
Retained earnings	2,412

ER will continue to provide central accounting, personnel and marketing services to AIR for a fee of $3 million per year, with the first fee payable in year one.

All revenues and cost (excluding interest) are expected to increase by approximately 5% per year.

Tax is paid one year in arrears.

STEP 2 Plan your answer. Double-check that you are applying the correct knowledge and that you are not neglecting areas from other syllabus areas that would help to support your analysis.

Example answer plan

This plan uses wording from the requirement and notes a range of points that could be made.

There are more than sufficient points there for a 9 mark requirement.

Part a

Define the financing mix

	Pros	**Cons**
Elements of the mix		
$4m	Relatively small investment	Conflict: managers v staff
$1m ER	Skills & motivation	
$20m loan	Term of loan	Floating rate, covenant
		Dividend restriction
$10m (balance) AV	Unsecured, fixed rate	Warrants, interest rate high
		Repaid in instalments
The overall mix		
– **highly geared**		Risk of default

Part b

Forecast

1 Forecast the profit or loss statement and then
2 Forecast the value of equity and debt each year
3 Then **evaluate** gearing in four years' time

This part of the plan identifies the approach that will be followed in constructing an answer.

STEP 3 Produce your answer, explaining the meaning of your points - and relating them to the scenario wherever possible.

Solution

(a) **Financing mix**

If the airport can be purchased for $35 million, **the financing mix** is proposed as:

	$m
8 million 50 cent shares purchased by managers and employees	4
2 million 50 cent shares purchased by ER	1
EPP Bank: secured floating rate loan at LIBOR + 3%	20
AV: mezzanine debt with warrants (balancing figure)	10
Total finance	35

Example of application to scenario

AV finance facility

Up to $15 million of the mezzanine debt is available, however this is an expensive source of finance costing 18% compared with 13% for the loan from EPP.

If the **warrants** attached to the mezzanine debt are exercised, AV will be able to purchase 1 million new shares in AIR for $1 each. This is a cheap price considering that the book value per share at the date of buyout is $3.50 ($35m/10 million shares). The **ownership** by managers and staff will be **diluted** from 80% to approximately 73%, with ER holding 18% and AV holding 9%. This should not affect management control provided that managers and staff remain as a unified group.

The debt must be repaid in five equal annual instalments; that is, $2 million each year. If profits dip in any particular year, AIR might experience cash flow problems, necessitating some **debt refinancing**.

Short punchy paragraphs explaining why your points matter

Management and employee contribution

A **leveraged buyout** of the type proposed allows managers and employees to own 80% of the equity while only contributing $4 million out of $35 million capital (11%). However, it is important that the managers and employees agree on the company's strategy at the outset. If the shareholders break into rival factions, **control** over the company might be **difficult to exercise**. It would be useful to know the disposition of shareholdings among managers and employees in more detail.

ER contribution

The continued involvement of ER will allow ER's skills to continue to be drawn on. This should enhance the possibility of the MBO succeeding. On a practical level, the continued provision of central services by ER reduces the risk that the MBO fails due to weaknesses in its accounting systems.

Applied to the scenario

EPP loan

The advantage of the loan is that it avoids the need for managers to invest more money, or for the relatively expensive finance facility from AV to be used in full. However, it is a variable rate loan and therefore exposes AIR to the risk of interest rate increases. The covenant exposes AIR to the risk of

default (this is analysed in part (b)). In addition the restriction on dividend payments for four years will reduce the short term gains to shareholders from the MBO.

Gearing

The initial **gearing** of the company will be extremely **high**: the **debt to equity ratio** is 600% ($30 million debt to $5 million equity). This makes the overall mix a risky one for the investors and is explains the existence of the loan covenant and restriction on dividend payments.

(b)

AIR: FINANCIAL FORECAST

	Year 0	*Year 1*	*Year 2*	*Year 3*	*Year 4*
	$'000	$'000	$'000	$'000	$'000
Landing fees	14,000				
Other revenues	8,600				
	22,600				
Labour	5,200				
Consumables	3,800				
Other expenses	3,500				
	12,500				
Direct operating profit growing at 5% p.a.	10,100	10,605	11,135	11,692	12,277
Central services from ER		(3,000)	(3,150)	(3,308)	(3,473)
EPP loan interest at 13% on $20m		(2,600)	(2,600)	(2,600)	(2,600)
Mezzanine debt interest at 18%					
on $10m		(1,800)			
on $8m			(1,440)		
on $6m				(1,080)	
on $4m					(720)
Profit before tax		3,205	3,945	4,704	5,484
Tax at 33%		1,058	1,302	1,552	1,810
Profit after tax		2,147	2,643	3,152	3,674
Reserves b/f		0	2,147	4,790	7,942
Reserves c/f		2,147	4,790	7,942	11,616
Share capital + reserves		7,147	9,790	12,942	16,616
Total debt at end of year		28,000	26,000	24,000	22,000
Gearing: debt/equity		392%	266%	185%	132%

Neatly produced forecast with a column for each year to save time

If warrants are exercised, $1m of new share capital is issued, reducing the gearing at Year 4 to 22,000/17,616 = 125%.

Concise explanation of meaning and limitations of the analysis as part of the evaluation

Gearing at period end

Using these assumptions and ignoring the possible issue of new shares when warrants are exercised, the **gearing** at the end of four years is predicted to be 132%, which is **significantly above the target** of 100% needed to meet the condition on EPP's loan.

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If warrants are exercised, $1 million of new share capital will be raised, reducing the Year 4 gearing to 125%, still significantly above the target.

Cash flow

A key assumption is that cash generated from operations is sufficient to repay $2 million of mezzanine debt each year, which is by no means obvious from the figures provided.

Increase in LIBOR

Results will be worse if **LIBOR rises** above 10% over the period. However, the purchase of the cap will stop interest payments on EPP's loan rising above 15%. Conversely if **LIBOR falls**, the **increase in profit** could be **considerable**, but it is still very unlikely that the loan condition will be met by Year 4.

Problems in meeting loan condition

There will therefore definitely be a problem in meeting EPP Bank's loan conditions. This may mean that AIR will need to repay the loan in full after four years.

However, if the company is still showing steady growth by Year 4, and there have been no problems in meeting interest payments, EPP Bank may **not exercise its right** to recall the loan. However, in light of this risk, the directors of AIR could consider control action to reduce the risk of the covenant being broken, eg **improvements** in **cost effectiveness, renegotiating** the **allowed gearing ratio** to a more realistic figure, or an injection of **equity funds**.

Keep suggested actions brief as this is potentially going beyond the scope of the requirement.

Exam success skills diagnostic

Every time you complete a question, use the diagnostic below to assess how effectively you demonstrated the exam success skills in answering the question. The table has been completed below for the AIR activity to give you an idea of how to complete the diagnostic.

Exam success skills	Your reflections/observations
Managing information	Did you understand the syllabus knowledge required to address the requirements – some from syllabus Section B (financing – in part (a)) and some from syllabus Section D (forecasting – in part (b))?
Correct interpretation of the requirements	Did you realise the need for narrative to support your numerical analysis in part (b)?
Effective writing and presentation	Did your evaluation include a critical evaluation of the assumptions made in your numerical analysis?
Most important action points to apply to your next question	

Summary

Make sure that you are able to 'think across the syllabus' by making sure that you do not have knowledge gaps by the time of the real exam. This will involve:

- Carefully revising discussion areas as well as numerical areas
- Revising all syllabus sections. Do not neglect syllabus Section A (role of the senior financial adviser) and D (corporate reconstruction and reorganisation) because they do not contain complex numerical techniques.

Remember that the structure of the AFM exam exposes students that have knowledge gaps because:

- The 50-mark question is structured to test multiple syllabus areas (and will span at least two syllabus sections)
- The 25-mark questions, although often focusing on a specific syllabus section, normally contain three requirements which often means that a wide variety of topics within this syllabus area is being tested
- There are no optional questions

It is therefore crucial that you prepare yourself for the exam by revising across the whole syllabus. Even if your knowledge is deeper in some areas than others there must not be any gaps'. Make sure when you answer questions that you try, where appropriate, to address a problem from a variety of perspectives.

This skill will often involve thinking outside the confines of one specific chapter of the Workbook and **thinking across the syllabus**.

Appendix 1 – Activity answers

Chapter 1 Financial strategy: formulation

Activity 1: Dividend capacity

	$m
Profits after interest and tax (400 – 30 – 75)	295
Less preference dividends	(15)
Add back depreciation	60
Less capital expenditure (Closing non-current assets higher by 40 + depreciation 60 = capital expenditure of 100)	(100)
Less debt repaid	
Dividend capacity	140

The ordinary dividend of $60 million is below this, which indicates that the dividend could potentially be increased.

Activity 2: Ethical considerations in financial management

Area of financial management	Ethical considerations
Investment	Fairness of wages and salaries, working conditions, training and career development Potential impact on the environment Bribery of government officials Failing to invest because bonuses are based on short-term share performance (short-termism) Over-priced takeovers indicate that managers are focused more on empire building than on shareholder value maximisation
Financing	A bank lending the company money may have an unethical profile Tempting to suppress bad news at a time that finance is being raised
Dividend policy	May be at the expense of providing quality products or services or treating other stakeholders fairly
Risk management	Neglect of risk management in order to hit profit targets. Directors pursuing diversification strategies to protect their own positions, when it is not in the best interests of shareholders

Note that many points could be made here – there is no definitive list. The actual issues should be clearly signalled in an exam question.

Chapter 2 Financial strategy: evaluation

Activity 1: Introductory example

Each investment has an expected return of 10% but investing 100% in either company leaves risk, ie return might be as high as 25% or as low as –5%.

Investing in a 50:50 portfolio gives an expected return of 10% per year under any scenario but with no risk, and therefore the portfolio is preferable to only investing either in an airline company or an oil company.

Activity 2: Technique demonstration

Use the beta of the company: 1.5

$K_e = 2 + (4 \times 1.5) = 8\%$

Activity 3: Technique demonstration

Credit spread on existing AAA rated bonds	0.18%
Yield curve benchmark	5.50%
Cost of debt pre-tax	5.68%
Cost of debt post-tax (5.68 × (1– 0.3))	3.98%

Activity 4: Technique demonstration

Time	*1*	*2*	*3*	*Total*
Per £100	6.2	6.2	106.2	
DF 4.58%	0.956			
DF 5.12%		0.905		
DF 5.68%			0.847	
PV	5.93	5.61	89.95	**101.49**

Nominal value £0.49 billion × 101.49/100 = market value £0.4973 billion being approximately £0.50 billion.

Workings

DF 4.58% for 1 year = (1+ 0.0458) ^ –1
DF 5.12% for 2 years = (1+ 0.0512) ^ –2
DF 5.68% for 3 years = (1 + 0.0568) ^ –3

Activity 5: Calculating the WACC

After tax cost of debt is 3.98%

WACC = (8 × 50/100) + (3.98 × 50/100) = **5.99%**

Activity 6: Ratio analysis

(a) Both the company and the sector performed badly in 20X6. However, in 20X7, the sector appears to have recovered but Neptune Co's performance has worsened. Neptune Co's actual average returns are significantly below the required returns in both years.

Neptune Co

Return to shareholders (RTS)	*20X6*	*20X7*
Dividend yield*	8.0%	6.25
Share price gain	–4.0%	–16.67%
Total	4.0%	–10.42%

* Technically it is better to use the closing year share price from the previous year for this calculation (eg 0.4/5.0 = 8% because this is the opening year share price and is consistent with the share price gain calculation but it is also acceptable to use the current year share price.

Required return (based on CAPM)	13.0%	13.60%

Sector (RTS)	*20X5*	*20X6*	*20X7*
Dividend yield	7.73%	6.64%	7.21%
Share price gain	16.53%	–1.60%	12.21%
Total	24.26%	5.04%	19.42%
Average: 16.2%			
Required return (based on CAPM)	13.0%	13.6%	16.0%
Average: 14.2%	eg (4 + 1.5 × (10 – 4)) = 13.0%)		

Note. The averages for Neptune Co and for the sector are the simple averages of the three years: 20X5 to 20X7.

(b) **Ratio calculations**

Focus on investor and profitability ratios

Neptune Co	*20X5*	*20X6*	*20X7*
Profit margin (profit/sales)		10.8%	6.0%
Earnings per share	n/a	$0.48	$0.24
Price to earnings ratio	n/a	10.00	16.67
Gearing ratio (debt/(debt + equity))	n/a	36.2%	32.3%
Dividend yield	n/a	8.00%	6.25%
(Calculating on opening year share prices; alternatively closing year may be used)		(0.4/5.0)	(0.3/4.8)

Other calculations

Neptune Co, sales revenue annual growth rate average between 20X6 and 20X7 = (2,390/2,670) – 1 = –10.5%.

Discussion

In terms of Neptune Co's performance between 20X5 and X7, it is clear from the calculations above, that the company is experiencing considerable financial difficulties.

Sales have fallen more sharply than the sector average and profit margins have fallen (–44%) and so has the earnings per share (–50%).

The share price has decreased over this period as well and in the last year so has the dividend yield. This would indicate that the company is unable to maintain adequate returns for its investors (please also see below).

Although Neptune Co's price to earnings (P/E) ratio has increased significantly in 20X7, this is because of the large fall in the EPS, rather than an increase in the share price. However, this could be an indication that there is still confidence in the future prospects of Neptune Co.

Finally, whereas the sector's average share price seems to have recovered strongly in 20X7, following a small fall in 20X6, Neptune Co's share price has not followed suit. So, it would seem that Neptune Co is a poor performer within its sector.

This view is further strengthened by comparing the actual returns to the required returns based on the capital asset pricing model (CAPM). Taking the above into account, the initial recommendation is for Splinter Co to dispose of its investment in Neptune Co.

Activity 7: Business risk

Examples of **business risk here** could include:

- Threats of **technical change** leading to **product obsolescence;** although this would not appear to be high here as DX Co does not manufacture the products.
- **Social change** leading to a fall in the number of people participating in sports.
- **Operational risks**, including risks such as human error, breakdowns in internal procedures and systems or external events. Damage to an organisation's reputation (**reputational risk**) can arise from **operational failures**.
- Threats to the business or the industry from government action (change to laws regarding minimum wages, taxes or regulations for example surrounding working conditions), ie **political/fiscal/regulatory risk**.

Chapter 3 DCF techniques

Activity 1: Avanti

(All figures $'000)

Time	*0*	*1*	*2*	*3*	*4*	*5*
Sales		1,100	2,500	2,800	3,000	
Direct costs		(750)	(1,100)	(1,500)	(1,600)	
Marketing		(170)	(250)	(200)	(200)	
Office overheads (40%)		(50)	(50)	(50)	(50)	
Net real operating flows		130	1100	1050	1,150	
		× 1.04	**× 1.04^2**	**× 1.04^3**	**× 1.04^4**	
Inflated at 4% (rounded)		**135**	**1,190**	**1,181**	**1,345**	
Tax allowable depreciation (W1)		(135)	(131)	(99)	(195)	
Unused TAD from time 1			(40)			
Taxable profit		**0**	**1,019**	**1,082**	**1,150**	
Taxation at 30% in arrears			0	(306)	(325)	(345)
Land and buildings (2,785 – 80)	(2,705)					
Fixture and fittings	(700)					
Resale value					4,000	
Add back TAD (used)		135	171	99	195	
		(175 – 40)	(131 + 40)			
Working capital cash flows (W2)	(165)	(225)	(64)	(52)	506	
Net nominal cash flows	(3,570)	(90)	1,126	823	5,526	(345)
12% discount rate (W3)	1.0	0.893	0.797	0.712	0.636	0.567
Present values	(3,570)	(80)	897	586	3,515	(196)
NPV						**1,152**

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Workings

1 *Tax allowable depreciation (TAD)*

Time	*0*	*1*	*2*	*3*	*4*	*5*
Written down value: start of year		700	525	394	295	
Scrap value					(100)	
					195	
TAD (25% reducing balance)		175	131	99	195 (balance)	

2 *Working capital*

Time	*0*	*1*	*2*	*3*	*4*
Nominal sales		1,144	2,704	3,150	3,510
Working capital	165	390	454	506	0
Cash flow	(165)	(225)	(64)	(52)	506

3 *Nominal discount rate* (1.077) × (1.04) = 1.12

Activity 2: IRR

$$\text{IRR} = 12 + \frac{1152}{1152-138}(20\text{-}12) = \textbf{21\%}$$

Activity 3: MIRR

Time	*0*	*1*	*2*	*3*	*4*	*5*
Present values	(3,570)	(80)	897	586	3,515	(196)

The investment phase is assumed to be time 0 only.

The returns phase is therefore time 1–5 and the sum of these present values is 4,722.

$$\left(\frac{4,722}{3,570}\right)^{1/5} \times (1+0.12) - 1 = 0.184 \text{ or } 18.4\%$$

18.4% is the modified IRR

Activity 4: Project duration

Time	*1*	*2*	*3*	*4*	*5*
PV as % of inflows 3,570 + 1,152 = 4,722	–80/4,722 = –0.02	897/4,722 = 0.19	586/4,722 = 0.12	3,515/4,722 = 0.74	–196/4,722 = –0.04

Project duration = (1 × –0.02) + (2 × 0.19) + (3 × 0.12) + (4 × 0.74) + (5 × –0.04) = –0.02 + 0.38 + 0.36 + 2.96 – 0.2 = **3.5**

Alternative solution, using quicker method:

PV of cash inflows = 4,722

Time	*1*	*2*	*3*	*4*	*5*
PV × time period	–80 × 1 = –80	897 × 2 = 1,794	586 × 3 = 1,758	3,515 × 4 = 14,060	–196 × 5 = –980

Project duration = (–80 + 1,794 + 1,758 + 14,060 – 980)/4,722 = **3.5**

This means that this project delivers its value over about 3.5 years, ie it has the same duration as a project that delivers 100% of its (present value) cash inflows in 3.5 years' time.

Activity 5: Value at risk

(a) The VAR at 95% is 1.645 × 1,000,000 × √4 = **$3,290,000**, ie worst case NPV (only 5% chance of being worse) = $2m – $3.29m = –$1.29m

(b) The VAR at 99% is calculated on the same basis but using 2.33 from the normal distribution table instead of 1.645. This results in a value at risk of $4.66m and a worst case NPV (only 1% chance of being exceeded) of $2m – $4.66m = –$2.66m

Chapter 4 Application of option pricing theory in investment decisions

Activity 1: Idea generation

	Option type			
	To expand	**To delay**	**To redeploy**	**To withdraw**
Proposal 1	Higher profile in the industry may make allow Entraq to move into new geographical markets/related product areas	Better information on which to make this decision will be available after the election		
Proposal 2		Better information on which to make this decision will be available after the election	Assets can be redeployed	Land should be easy to sell

Activity 2: Valuing a call option

1 **Initial variables**

P_a =	$600,000 discounted back to time 0 at 10% = $409,800.	r=	0.04 (risk free rate)
P_e =	$600,000	t =	4 (expiry of option)
		e^{-rT} =	$e^{-(0.04 \times 4)} = 0.852$

Note. That if P_a had been given in present value terms then you would not have discounted this value.

2 **Calculation of d_1 and d_2, starting with d_1.**

$\ln(P_a/P_e)$ =	$\ln(409,800/600,000) = -0.381$	$(r+0.5s^2)t$ =	$(0.04 + 0.5 + 0.3^2) \times 4 = 0.340$
s =	0.30	$s\sqrt{t}$ =	$0.3 \times 2 = 0.6$
d_1 =	$\frac{-0.381+0.34}{0.6} = -0.07$		

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d_2 = $-0.07 - 0.3 \times 2 = -0.67$

$N(d_1) = 0.5 - 0.0279 = 0.4721$

$N(d_2) = 0.5 - 0.2486 = 0.2514$

Co= $(409{,}800 \times 0.4721) - (600{,}000 \times 0.2514 \times 0.852) = \$193{,}467 - \$128{,}516$ **= $\underline{\$64{,}951}$**

Project A now becomes a +NPV project ($64,951 – $10,000 = $54,951)

We can now see the value of the real options approach. Here a project originally showed a negative NPV of $10,000 and would therefore be rejected. However, by valuing a real option associated with the project we can see that the project now has a positive NPV and can therefore be justified.

Activity 3: Valuing a put option

Solution

1 First identify the basic variables that are needed to complete the call option formula

$$C_0 = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

PV of the inflows from the project = outlay $90m + NPV $10m = $100m

P_a =	P_a is the PV of the cash inflows from the project **AFTER the exercise of the option**. Assuming that this is in 10 years' time, then 20 years of the project remain so Pa is estimated as 20/30 × 100 = $66.7m.	r=	0.05
P_e =	$40m	t =	10
		e^{-rt}	$= e^{-(0.05 \times 10)} =$ 0.6065

2 Next complete the workings for d_1 and d_2, starting with d_1

$$d_1 = \frac{\ln(P_a / P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

s =	0.45	$s\sqrt{t}$ =	1.423

d_1 = $\dfrac{\ln(66.7/40) + (0.05 + 0.5 \times 0.45^2)10}{0.45\sqrt{10}} = \dfrac{0.511 + 1.513}{1.423} = 1.42$

$$d_2 = d_1 - s\sqrt{T}$$

d_2 = $d_2 = 1.42 - 0.45 \times 3.162 = 0$

3 Then use the normal distribution tables to calculate $N(d_1)$ and $N(d_2)$

The normal distribution tables tell you that where the values of d_1 and d_2 are positive they should be added to 0.5, where they are negative they are subtracted from 0.5. Here we are dealing with positive numbers.

$N(d_1) = 0.5 + 0.4222 = 0.9222$

$N(d_2) = 0.5 + 0 = 0.5$

4 Value the call option

$$C_0 = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

C_0 = = (66.7 × 0.9222) – (40 × 0.5 × 0.6065) = 61.51 – 12.13 = **$49.38m**

5 Now value the put option

$$P = C - P_a + P_e e^{-rt}$$

Put option value = 49.38 – 66.7+ 40 × 0.6065 = $6.94m

– the project's NPV is understated by this value.

If this option can be exercised **at any point** up to the end of the ten-year period then the option would be worth more than this, since it could be exercised if the project is failing; the Black–Scholes model assumes that the option is exercised on a specific date, ie at the end of ten years.

Chapter 5: International investment and financing decisions

Activity 1: PPP theory

Year 1 = 1.5 × 1.025/1.021 = 1.506

Year 2 = 1.506 × 1.025/1.021 = 1.512

Year 3 = 1.512 × 1.030/1.010 = 1.542

This is potentially bad news for a US firm because the strengthening dollar indicates a **fall in the value of the foreign currency (the peso).**

Activity 2: Technique demonstration

Exchange rate workings

The first step is to calculate the expected exchange rate between the peso and the $ at the end of each year. This can be estimated using **purchasing power parity theory**.

It is assumed that expected inflation remains constant.

Formula: $$\text{Forecast rate} = \text{Spot rate} \times \frac{1 + \text{Country Z Inflation}}{1 + \text{US Inflation}}$$

The expected spot rate at the end of each year can now be found.

Year		Peso/$
0		2.0000
1	$2.000 \times \frac{1.03}{1.05} =$	1.9619
2	$1.9619 \times \frac{1.03}{1.05} =$	1.9245
3	$1.9245 \times \frac{1.03}{1.05} =$	1.8878
4	$1.8878 \times \frac{1.03}{1.05} =$	1.8518

The $ NPV can now be found.

Discounting annual $ cash flows at 16%

Time	*0*	*1*	*2*	*3*	*4*
Cash flow (peso '000)	(2,500)	750	950	1,250	1,350
Exchange rate (see workings)	2.0000	1.9619	1.9245	1.8878	1.8518
Cash flow ($'000)	(1,250)	382	494	662	729
Discount at 16%	1.000	0.862	0.743	0.641	0.552
Present value	(1,250)	329	367	424	402

Total NPV = $272 ('000s)

Activity 3: Extra complications

'000 peso	*0*	*1*	*2*	*3*	*4*
Operating cash flows		750	950	1,250	1,350
TAD		(100)	(100)	(100)	(100)
Intercompany transactions		(25)	(25)	(25)	(25)
Taxable profit		625	825	1,125	1,225
Taxation (20%)		(125)	(165)	(225)	(245)
Capital expenditure	(2,500)				
Add back TAD		100	100	100	100
Net cash flows	(2,500)	600	760	1,000	1,080
Forecast exchange rate	2.0000	1.9619	1.9245	1.8878	1.8518
Net cash flows in $'000s	(1,250)	306	395	530	583
Extra tax in US in $'000s (extra 10%)		(32)	(43)	(60)	(66)
Intercompany transactions		13	13	13	14
Other US cash flows		(15)	(15)	(15)	(15)
Taxable profit in $s		(2)	(2)	(2)	(1)
Tax paid or saved on US cash flows (at 30%)		1	1	1	0
Net cash flows in $'000s	(1,250)	273	351	469	516
DF @ US rate 16%	1.000	0.862	0.743	0.641	0.552
Present value in $'000s	(1,250)	235	261	301	285

Net present value = $(168) in '000s, ie reject project

Workings

'000 peso	*0*	*1*	*2*	*3*	*4*
Taxable profit		625	825	1,125	1,225
Overseas tax paid		(125)	(165)	(225)	(245)
Extra US tax (30% is 50% above 20%)		(62.5)	(82.5)	(112.5)	(122.5)
In $s (dividing by exchange rate)		(32)	(43)	(60)	(66)

Or

'000 peso	*0*	*1*	*2*	*3*	*4*
Taxable profit		625	825	1,125	1,225
Extra tax in US (extra 10%) in pesos		(62.5)	(82.5)	(112.5)	(122.5)
In $s (dividing by exchange rate)		(32)	(43)	(60)	(66)

Activity 4: Translation risk

(a)

Exchange rate	1.1 $/€	**Exchange rate**	1.4 $/€
	€m		€m
Assets	14,909	Assets	14,714
Equity (balance)	5,650	Equity	5,455
Floating rate debt	2,909	Floating rate debt	2,909
Current liabilities	6,350	Current liabilities	6,350
	14,909		14,714

(b)

Exchange rate	1.1 $/€	**Exchange rate**	1.4 $/€
	€m		€m
Assets	14,909	Assets	14,714
Equity (balance)	5,650	Equity	5,650
Floating rate debt	2,909	Floating rate debt	2,714
Current liabilities	6,350	Current liabilities	6,350
	14,909		14,714

Using overseas debt means that if the local exchange rate falls, the decline in the value of the overseas assets is matched by a decline in the value of the liabilities – if local debt finance is used this does not happen and the book value of equity is damaged.

Chapter 6 Cost of capital and changing risk

Activity 1: Idea generation

(a) The existing WACC could not be used because this would ignore the benefit of using debt finance.

(b) K_e would rise because the use of debt makes equity more risky (higher financial risk, dividends become more volatile). Note that the WACC would still fall.

Activity 2: M&M cost of equity demonstration

(a) $K_e = 12 + (1 - 0.3)(12 - 6) \times 1/1 = 12 + 4.2 = 16.2\%$

(b) WACC = (0.5×16.2) + ($0.5 \times 6 \times (1 - 0.3)$) = 8.1 + 2.1 = **10.2%**

The use of debt will bring benefit to the company because the lower WACC will enable future investments to bring greater wealth to the company's shareholders.

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Activity 3: APV demonstration

Step 1

Base case NPV at **ungeared** cost of equity

Time	*0*	*1–5*
Project cash flows $m	(11.0)	2.900
Df 10%	1.0	3.791
Present value	(11.0)	10.994
Overall NPV of project as if ungeared	**($0.006)m**	

Step 2

Annual interest paid $m	$8m × 0.05 = $0.4m

Time	1–5
Tax saved on interest $m	$0.4m × 0.3 = $0.12m
Df at return on debt **(5%)**	4.329
Present value	$0.519m

Step 3

Issue costs $m =	($0.2m)

APV

APV $m Step 1 + Step 2 + Step 3 =	**–0.006 + 0.519 – 0.2 = +$0.313m ∴ Accept**

Activity 4: APV using an asset beta

Step 1

Equity beta = 1.75

Ungear

$\beta_a = 1.75 \times (2/2.7) = 1.2963$

$K_e = 5 + (4)1.2963 = 10.19\%$ (as previous example)

Activity 5: Business risk – two approaches

(a) **Step 1**

Beta of parcel delivery company = 1.8

Ungeared this becomes

$\beta_a = 1.8 \times (1/2.4) = 0.75$

Step 2

Regear to reflect Stetson's gearing

$0.75 = \beta_e \times (1/1.7)$

$\beta_e = 0.75/(1/1.7) = 1.275$

Step 3

$K_e = 4 + (8)1.275 = 14.2\%$

WACC = (14.2% × 1/2) + (4% × 0.7 × 1/2) = 7.1 + 1.4 = 8.5%

This WACC reflects the business and financial risk of the new investment.

(b) **Step 1**

K_e = 18.4%

Ungear

$18.4 = K_e^{i} + 0.7(K_e^{i} - 4)\ 2/1$

$18.4 = K_e^{i} + 1.4K_e^{i} - 5.6$

$24 = 2.4K_e^{i}$

K_e^{i} = **10%**

Step 2

Regear

$K_e = 10 + (0.7 \times (10 - 4))\ 1/1$ = **14.2%**

Step 3

WACC = (14.2% × 1/2) + (4% × 0.7 × 1/2) = 7.1 + 1.4 = **8.5%**

This is a WACC that reflects the business and financial risk of the new investment.

Chapter 7 Financing and credit risk

Activity 1: Yield curve

If a government bond with a coupon rate of 4.5% and **three years** to maturity is trading at $97.4, then we can estimate the required yield in Year 3 as:

$\$97.4 = \$4.5 \times (1 + r_1)^{-1} + \$4.5 \times (1 + r_2)^{-2} + \$103.5 \times (1 + r_3)^{-3}$

We know that the required yield for cash flows in 1 year is 4.5% from the earlier illustration, and in year 2 is 5% so this becomes:

$\$97.4 = \$4.31 + \$4.08 + \$104.5 \times (1 + r_3)^{-3}$

So $(\$97.4 - 4.31 - \$4.08)/\$104.5 = (1 + r_3)^{-3}$

So $0.852 = (1 + r_3)^{-3}$

Given that $(1 + r)^{-3} = 1/(1 + r)^3$ then: $1/0.852 = (1 + r_3)^3$

Then $(1 + r_3) = \sqrt[3]{1.174} = 1.055$

So r_3 = 0.055 or 5.5%.

This the required yield in Year 3.

Activity 2: Impact of a change in credit rating

1 **Tetron's current WACC**

Current required return on debt =	**4.4% + 0.10% = 4.5% (pre-tax)**
Current WACC =	**(90/100) 8% + (10/100) 4.5% (1-0.2) = 7.56%**

2 **New required yield on debt at a credit rating of A**

Current debt finance (1 year to maturity)	4.4 + 0.6 = 5.0% pre-tax
New debt finance (3 years to maturity)	5.5 + 0.75 = 6.25% pre-tax

3 **New market value of debt.**

Current debt finance (one year to maturity) Repays $10m + $0.45 = $10.45m in 1 year	Time	1
	$m	10.45
	df **5%**	**0.952**
	Present value	$9.95m
New debt finance (three years to maturity)	$5 million as given	

4 **Revised WACC**

Revised WACC = (90/104.95) 8% + (9.95/104.95) 5% (1-0.2) + (5/104.95) 6.25% (1-0.2)
= 6.86 + 0.38 + 0.24 = 7.48%

Workings

V_e = $90m

Existing debt = $9.95m costing 5% pre-tax

New debt = $5m costing 6.25%

Total capital = $90m + $9.95m + $5m = $104.95m

Despite the change in credit rating the impact of the new debt issue, in this example, is to decrease the WACC.

Activity 3: Islamic finance

With a Mudaraba contract, any profits would be shared with the bank according to a pre-agreed arrangement when the contract is constructed. Losses, however, would be borne solely by the bank as the provider of the finance. The bank would not be involved in the executive decision-making process. In effect, the bank's role in the relationship would be similar to an equity holder holding a small number of shares in a large organisation.

With a Musharaka contract, the profits would still be shared according to a pre-agreed arrangement similar to a Mudaraba contract, but losses would also be shared according to the capital or other assets and services contributed by both parties involved in the arrangement. Within a Musharaka contract, the bank can also take the role of an active partner and participate in the executive decision-making process. In effect, the role adopted by the bank would be similar to that of a venture capitalist.

A bank may prefer the Musharaka contract because it may be of the opinion that it needs to be involved with the project and monitor performance closely due to the inherent risk and uncertainty of the venture, and also to ensure that the revenues, expenditure and time schedules are maintained within initially agreed parameters. In this way, it may be able to monitor and control agency related issues more effectively.

Chapter 8 Valuation for acquisitions and mergers

Activity 1: Asset valuation

Correct answer **$1,100m**

The value of the net assets is $2,380 – $1,280 = **$1,100m** (which is also the book value of equity).

Note on incorrect answers:

- $2,380m – this is the total value of assets, ie ignores liabilities
- $1,680m – this is total assets less current liabilities, ie ignores non-current liabilities

Activity 2 (continuation of Activity 1): CIV

CIV involves the following steps:

1 Estimate the profit that would be **expected** from an entity's tangible asset base using an **industry average** expected return

12% of $2,000m = $240m

2 Calculate the present value of any *excess* profits that have been made in the recent past, using the **WACC** as the discount factor.

So Transit is making excess pre-tax profits of $400m – $240m = $160m

Post-tax this is $160 × (1 – 0.25) = $120m

$120m discounted to infinity at 10% = $120m × 1/0.1 = **$1,200m**

This is an estimated of the value of Transit Co's intangible assets.

So the revised asset value is $1,100m (from Activity 1) + $1,200m = **$2,300m**

Activity 3: Technique demonstration

Groady's P/E ratio is higher, indicating higher growth prospects.

If Bergerbo can be turned around and will share these growth prospects, then its earnings of €5.6m will have a total value of **€118.7m** (5.6 × 21.2).

Activity 4: Post-acquisition values

(a) **Maximum amount to be paid**

Macleanstein must consider the synergies to be made from the combination when determining the maximum amount to pay.

Value of Thomasina to Macleanstein = value of combined company – current value of Macleanstein

Earnings of combined company = (500m + 750m + 150m) = $1,400m
Current value of Macleanstein = 17 × $750m = $12,750m

Max price = $9,650m ($1,400m × 16) – $12,750m

(b) **Minimum amount that Thomasina's shareholders should accept**

= current value of Thomasina's equity

= 14 × $500m = $7,000m

The final amount paid will probably fall between these two extremes.

Activity 5: Non-constant growth

Phase 1

Time	*1*	*2*	*3*
Dividend $m	5.15	5.30	5.46
DF @ 8%	0.926	0.857	0.794
PV	4.77	4.54	4.34

Total = **$13.65m**

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Phase 2

$P_0 = \frac{d_0(1+g)}{r_e - g}$ is adapted to $P_3 = \frac{d_3(1+g)}{r_e - g}$

$P_3 = \frac{5.46 \times 1.02}{0.08 - 0.02} = \frac{5.57}{0.08 - 0.02} = \$92.83m$

Then discounting at a time-3 discount factor of 0.794 = \$92.83 × 0.794 = **\$73.71m**

Total Phase 1 + Phase 2 =

Total = \$13.65m + \$73.71m = **\$87.36m**

Activity 6: FCF and FCFE method

Approach 1

Time	*1*	*2*	*3*	*4 onwards*
\$m	5.6	7.4	8.3	12.1
Annuity (1/0.13)				7.692
Value **at time 3**				93.1
@ 13%	0.885	0.783	0.693	0.693
PV	5.0	5.8	5.8	64.5

Total PV	81.1
Less debt	(15.0)
Value of equity	**66.1**

This suggests that the target is not worth \$75m

K_e (using CAPM) 5.75 + 2.178 (10 – 5.75) = 15.0%
K_d × (1 – t) 5.75% × 0.7 = 4.03%
WACC = (15 × 0.833) + (4.03 × 0.167) = **13.2% (rounded to 13%)**

Approach 2

Interest p.a. = \$0.6m after tax (\$15m × 0.0575 × 0.7)

Time	*1*	*2*	*3*	*4 onwards*
\$m after interest	5.0	6.8	7.7	11.5
Annuity (1/0.15)				6.667
Value **at time 3**				76.7
K_e = 15%	0.870	0.756	0.658	0.658
PV	4.4	5.1	5.1	50.5

Value of equity **65.1**

(as Approach 1 except for a small rounding difference) since we used 13.0% in Approach 1 instead of 13.2%

Activity 7: Technique demonstration

$$\beta_a = \left(\frac{V_e}{(V_e + V_d(1-T))}\right)\beta_e + \left(\frac{V_d(1-T)}{(V_e + V_d(1-T))}\right)\beta_d$$

1 **Asset beta calculations assuming a debt beta of zero**

Value of Salsa = £9 × 40m = £360m pre-acquisition

Value of Enco = £1 × 62.4m = £62.4m pre-acquisition

Total = £360m + £62.4m = £422.4m

Degearing Salsa's beta	(360/(360 + 45 × (1 – 0.3)) × 1.19	**= 1.09**
Degearing Enco's beta	(62.4/(62.4 + 5 × (1 – 0.3)) × 2.2	**= 2.08**
Post-acquisition asset beta	(1.09 × 360/422.4) + (2.08 × 62.4/422.4)	**= 1.24**

2 **Regear the beta using pre-acquisition equity and debt weightings, including the £80m of extra debt**

(ie total debt = 80 + 45 + 5 = 130).

1.24/(422.4/(422.4 + 130 × (1 – 0.3))) = 1.51

so K_e = 4.5 + (1.51 × 3.5) = 9.79%

3 **Post-acquisition WACC**

(9.79 × 422.4/552.4) + (6.8 × 130/552.4 × (1 – 0.3)) = 8.6%
7.49 + 1.12 = 8.6%

4 **Post-acquisition NPV**

Time	*1*	*2*	*3*	*4*	*5*	*After Year 5*
Free cash flows	35.18	36.87	38.66	40.56	42.58	43.43
Annuity (1/(0.086 – 0.02))						15.15
Value as at time 5						657.96
df at 8.6%	0.921	0.848	0.781	0.719	0.662	0.662
NPV	32.40	31.27	30.19	29.16	28.19	435.57
Total	586.71					
Land	6.5					
Total	593.21					

Subtract debt	
Salsa debt	45
Enco debt	5
New debt	80
Total debt	130

Total value of equity post-acquisition = £593.1m – £130m = **£463.21m**

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5 **Subtract value of bidder to establish the maximum value to pay**

Value of Salsa was initially £360m (40m × £9).

Maximum to pay for Enco = £463.21m – £360m = £103.21m

The maximum bid is £23.21m higher than the current bid of £80m.

6 **Subtract value of bidder and target to establish the value created**

Total value created = £463.21m – £360m – £62.4m (Enco's value pre-acquisition) = **£40.81m**

Chapter 9 Acquisitions: strategic and regulatory issues

Activity 1: Homework exercise

(a) Prevents the offeree company from being constantly distracted from their core business by rumours. The so-called 'put up or shut up rule' was changed in 2011 by the Takeover Panel, the body which polices mergers and acquisitions, so that from the day a company announces it has received an approach, the business making the offer has 28 days to put forward a firm bid.

This also means a company has 28 days to prepare a defence before a business returns with a firm offer.

(b) To prevent unrealistic bids.

(c) Encourages the offeree company **not** to reject bids that are in the best interests of their own shareholders.

(d) Prevents the bidder from exercising control without giving other shareholders the chance to sell out.

(e) Bid timetable aims to get bids out of the way quickly. Conditional offers mean that extra shares only have to be bought by the bidding company if they have achieved more than 50% control.

(f) See (a).

Chapter 10 Financing acquisitions

Activity 1: Technique demonstration

(a) 1 Estimate the group's **post-acquisition earnings** including synergies

	Minprice	*Savealot*
EPS	\$0.191	\$0.465
Number of shares in issue	155m	21m
Total earnings	\$29.605m	\$9.765m

Combined earnings = 29.605 + 9.765 = \$39.37m

2 Use an appropriate P/E ratio to value these earnings

	Minprice	*Savealot*
P/E	300/19.1= **15.71**	500/46.5 = **10.75**

Valuation at Minprice's P/E of 15.71

39.37 × 15.71 = \$618.5m

Divide by the new number of shares in issue to get the estimated post-acquisition share price

	Minprice		*Savealot*
No shares in issue	155m	+	42m (21 × 2) new shares
			= **197m**

$618.5m/197m shares = post-acquisition share price of **$3.1396**

Deduct the value of whole bid to see if value is created for the bidding company's shareholders.

Value of offer to Savealot = $3.1396 × 21m shares × 2 = $131.9m

Post-acquisition value $618.5m – amount paid in shares of $131.9 = $486.6m

This is the value belonging to the existing shareholders post acquisition and is higher than the existing market value of Minprice before the bid of $3 × 155m = $465m. So Minprices's shareholders will gain by $486.6m - $465m = **$21.6m**.

Evaluation of result

	Minprice	*Savealot*
Wealth before bid	$3 × 155 = **$465m**	$5 × 21m = **$105m**
Wealth after bid	$3.1396 × 155= **$486.6m**	$3.1396 × 42m **= $131.9m**
Gain (so shareholders would approve)	**$21.6m**	**$26.9m**

Percentage of shares owned by Minprice shareholders = 155m/197m = **79%**

(b) The maximum bid will leave Minprice Co's share price unchanged at $3.00

The post-acquisition value of $618.5m divided by the new number of shares in issue = $3.00

So $618.5m/$3 = total number of shares post acquisition = 206.2 million

There are currently 155 million Minprice shares, so this is an increase of 51.2 million.

51.2 million Minprice shares for 21 million Savaealot shares is approximately a **2.4-for-1 paper bid**.

Activity 2: Continuation of Activity 1

	Minprice	*Savealot*
EPS	$0.191	$0.465
No shares in issue	155m	21m
Total earnings	$29.605m	$9.765m

Combined earnings = 29.605 + 9.765 = $39.37m

New number of shares in issue = 155m + (2 × 21m) = 197m

EPS = $39.37m ÷ 197m = $0.12

The P/E implied by the original bid is 2 shares × $3 = $6 ÷ 0.465 = **12.90**

Minprice's current P/E ratio is $3/0.191 = **15.71**.

EPS has improved (from $0.191 to $0.20) because the P/E ratio of the acquiring company exceeds the P/E ratio implied by the amount paid for the target.

Chapter 11 The role of the treasury function in multinationals

Activity 1: Technique demonstration

		Paying subsidiary			*Total receipts*	*Total payments*	*Net*
		UK	*US*	*French*			
Receiving	UK	–	£2m	£1m	£3m	£4.5m	(£1.5m)
subsidiary	US	£1.5m	–	£0.5m	£2m	£6.4m	(£4.4m)
	French	£3m	£4.4m	–	£7.4m	£1.5m	£5.9m

This minimises transaction costs for inter-company payments.

Only three transactions will take place, two payments to central treasury by the UK and US operations and a receipt from central treasury by the French subsidiary. Don't forget to state this in your answer to an exam question (this is a common error).

It is possible that government regulations will prevent multilateral netting, in order to protect the income that local banks derive from transaction fees associated with currency transactions.

Another potential issue is that delaying the settlement of transactions (everything is settled in 6 months) may create cash flow problems for the affected subsidiaries.

Activity 2: Decentralised treasury

- If subsidiaries have control over treasury operations, such as hedging, then they have greater control over their financial performance. Enhancing controllability can make performance appraisal easier, and also increase the motivation of local management.
- Local managers may have greater knowledge of local financing opportunities which centralised treasury would not be aware of.

Activity 3: Delta hedging

$P_a = 444$ $P_e = 430$ $T = 0.3333$

$r = 0.0417$ $\sigma = 0.25$

$d_1 = (0.032 + (0.0417 + 0.03125)\ 0.333)/(0.25 \times 0.577)$

$d_1 = (0.0563/0.144)$

$d_1 = 0.39$

$N(-d_1) = 0.5 - 0.1517 = 0.3483$

(Although this is a positive number, by convention the delta of a put option is referred to as a negative because the put option will fall in value as the share price rises, and *vice versa*.)

Options needed = Number of shares held divided by delta

Options needed = 1,000/0.3483 = 2,871

Chapter 12 Managing currency risk

Activity 1: Introduction to transaction risk

(a) A$360,000/1.8 = £200,000 revenue expected

A$360,000/1.5 = £240,000 received

Profits = £40,000

UK exporters gain when the £ gets weaker

(b) A$360,000/1.8 = £200,000 cost expected

A$360,000/1.5 = £240,000 paid

Losses = £40,000

UK importers lose when the £ gets weaker

Activity 2: Interpreting spreads

(a) The worst rate for buying £s is 1.9618, so this is the rate that will be offered by a bank.

A$200,000 ÷ 1.9618 = £101,947

(b) The worst rate for buying €s is 0.9000, so this is the rate that will be offered by a bank.

€400,000 × 0.9000 = £360,000

Activity 3: Forward contracts

(a) The worst rate for selling A$s is 1.9615, so this is the rate that will be offered by a bank.

A$2m/1.9615 = £1,019,628

(b) The worst rate for buying $s is 1.9600, so this is the rate that will be offered by a bank.

$2m/1.9600 = £1,020,408

Activity 4: Futures demonstration

Step 1: Now (31 December)

Type of contract

The contract currency is £s and Spandau will need to buy £s (with the $s received), so **contracts to buy** are needed.

Date of contract

The earliest futures expiry date after the transaction is **June** so this will be chosen.

Number of contracts

The standard contract size is £125,000. At the June futures rate of 1.9502, the number of contracts needed is $5.1m ÷ 1.9502 = £2,615,116. So the number of contracts needed is £2,615,116/£125,000 = **21 contracts (to the nearest contract)**

So Spandau will need to enter into **21 June contracts to buy @ 1.9502**

Step 2: End April

Complete the **actual** transaction on the **spot market**.

So $5.1m revenue will be worth @ April spot rate 2.0000 = **£2,550,000**

Step 3: At the same time as Step 2

Close out the futures contract by **selling** £s back to the futures market.

31 Dec: contracts to buy £s at	1.9502
End April contracts to sell £s at	1.9962
Difference	0.0460

A **profit** has been made as the selling price is above the buying price.

The profit can be quantified in one of two ways (either can be used):

(a) 0.0460 × 125,000 × 21 contracts = $120,750; or
(b) $12.50 × 460 ticks × 21 contracts = $120,750.

Converting $120,750 into £s at April's spot rate = $120,750/2.0000 = £60,375 profit

So the net outcome from the futures hedge is £2,550,000 (Step 2) + £60,375 (Step 3) profit = £2,610,375

Activity 5: Technique demonstration

	Now (31 Dec)
June futures contract	1.9502
Spot rate	1.9615
Difference (basis)	
Future – spot	**(0.0113)**
Time difference	Six months (to expiry of June contract)

In four months' time (end April) there will only be two months to the expiry of the June future so only two months of the basis should remain which is (0.0113) × 2/6 = (0.0038) rounding to four decimal places.

We can forecast the June future in 4 months' time as being the spot rate of 2.0000 $ per £ less 0.0038 = **1.9962**.

This was the rate given in Activity 4

Activity 6: Quicker method

Quick method:

opening futures rate – closing basis = effective exchange rate

1.9502 – –0.0038 = **1.9540**

Footnote – comparison of the two methods

Longer method

Opening future 1.9502	Closing future 1.9962	Change –0.0460
	Closing spot 2.0000	
Effective rate	Closing spot – change in future 2.0000 – 0.046 = **1.9540**	

Quick method

Opening future 1.9502	
	Closing basis –0.0038
Effective rate	Opening future rate – closing basis 1.9502 – 0.0038 = **1.9540**

Activity 7: Technique demonstration

(a) The option rate is better than the spot so the option is used giving a value of A$2m/1.47 = £1.36m, which becomes £1.31m after the premium (which is paid up front).

(b) The option rate is worse than the spot, so the spot is used giving a value of £1.54m or £1.51m, after the premium.

(c) If the option is worthless it will be abandoned (eg in (b)) or the company can exercise the option and make a profit (buy A$2m at spot for £1.33m and then sell the A$2m for £1.36m). In either case the premium still has to be paid.

Activity 8: Understanding of option pricing

(a) 1.25 is a better intrinsic value for a call option to buy £s than 1.3, ie an option to buy something for 1.25 is better than an option to buy it at 1.30

(b) A May call gives cover in April and May, so it will be more expensive; it has a higher time value

Activity 9: Exchange-traded options

(a) **Step 1**

Set-up today – 31 December

Calculate the £ required = $5m/1.275 = £ 3,921,569

Number of contracts = £3,921,569/£31,250 = **125 contracts**

Note that 125 × 31,250 = £3,906,250 × 1.275 = $4,980,469

There is a **shortfall of $19,531** if the option is exercised

(This could be hedged with a forward, or left unhedged; do whichever is easier because the amount is not material)

Date and type: 125 April put options at $1.275

Calculate premium: $0.0170 × 125 × 31,250 = **$66,406**

Paid at **today's spot** of 1.2653 = **£52,482**

Step 2

Outcome – end April

Option exercised @ option rate (1.275)

125 × £31,250 = £3,906,250

Shortfall of $19,531 @ April forward 1.25 = £15,625

Step 3

Net outcome

£3,906,250 cost of exercising option + premium for option £52,482 + shortfall £15,625 = **£3,974,357**. This is the worst case outcome; if the spot rate is better than the option rate then the outcome could be better.

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(a) **Step 1**

Set-up today – 31 December

Calculate the £ required $2m/1.275 = £1,568,627

Number of contracts £1,568,627/£31,250 = 50 contracts

Note that 50 × 31250 × 1.275 = $1,992,188

There is an unhedged amount of $7,812 to be received

(This could be hedged with a forward)

So 50 June call options at $1.275 are needed

Premium = $0.0185 × 50 × 31250 = $28,906

Paid at today's spot of 1.2653 = £22,845

Step 2

Outcome – end June

Option exercised @ option rate (1.275)

50 × £31,250 = £1,562,500

Shortfall of $7,812 @ June forward 1.3 = £6,009 to be received

Step 3

Net outcome

£ 1,562,500 revenue + £6,009 – premium £22,845 = £1,545,644

Activity 10: Further practice

(a) The **company needs to buy dollars in May**.

Forward contract

A forward currency contract will fix the exchange rate for the date required near the end of May. This will remove currency risk **provided that the franchise is won**. If the **franchise is not won** and the group has no use for US dollars, it will still have to buy the dollars at the forward rate. It will then have to sell them back for pounds at the spot rate, which might result in an exchange loss.

Futures contract

A currency hedge using futures contracts will attempt to create a **compensating gain** on the futures market which will **offset** the **increase** in the **sterling cost** if the dollar strengthens. The hedge works by entering into futures contracts to sell **sterling** now and closing out by entering into futures contracts to buy **sterling at the end of May** at a lower dollar price if the dollar has strengthened. Like a forward contract, the exchange rate in May is effectively fixed because, if the dollar weakens, the futures hedge will produce a loss which counterbalances the cheaper sterling cost. However, because of inefficiencies in future market hedges, the exchange rate is not fixed to the same level of accuracy as a forward hedge.

A futures market hedge has the same weakness as a forward currency contract – if the franchise is not won, an **exchange loss** may result.

Currency option

A currency option is an ideal hedge in the franchise situation. It gives the company the **right but not the obligation** to sell pounds for dollars in May (or in theory up to the end of June). It is only exercised if it is to the company's advantage; that is, if the dollar has

strengthened. If the **dollar strengthens** and the franchise is won, the exchange rate has been **protected**. If the dollar strengthens and the **franchise is not won**, a **windfall gain** will result by **selling pounds** at the exercise price and buying them more cheaply at spot with a stronger dollar. The only downside is the premium.

(b) **Results of using currency hedges if the franchise is won**

Forward market

Using the forward market, the rate for **buying dollars** at the end of May is 1.4310 US$/£. The cost in sterling is $15m/1.4310 = £10,482,180. This is a cost.

Futures

Date of contract

June future

Type of contract

Sell sterling futures

Number of contracts

$$\frac{15,000,000}{1.4302 \times 62,500} = 167.8 \approx 168 \text{ contracts}$$

Tick size

0.0001 × 62,500 = $6.25

Closing futures price

This can be estimated by assuming that the difference between the futures rate and the spot rate (ie basis) decreases constantly over time. On 31 May there will be one month left of this June contract, so the basis should have fallen to zero.

	28 Feb	*31 May*
Futures price	1.4302	
Spot rate now	1.4461	
Basis (future – spot)	–0.0159	–0.0040
Timing	4 months to expiry of future	1 month to expiry of future

Assuming basis = –0.0040 then the futures price will 0.0040 lower than the spot price.

Hedge outcome

Spot price	*1.3540*
	$
Opening futures price	1.4302
Closing futures price (1.3540 – 0.0040)	1.3500
Movement in ticks	802
Futures profits/(losses)	
168 × tick movement × $6.25	842,100

Net outcome

	$
Spot market payment	(15,000,000)
Futures market profits/(losses)	842,100
	(14,157,900)

Translated at closing rate (1.3540) £10,456,352

This gives an effective rate of $15m/£10.456352m = 1.4345

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A **shortcut** that will deliver **approximately** the same answer is:

Opening futures price – closing basis = effective futures rate

Here this gives:
1.4302 – –0.0040 = 1.4342

Applying this rate gives an outcome in £s of $15m/1.4342 = £10,458,792

This is preferred approach for tackling futures questions because it is so much quicker.

The slight difference arises because this shortcut does not account for the fact that the futures hedge is for 168 contracts, not 167.8.

Options

Date of contract

June

Option type

Buy $, sell £, therefore Sterling put

Exercise price

Assume the option closest to the current spot (1.45) is used (other assumptions are justifiable)

Number of contracts

$$\frac{15,000,000}{31,250 \times 1.45} = 331.03 \approx 331 \text{ contracts}$$

Premium

$0.0238 \times 31,250 \times 331 =$ $246,181 at 1.4461
= £170,238

Outcome

	1.3540
	$
Option market	
Strike price	1.4500
Closing price	1.3540
Exercise?	Yes
Outcome of option 331 × £31,250 × 1.45	$14,998,438
= Shortfall in $s vs $15m needed	$1,563
At forward rate of 1.4310 (or spot rate of 1.354 could be used)	£1,092

Net outcome

	1.3540
	$
Option exercised (331 × £31,250) costing	10,343,750
Shortfall (cost)	1,092
Premium (cost)	170,238
	10,515,080

Summary

The company will either choose to purchase a **future** (which is cheaper than a forward) or an **option**. Although futures are slightly more advantageous at lower exchange rates, the net benefits of using an option are significant if the exchange rate moves in Smart's favour. Also, given that the transaction is not certain to be required, an option will be more suitable because it can be sold on if it is not needed.

On this basis an option is recommended.

Note. Other conclusions are possible.

Chapter 13 Managing interest rate risk

Activity 1: Technique demonstration

FRA outcome

Altrak pays compensation to the bank because interest rates have fallen compared to the 5.5% that is fixed in the FRA.

Altrak will therefore pay 5.5% – 4.5% = 1.00% to the bank

In $s this is:

1.00 ÷ 100 × $5m × 6 months (term of loan) ÷ 12 months (interest rate is annual) = $25,000

Actual loan

Altrak borrows at the best rate available, eg 4.5 + 1 = 5.5%

In $s this is 5.5 ÷ 100 × $5m × 6 months ÷ 12 months = $137,500

Net outcome

Net costs = 5.5% + 1% = 6.5%

In $s this is $137,500 + $25,000 = $162,500

Activity 2: Technique demonstration

Step 1: On 1 December

Contracts **to sell** are required as Altrak is borrowing.

Number of contracts:

$$\$5\text{m loan} \div \$0.5\text{m contract size} \times \frac{6 \text{ (term of loan)}}{3 \text{ (standard term of future)}} = \underline{\textbf{20 contracts}}$$

Date:

Cover is required until the loan begins because it is the interest rate at this point that determines the risk (assuming the loan taken out is at a fixed rate, interest rate changes after the loan is taken out do not have any effect on loan repayments).

Therefore a March future at 5.35% (which covers the start of the loan on 1 March) is required.

Altrak should enter into 20 March futures (to sell) at 5.35%.

Step 2: 1 March

Complete the actual loan: Altrak will borrow at LIBOR + 1% so this is 4.5 + 1 = 5.5%

Step 3: 1 March

Forecasting the futures price on 1 March (as for currency futures)

	Now to 1 Dec		*1 March*
March future	5.35		
LIBOR	5.25		
Basis	0.10	× 1/4 =	0.03
	4 months of time until end of future		One month remaining

The March future rate is forecast to be 0.03% above LIBOR on 1 March, so if LIBOR is 4.5% the future price should be 4.5 + 0.03 = **4.53%**

Close out the futures contract by doing the opposite of what you did in Step 1.

1 Dec contract to pay interest at	5.35%
1 March contract to buy receive interest at	4.53%
Difference	(0.82)%

Interest rate have fallen. Since the rate of interest received is below the rate of interest paid, a **loss** is made; this is paid by Altrak to the exchange.

Calculate net outcome

As a percentage this is 5.5% (Step 2) plus 0.82% (Step 3) = 6.32%.

In $s this is 0.0632 × $5 million × 6 months (term of loan) ÷ 12 months (interest rates are in annual terms) = $158,000.

This is the same outcome as the illustration, showing that futures fix the outcome.

Activity 3: Technique demonstration

Step 1: On 1 December

Put options are required as Altrak is borrowing.

Number of contracts:

$$= \$5\text{m loan} \div \$0.5\text{m contract size} \times \frac{6 \text{ (term of loan)}}{3 \text{ (standard term of future)}} = \textbf{20 contracts}$$

Date: as for futures, cover is required until the loan begins.

Altrak should enter into 20 March put options (to sell) at 5.45%.

A premium of 0.245% is paid.

Step 2: 1 March

Complete the actual loan: Altrak will borrow at LIBOR + 1% so this is 4.5 + 1 = 5.5%

Step 3: 1 March

Forecasting the futures price on 1 March (as for interest rate futures)

	Now to 1 Dec		*1 March*
March future	5.35		
LIBOR	5.25		
Basis	0.10	× 1/4 =	0.03
	4 months of time until end of future		1 month remaining

The March future rate is forecast to be 0.03% above LIBOR on 1 March, so if LIBOR is 4.5% the future price should be 4.5 + 0.03 = **4.53%**

Close out the options by doing the opposite of what you did in Step 1 (if a profit is made).

1 Dec put options to pay interest at 5.45%

1 March contract to buy receive interest at 4.53%

Difference would generate a loss so the option is NOT exercised.

Calculate net outcome.

As a percentage this is 0.245% (Step 1) + 5.5% (Step 2) = 5.745%

In $s this is 0.05745 × $5 million × 6 months (term of loan) ÷ 12 months (interest rates are in annual terms) = $143,625.

This is a better outcome than the FRA or the future in Illustrations 1 and 2, showing that the worst case scenario is that the option is exercised but if it is not then there will be a better outcome because interest rates have moved in a company's favour.

Activity 4: Technique demonstration

Step 1: On 1 December

Put options are required as Altrak is borrowing.

Number of contracts: as before = **20 contracts**

Date: as before, March.

Altrak should enter into 20 March put options (to sell) at 5.45% **and sell 20 March call options at 5.25%**.

A net premium of 0.245% **– 0.008%** = 0.237% is paid.

Step 2: 1 March

Complete the actual loan: Altrak will borrow at LIBOR + 1% so this is 4.5 + 1 = 5.5%

Step 3: 1 March

As before, the March future rate is forecast to be 0.03% above LIBOR on 1 March, so if LIBOR is 4.5% the future price should be 4.5 + 0.03 = **4.53%**

Close out the options by doing the opposite of what you did in Step 1 (if a profit is made).

Put options are not valuable because interest rates have fallen.

The holder of call option will make profits if interest rates fall and Altrak will have to pay this to the holder of the call option.

1 Dec call options to receive interest at	5.25%
1 March contract to pay interest at	4.53%
Difference	0.72%

Calculate net outcome.

As a percentage this is 0.237% (Step 1) + 5.5% (Step 2) + 0.72% (Step 3) = 6.457%

Activity 5: Swap example

Step 1 – assess potential for gain from swap

	Company A	Company B	Difference
Fixed	8%	7%	1% Company B cheaper
Variable	LIBOR + 1.00%	LIBOR – 1%	2% Company B cheaper
			Difference of differences = 2% – 1% = 1%

Here no swap has been suggested.

If a swap uses company B's comparative advantage in variable rate finance then a gain of 1.0% (before fees) is available.

This means company B will need to borrow at a variable rate and swap to fixed.

Company A will therefore swap from fixed to variable.

0.1% fees are charged to both companies so this gain will be 0.8% after fees, split 50:50 ie 0.8% x 0.5 = 0.40% each.

Step 2 – swap, variable rate at LIBOR, designed to splitting gain 50:50

Position if no swap	LIBOR + 1%		7%
	Company A		**Company B**
Actual loan	8%		LIBOR – 1%
Fees	0.1%		0.1%
Swap: variable	LIBOR	→	(LIBOR)
Swap: fixed*	(7.5%)	←	7.5%
	LIBOR + 0.6%		6.6%
	0.4%	gain vs no swap	0.4% gain

* the fixed rate is a balancing figure designed to give the required gain to each party.

Activity 6: Swap valuation

The swap will be designed so that the bank makes a reasonable return; the bank will expect to at least make an NPV of 0 from the deal.

The bank's expected payments (receipts to the company) at a variable rate are estimated, using the FRA rates as:

	One year	*Two years*	*Three years*
FRA	3.00%	5.21%	6.52%
FRA – 0.5%	2.50%	4.71%	6.02%
In $m	$2.50m	$4.71m	$6.02m

The bank's expected receipts (payments by the company) at a fixed rate = R

The bank's net cash flows will be

	One year	*Two years*	*Three years*
In $m	R – $2.5m	R – $4.71m	R – $6.02m

These are discounted at the spot yield rates of 3% for one year, 4.1% for two years and 4.9% for three years:

Time	*1*	*2*	*3*	*Total NPV*
Net cash flows	R – 2.5	R – 4.71	R – 6.02	
Df 3%	0.971			
Df 4.1%		0.923		
Df 4.9%			0.866	
Total	0.971R – 2.428	0.923R – 4.347	0.866R – 5.213	2.76R – 11.988

For the NPV to be zero then 2.76R = 11.988 so R = $4.343m per year.

As a percentage this is 4.343/100 = 4.343%.

Although at the start of the swap the present value of the swap is zero, the value of the swap will change as rates fluctuate.

Activity 7: Technique demonstration

Workings

(a)

Time (in six-month periods)	*1*	*2*	*3*	*4*
Annual interest rate	3.25%	3.45%	3.50%	3.52%
In terms of six-month periods	1.625%	1.725%	1.750%	1.760%
Time (in six-month periods)	*1*	*2*	*3*	*4*
Cash flow in €'000 (2.5% every six months)	220	220	220	220
Proposed swap rate	1.2032	1.2032	1.2032	1.2032
£ cash paid (cash outflow)	182.846	182.846	182.846	182.846
Forward rate	1.201	1.203	1.205	1.206
£ equivalent of euro receipts (cash inflow)	183.181	182.876	182.573	182.421
Net gain/loss	0.335	0.030	–0.273	–0.425
Discount rate **(see workings above)**	0.984	0.966	0.949	0.933
Present value	0.330	0.029	–0.259	–0.396
Total	**–0.296**	in £s		
	the swap is not acceptable on these terms			

(b)

Time (in six-month periods)	*1*	*2*	*3*	*4*
Cash flow in €'000 (2.5% every six months)	220	220	220	220
Forward rate	1.201	1.203	1.205	1.206
£ equivalent	183.181	182.876	182.573	182.421
Discount rate	0.984	0.966	0.949	0.933
Present value	180.252	176.726	173.313	170.125
Total	700.416	in £s		
Cumulative discount factor	3.832	(addition of the discount factors given)		
Annuity	182.768	in £s		

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Swap proposed

Time (in six-month periods)	*1*	*2*	*3*	*4*
Cash flow in €'000	220	220	220	220
Cash flow in £'000	182.768	182.768	182.768	182.768

ie swap rate = **1.2037** (220/182.768)

Chapter 14 Financial reconstruction

Activity 1: Evaluating a reconstruction

Step 1: Estimate the position if insolvency proceedings go ahead

Break-up values of assets at 31 March 20X2

	$'000
Freehold	5,750
Insolvency costs	(500)
10% loan (fixed charge)	(1,600)
	3,650
Plant and machinery	2,000
Motor vehicles	200
Current assets	1,000
	6,850
Secured creditors (floating charges)	(4,800)
	2,050
Trade payables and overdraft	4,300

If the company was forced into insolvency, the secured loan and other loans would be met in full but, after allowing for the expenses of insolvency proceedings, the bank and trade creditors would receive a dividend of 48c per $. The ordinary shareholders would receive nothing.

Step 2: Apply the reconstruction and evaluate the impact on affected parties

1 **Secured loan**

Under the scheme they will receive securities with a total nominal value of $2,150,000 ($1.25m bond + $0.9m shares being 600,000 shares at $1.5); this is a significant increase. The new bonds issued can be secured on the freehold property. So, this may well be acceptable but it depends on whether they agree with the share valuation and whether the increase in wealth compensates for the greater risk (less security).

2 **VC**

VC's existing loan of $4.8m will, under the proposed scheme, be changed into a $3.2m secured loan and $1.65m of ordinary shares (1.1m shares at $1.50). In total this gives total loans of $4,450,000 (including the bond) secured on property with a net disposal value of $5,750,000 (so the security given by the property comfortably covers the full value of the debt that is secured on the property). The scheme will give an improvement in security for VC on the first $3,200,000 to compensate for the risk involved in holding ordinary shares. This is a marginal gain for a position that exposes the bank to high levels of risk.

3 **MA bank**

This should be acceptable because of the security of a floating charge.

4 **Ordinary shareholders**

In insolvency proceedings, the ordinary shareholders would also receive nothing. Under the scheme, they will lose a degree of control of the company because 3.7m shares will be in issue (2m for existing shareholders + 0.6m for secured loan holder + 1.1m for VC bank) and they will only own 2m of these, ie 54% of the total. However, in exchange for their additional investment, equity in a company which will have sufficient funds to finance the expected future capital requirements and which will offer a capital gain compared to their initial investment of $1.

Step 3: Check if the company is now financially viable

Cash flow forecast, on reconstruction

	$'000
Cash for new shares from equity shareholders	2,000
Repayment of overdraft	1,200
Cash available	800

A cash flow forecast will be required to establish whether this is a sufficient cash base for the company post-reconstruction.

Conclusion

This scheme of reconstruction might not be acceptable to all parties, if the future profits of the company seem unattractive. In particular, VC might be reluctant to agree to the scheme.

In such an event, an alternative scheme of reconstruction must be designed, perhaps involving another provider of funds (such as another venture capitalist). Otherwise, the company will be forced into insolvency.

Chapter 15 Business reorganisation

Activity 1: Financing issues

Gearing at period end

Assuming no dividend is paid and ignoring the possible issue of new shares, the gearing at the end of two years is predicted to be 138%, which is significantly below the target of 200% needed to meet the condition on the bank's loan.

If conversion rights are then exercised, new share capital will be raised, reducing the gearing still further.

Cash flow

It is assumed that cash generated from operations is sufficient to repay the bank loan each year, which is by no means obvious from the figures provided.

Conclusion

As long as there is sufficient cash to finance the loan repayments, there will probably not be a problem in meeting the loan conditions.

APPENDIX

1 **Forecast statements of profit or loss**

	Year 1	*Year 2*
	$'000	$'000
Revenue	35,594	37,374
Operating costs	19,686	20,670
Direct operating profit growing at 5% p.a.	15,908	16,704
Central services from Lomax	(4,500)	(4,725)
VC loan interest at 18% on $15m	(2,700)	(2,700)
Bank loan at 8% (interest only)		
Year 1	(2,400)	
Year 2		(1,661)
Profit before tax	6,308	7,618
Tax at 20%	1,262	1,524
Profit after tax	5,046	6,094
Retained earnings	5,046	6,094

2 **Forecast levels of debt and equity**

Reserves b/f	0	5,046
Reserves c/f	5,046	11,140
Share capital + closing reserves	12,546	18,640
Total debt at end of year (see workings)	35,759	25,779
Gearing: debt/equity	285%	138%

Working

Using the profile of debt repayments provided we can calculate the debt outstanding at the end of each year.

	Year 1	*Year 2*
Loan carried forward (see above)	20,759	10,779
VC loan	15,000	15,000
Total debt	**35,759**	**25,779**

Chapter 16 Planning and trading issues for multinationals

Activity 1: Idea generation

A single market area like the EU aims to remove barriers to trade and allow **freedom of movement** of production resources such as capital and labour within the EU. The EU also has a **common legal structure** across all member countries and tries to **limit any discriminatory practice** against companies operating in these countries.

The EU also erects **common external trade barriers** to trade against countries which are not member states.

Degli Co may benefit from operating within the EU because it may be protected from non-EU competition – companies outside the EU may find it **difficult to enter the EU** markets due to barriers to trade.

A common legal structure should ensure that manufacturing standards apply equally across all the member countries. This will **reduce compliance costs** for Degli, which may be an important issue for a small company with limited financial resources.

Having access to capital and labour within the EU may make it easier for the company to set up and attract resources (eg labour) from within the EU.

The company may also be able to access any grants which are available to companies based within the EU and will be able to bid for contracts with EU companies without any risk of discrimination.

Activity 2: Tax issues

Profits before tax of foreign subsidiary	$3.00m
Tax on profits paid in Country F 20%	($0.60m)
Profits after tax	$2.40m
Dividend paid 75%	**$1.80m**
Withholding tax 10% on $1.80m	**($0.18m)**
Extra tax on profits 4% on $3.00m profit (**before tax**)	**($0.12m)**
Net cash received	**$1.50m**

This is the required adjustment so the new dividend capacity is $14m + $1.5m = $15.5m

Financial strategy: formulation

1

Essential reading

1 Financial strategy: formulation

1 Dividend policy

This section covers brought forward knowledge, from the Financial Management (FM) exam.

1.1 General factors affecting dividend policy

When deciding on the dividends to pay out to shareholders, one of the main considerations of the directors will be the amount of cash they wish to retain to meet financing needs.

As well as future financing requirements, the decision on how much of a company's profits should be retained, and how much paid out to shareholders, will be influenced by:

(a) The need to remain profitable. Dividends are paid out of profits, and an unprofitable company cannot go on indefinitely paying dividends out of retained profits made in the past.

(b) The law on distributable profits. Companies legislation may make companies bound to pay dividends solely out of accumulated net realised profits, as in the UK.

(c) The government may impose direct restrictions on the amount of dividends that companies can pay.

(d) Any dividend restraints that might be imposed by loan agreements and covenants. A loan covenant may restrict the amount of dividends that the company can pay, because this will provide protection for the lender.

(e) The effect of inflation. There is also the need to retain some profit within the business just to maintain its operating capability.

(f) The company's gearing level. If the company wants extra finance, the sources of funds used should strike a balance between equity and debt finance.

(g) The company's liquidity position. Dividends are a cash payment, and a company must have enough cash to pay the dividends it declares.

(h) The need to repay debt in the near future. The company must have enough cash to pay debts as they fall due.

(i) The ease with which the company could raise extra finance from sources other than retained cash. Small companies which find it hard to raise finance might have to rely more heavily on retained cash than large companies.

(j) The signalling effect of dividends to shareholders and the financial markets in general. See below for more details.

1.2 Dividend as a signal

The ultimate objective in any financial management decisions is to maximise shareholders' wealth. This wealth is basically represented by the current market value of the company, which should largely be determined by the cash flows arising from the investment decisions taken by management.

Although the market would like to value shares on the basis of underlying cash flows on the company's projects, such information is not readily available to investors. However, the directors do have this information. The dividend declared can be interpreted as a signal from directors to shareholders about the strength of underlying project cash flows.

Investors usually expect a consistent dividend policy from the company, with stable dividends each year or, even better, steady dividend growth. A large rise or fall in dividends in any year can have a marked effect on the company's share price. Stable dividends or steady dividend growth are usually needed for share price stability. A cut in dividends may be treated by investors as signalling that the

future prospects of the company are weak. Thus the dividend which is paid acts, possibly without justification, as a signal of the future prospects of the company.

The signalling effect of a company's dividend policy may also be used by management of a company which faces a possible takeover. The dividend level might be increased as a defence against the takeover: investors may take the increased dividend as a signal of improved future prospects, thus driving the share price higher and making the company more expensive for a potential bidder to take over.

1.3 Theories of dividend policy

1.3.1 Residual theory

A 'residual' theory of dividend policy can be summarised as follows.

- If a company can identify projects with positive NPVs, it should invest in them.
- Only when these investment opportunities are exhausted should dividends be paid.

Dividends should therefore be the amount of after-tax profits left over (the 'residual' amount) after setting aside money to invest in all viable business opportunities.

1.3.2 Irrelevancy theory

In contrast to the traditional view, Modigliani and Miller (M&M) proposed that in a perfect capital market, shareholders are indifferent between dividends and capital gains, and the value of a company is determined solely by the 'earning power' of its assets and investments (quoted in: Watson and Head, 2013, p.320).

M&M argued that if a company with investment opportunities decides to pay a dividend so that retained cash are insufficient to finance all its investments, the shortfall in funds will be made up by obtaining additional funds from outside sources.

As a result of obtaining outside finance instead of using retained cash:

Loss of value in existing shares = Amount of dividend paid

M&M argued that if a company with investment opportunities decided not to pay a dividend, then the share price would rise due to the investments being financed but shareholders would not receive a cash dividend. Again this leaves shareholders' wealth unchanged (and shareholders who wanted a dividend could 'manufacture' one by selling some of their shares).

In answer to criticisms that certain shareholders will show a preference either for high dividends or for capital gains, M&M argued that if a company pursues a consistent dividend policy, 'each corporation would tend to attract to itself a clientele consisting of those preferring its particular payout ratio, but one clientele would be entirely as good as another in terms of the valuation it would imply for the firm' (quoted in: Watson and Head, 2013, p.320).

Note that M&M's view assumes that there are no transaction costs incurred when selling shares.

1.3.3 Argument against irrelevancy theory

There are strong arguments against M&M's view that dividend policy is irrelevant as a means of affecting shareholders' wealth.

(a) M&M's view assumes that there is no personal or corporation tax. However, differing rates of taxation on dividends and capital gains can create a preference among investors for either a high dividend or high earnings retention (for capital growth).

(b) Dividend retention will often be preferred by companies in a period of capital rationing.

(c) Due to imperfect markets and the possible difficulties of selling shares easily at a fair price, shareholders might need high dividends in order to have funds to invest in opportunities outside the company.

(d) Markets are not perfect. Because of transaction costs on the sale of shares, investors who want some cash from their investments will prefer to receive dividends rather than to sell some of their shares to get the cash they want.

(e) Information available to shareholders is imperfect, and they are not aware of the future investment plans and expected profits of their company. Even if management were to provide them with profit forecasts, these forecasts would not necessarily be accurate or believable.

(f) Perhaps the strongest argument against the M&M's view is that shareholders will tend to prefer a current dividend to future capital gains (or deferred dividends) because the future is more uncertain.

2 Examples of ethical issues in different business functions

2.1 Human resource management

Employees in a modern corporation are not simply a factor of production which is used in a production process. Employees as human beings have feelings and are entitled to be treated by their employers with respect and dignity. In most advanced countries there are employment laws that determine the rights of employees and provide protection against abuse by of their employers.

Ethical problems arise when there is a conflict between the financial objectives of the firm and the rights of the employees. These ethical problems arise, for example, in relation to minimum wages and discrimination.

2.1.1 Minimum wage

Companies are obliged to pay their employees at least the legal minimum wage. However, when multinational companies operate in countries where there are no minimum wage requirements, then the companies may try to take advantage of the lack of protection and offer low wages. Business ethics would require that companies should not exploit workers and pay lower than the warranted wages.

2.1.2 Discrimination

Discrimination on the basis of sexual orientation, race, religion, gender, age, marital status, disability or nationality is prohibited in most advanced economies, through equal opportunity legislation.

2.2 Marketing

Marketing decisions by the firm are also very important in terms of the impact on firm performance. Marketing is one of the main ways of communicating with its customers and this communication should be truthful and sensitive to the social and cultural impact on society. The marketing strategy should not target vulnerable groups, and should also avoid creating stereotypes or creating insecurity and dissatisfaction.

2.3 Treatment of customers and suppliers

Companies should not take advantage of their dominant position in the market to exploit suppliers or customers.

For example, companies which are dominant in the product market and enjoy monopolistic power may charge a price which will result in abnormally high profits. For example, a water company may charge high prices for water in order to increase its profits because the remuneration of managers may be linked to profitability. For example, in many developing countries multinational companies are the only buyers of raw materials and they determine the price they pay to their suppliers.

3 Mechanisms for resolving agency issues

3.1 Reward systems

Agency theory sees employees of businesses, including managers, as individuals, each with their own objectives. Within a department of a business, there are departmental objectives. If achieving these various objectives also leads to the achievement of the objectives of the organisation as a whole, there is said to be goal congruence.

Goal congruence is accordance between the objectives of agents acting within an organisation and the objectives of the organisation as a whole.

Goal congruence may be better achieved and the 'agency problem' better dealt with by giving managers some profit-related pay, or by providing incentives which are related to profits or share price. Examples of such remuneration incentives are:

(a) Profit-related/economic value added pay

This is pay or bonuses related to the size of profits or economic value added.

(b) Rewarding managers with shares

This might be done when a private company 'goes public' and managers are invited to subscribe for shares in the company at an attractive offer price. In a management buy-out or buy-in (the latter involving purchase of the business by new managers; the former by existing managers), managers become owner-managers.

(c) Executive share option plans

In a share option scheme, selected employees are given a number of share options, each of which gives the holder the right after a certain date to subscribe for shares in the company at a fixed price. The value of an option will increase if the company is successful and its share price goes up. However, once the share price has fallen below the exercise price, there is **no further penalty** if the share price continues to fall. This means that share option schemes can skew decision making towards **risky projects** which have both a high upside and downside potential.

Discussion of managerial priorities may be part of a longer question in the exam. The integrated approach to the syllabus means that a question on the effect of the introduction of a share option scheme on management motivation may be examined as part of a question on general option theory.

Reward systems may be extended to reward management for considering the interests of other key stakeholders such as suppliers, staff or customers. This will require the measurement of a range of social and environmental measures (see Section 4).

3.2 Corporate governance

By ensuring that not too much power resides with a single individual within an organisation, an organisation can reduce the risk of powerful stakeholders pursuing their own agendas. The role of the chairman and the chief executive, for example, should be split.

Another approach to attempt to monitor managers' behaviour is through the adoption of a corporate governance framework of decision making that restricts the power of managers and increases the role of independent non-executive directors in the monitoring of their duties.

4 Integrated reporting

4.1 Content of integrated reports

In addition to reporting on the 'capitals', an integrated report will normally include:

(a) Organisational overview and external environment

(b) How the governance structure supports value creation

(c) Business model

(d) Opportunities and risks that affect ability to create value over the short, medium and long term and how the organisation is dealing with them

(e) Strategy and resource allocation – where the organisation intends to go and how it intends to get there

(f) Performance – the extent to which the organisation has achieved its strategic objectives and what the outcomes are in terms of effects on capitals

(g) Outlook – what challenges and uncertainties the organisation is likely to encounter in pursuing its strategy and the potential implications for its business model and future performance

(h) Basis of preparation and presentation – how the organisation determines which matters to include in the integrated report and how such matters are quantified or evaluated

4.2 Communicating with stakeholders

4.2.1 Communicating with shareholders

Integrated reporting aims to emphasise the importance of value **creation**, with the aim of producing guidance that will assist investors' decisions. A key selling point of integrated reporting is that it provides a higher quality of information for investors. This should enable them to make more informed decisions and ensure a better allocation of capital across the whole economy, towards sustainable businesses that focus on longer-term value creation within natural limits and the expectations of society.

4.2.2 Communicating with other stakeholders

Integrated reporting also stresses the importance of responding to key stakeholders' legitimate needs and interests.

Above all, integrated reporting should promote engagement with stakeholders that goes beyond the provision of information. It should encourage businesses to focus on enhancing the mechanisms for stakeholder feedback, which may identify issues that have not been considered as important previously, but are concerns that should have an impact on strategy.

4.3 CSR reporting; the triple bottom line approach

The triple bottom approach to reporting on corporate social responsibility (CSR) involves consideration of social, economic and environmental factors.

Under the triple bottom line (TBL) approach decision making should ensure that each perspective is growing but not at the expense of the other. That is, economic performance should not come at the expense of the environment or society.

The TBL can be defined conceptually as **economic prosperity**, **environmental quality** and **social justice**.

Many companies, thinking it is just a matter of **pollution control**, are missing the bigger picture that meeting the needs of the current generation will destroy the ability of future generations to meet theirs.

4.3.1 Advantages of TBL reporting

- **Better risk management and higher ethical standards** through:
  - Identifying stakeholder concerns
  - Employee involvement
  - Good governance
  - Performance monitoring
- **Improved decision making** through:
  - Stakeholder consultation
  - Better information gathering
  - Better reporting processes
- **Attracting and retaining higher calibre employees** through practising **sustainability** and **ethical values**

4.3.2 TBL measures

TBL reporting requires proxies to indicate the economic, environmental and social impact of doing business. Examples of useful proxies are given below.

An indication of **economic impact** can be gained from such items as:

(a) Gross operating surplus
(b) Dependence on imports
(c) Stimulus to the domestic economy by purchasing of locally produced goods and services

An indication of **social impact** can be gained from, for example:

(a) The organisation's tax contribution
(b) Employment

An indication of **environmental impact** can be gained from such measures as:

(a) Pollution
(b) Water and energy use

Such indicators can distil complex information into a form that is accessible to stakeholders. Organisations report on indicators that reflect their objectives and are relevant to stakeholders. One difficulty in identifying and using indicators is to ensure consistency within an organisation, over time, and between organisations. This is important for benchmarking and comparisons.

4.4 Communication with shareholders

Communication with shareholders will often extend beyond reporting. In addition it may also be useful for a 'lead' non-executive director to provide a facility for shareholders to report any concerns over a company's strategy or leadership. This creates a mechanism for generating useful feedback for a company (instead of waiting for the AGM to hear the concerns of disaffected shareholders).

Financial strategy: evaluation

2

Essential reading

2 Financial strategy: evaluation

1 Cost of equity

This section mainly recaps some basic knowledge from the Financial Management exam.

1.1 Cost of equity using the dividend growth model

The dividend growth method is based on a particular assumption about the growth rate of dividends of a company. For example, if we were to assume a constant rate of growth for dividends at the rate of g per annum, the shareholders' required rate of return is r_e per annum, and the next period's dividend payment is d_0 (1 + g) then the market value of the share will be:

$$P_0 = \frac{d_0(1 + g)}{r_e - g}$$

where P_0 = the ex-div market value of the share

d_o = latest dividend

r_e = the investors' required rate of return (ie K_e)

g = the expected annual growth rate of the dividends

This formula is given on the formula sheet.

The formula can be rearranged as follows: $k_e - g = \frac{d_0(1 + g)}{P_0}$

to solve this for the cost of equity

$$k_e = \frac{d_0(1+g)}{P_0} + g$$

where d_0 = the current dividend

P_0 = the market value determined by the investor

g = the expected annual growth rate of the dividends

Illustration 1

A company is about to pay a dividend of $1 on its ordinary shares. The shares are currently quoted at $23.00. The dividend is expected to grow at the rate of 10% per annum. Calculate the cost of equity for the company.

Solution

Since we are about to pay the dividend, we will assume that the share is currently cum div (ie the price includes the value of the dividend that is about to be paid). Hence, since we need the ex-div value (it is the ex-div value that is used in the formula), we must use the expression:

$P_{0ex\text{-}div} = P_{0cum\text{-}div} - d_0$

to calculate the ex-div price as

$P_{0ex\text{-}div}$ = $23.00 – $1.00 = $22.00

Then using the above formula for the cost of equity, we get

$$k_e = \frac{d_0(1+g)}{P_0} + g$$

$$k_e = \frac{\$1 \times 1.1}{\$22.00} + 0.1$$

$$k_e = \frac{1.10}{\$22.00} + 0.1$$

$k_e = 0.05 + 0.1 = 0.15$ or 15% per annum

1.1.1 Estimating the growth rate

There are two methods for estimating the growth rate that you need to be familiar with.

Firstly, the future growth rate can be predicted from an **analysis of the growth in dividends** over the past few years using the formula

$$1 + g = \sqrt[n]{\frac{\text{newest dividend}}{\text{oldest dividend}}}$$

[this will be illustrated in Chapter 8 in the context of the dividend valuation model]

Alternatively, the growth rate can be estimated using **Gordon's growth approximation**. The **rate of growth in dividends** is sometimes expressed, theoretically, as:

$g = br_e$

where g is the annual growth rate in dividends
b is the proportion of profits that are retained
r_e is the rate of return to shareholders on new investments

Illustration 2

If a company retains 65% of its earnings for capital investment projects it has identified and these projects are expected to generate an average return of 8%:

$g = br_e = 65\% \times 8 = 5.2\%$

1.2 CAPM – further issues

1.2.1 Beta factors of portfolios

Just as an individual security has a beta factor, so too does a portfolio of securities.

(a) A portfolio consisting of all the **securities** on the **stock market** (in the same proportions as the market as a whole), excluding risk-free securities, will have a risk equal to the risk of the market as a whole, and so will have a **beta factor of 1**.

(b) A portfolio consisting entirely of **risk-free securities** will have a beta factor of **0**.

(c) The beta factor of an investor's portfolio is the **weighted average** (using market values as the weighting) of the **beta factors** of the securities in the **portfolio**.

Illustration 3

A portfolio consisting of five securities could have its beta factor computed as follows.

Security	*Percentage of portfolio* %	*Beta factor of security*	*Weighted beta factor*
A Inc	20	0.90	0.180
B Inc	10	1.25	0.125
C Inc	15	1.10	0.165
D Inc	20	1.15	0.230
E Inc	35	0.70	0.245
	100	Portfolio beta =	0.945

If the risk free rate of return is 12% and the average market return is 20%, the required return from the portfolio using the CAPM equation would be 12% + (20 – 12) × 0.945% = 19.56%.

The calculation could have been made as follows.

Security	*Beta factor*	*Expected return (using CAPM)* $E(r_j)$	*Weighting* %	*Weighted return* %
A Inc	0.90	19.2	20	3.84
B Inc	1.25	22.0	10	2.20
C Inc	1.10	20.8	15	3.12
D Inc	1.15	21.2	20	4.24
E Inc	0.70	17.6	35	6.16
			100	19.56

1.2.2 CAPM and portfolio management

Practical implications of CAPM theory for an investor are as follows.

(a) They should decide what **beta factor** they would **like to have** for their portfolio. They might prefer a portfolio beta factor of greater than 1, in order to expect above-average returns when market returns exceed the risk-free rate, but they would then expect to lose heavily if market returns fall. On the other hand, they might prefer a portfolio beta factor of 1 or even less.

(b) They should seek to invest in shares with **low beta factors** in a **bear market**, when average market returns are falling. They should then also sell shares with high beta factors.

(c) They should seek to invest in shares with **high beta factors** in a **bull market**, when average market returns are rising.

1.2.3 International CAPM

The possibility of international portfolio diversification increases the opportunities available to investors.

Significant international diversification can be achieved by the following methods:

- Direct investment in companies in different countries
- Investments in multinational enterprises
- Holdings in unit trusts or investment trusts which are diversified internationally

The international picture may be complicated by market segmentation. Segmentation is usually caused by government-imposed restrictions on the movement of capital, leading to restricted capital availability within a country or other geographical segment. Therefore:

- Returns on the same security may differ in different markets.
- Some investments may only be available in certain markets.

2 Cost of debt: brought forward knowledge

This section recaps some basic knowledge from the Financial Management exam.

2.1 Cost of redeemable debt using IRR

If debt is **redeemable**, the cost of raising the bond can be assessed by looking at the IRR of the cash flows relating to the bond. It is easiest to assess one unit of $100 debt (or £100, €100 etc).

IRR is used in project appraisal to calculate the % return given by a project. You may find it helpful to lay out the cash flows so that they look like a project:

Time	$
0	(Market value)
1 – n	Interest × [1 – tax]
n	Redemption value

Step 1 Calculate the NPV of the cash flows, at say 5%

Step 2 Calculate the NPV of the cash flows at another rate, say 10%

Step 3 Calculate the internal rate of return using the formula

IRR formula

Formula to learn

$$IRR = a + \frac{NPV_a}{NPV_a - NPV_b}(b - a)$$ **(not given in the exam)**

a = lower cost of capital
b = higher cost of capital
NPV_a = NPV at the lower cost of capital
NPV_b = NPV at the higher cost of capital

Illustration 4

N Co has $100,000 5% redeemable bonds in issue. Interest is paid annually on 31 December. The ex interest market value of the stock on 1 January 20X7 is $90 and the stock is redeemable at a 10% premium on 31 December 20Y1. Corporation tax is 30%.

Required

What is the cost of debt?

Solution

Internal rate of return to company

Time		*DF @ 10%*	*PV*	*DF @ 5%*	*PV*
	$		$		$
0	(90)	1	(90)	1	(90)
1–5	5(1–0.3)	3.791	13.27	4.329	15.15
5	110	0.621	68.31	0.784	86.24
			(8.42)		11.39

IRR = 5 + (11.39/19.81 × 5) = 7.87%

If **issue costs** are given, these reduce the net proceeds from the sale of a bond and so they need to be subtracted from the market value of the debt in the calculations above.

Note. To calculate the expected **yield** (or return) from a bond the same IRR calculations need to be performed but excluding the impact of corporation tax.

2.2 Cost of convertible debt using IRR

Convertible bonds example

IOU $100

Pay interest of **2%**
Repay $100 in
10 years' time **or**
xx shares

- A hybrid of debt and equity
- **Cheaper interest** costs
- **Fewer covenants**
- Attractive if shares are underpriced

We have seen that the cost of a bond can be estimated by calculating the IRR of the return of its cash flows; this approach is adapted for convertibles to take into account the impact of the potential cost of conversion into shares.

Illustration 5

If the conversion ratio was $100 for 20 shares (ie effectively each share costs $5) and the share price at the redemption date was $4, conversion would not happen and the calculations for the cost of debt would be unchanged. However, if the share price was $6 then the calculations would change to the IRR of:

Time

0 (Market value)

1 – n Interest × [1 – tax]

n **Value of the shares** (here $120)

2.3 Cost of debt using CAPM

If an exam question gives you a **debt beta**, then the cost of debt can be estimated using the CAPM.

Illustration 6

Required

If the market return is expected to be 8% and the risk-free rate is 4% on debt which has a debt beta of 0.2, what is the cost of debt to the company if the tax rate is 30%?

Solution

$r_D = 4 + (0.2 \times (8 - 4)) = 4.8\%$

Multiply by (1–tax rate) to calculate the cost to the company = $(1 - 0.3) \times 4.8\% = 3.4\%$

2.4 Cost of preference shares

The preference shareholder will receive a fixed income, based upon the nominal value of the shares held (not the market value). These dividends are paid out of post-tax profits and therefore **do not** receive tax relief. The cost of preference share capital is calculated as:

Formula to learn

$$K_{pref} = \frac{\text{Dividend}}{\text{Market value}_{(ex\ div)}} = \frac{d}{P_0}$$

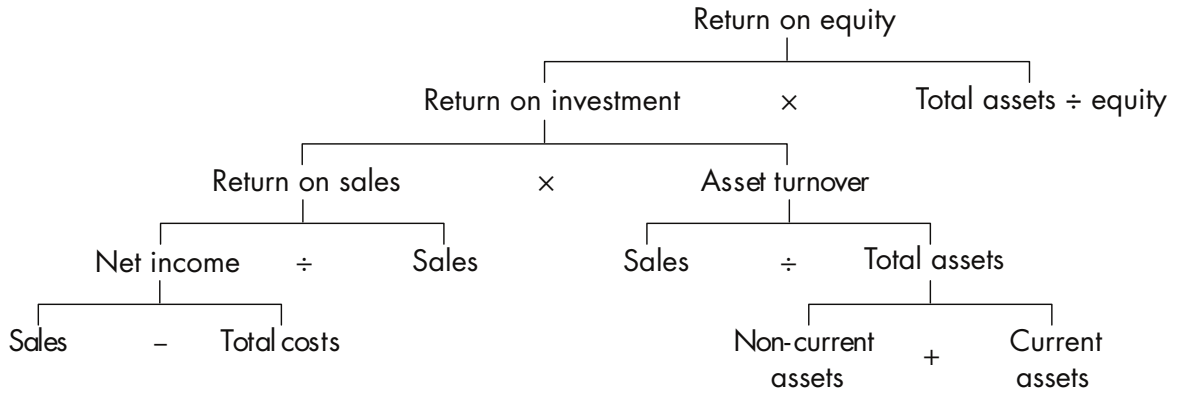
3 Ratio analysis

The assessment of your own company's, or someone else's, corporate performance is an important foundation for the formulation of financial strategy. Knowledge of company performance will help management to determine new strategies or amend existing strategies to take account of changing circumstances.

You should already be familiar with ratio analysis from Financial Management (FM). However, as a reminder, the main ratios are listed below.

Note. None of these ratios are given in the exam so you will have to learn them.

Hierarchy of ratios



Profitability ratios

Formula to learn

$$\text{Return on capital employed (ROCE)} = \frac{\text{PBIT}}{\text{Capital employed}}$$

Capital employed = Shareholders' funds **plus** payables: amounts falling due after more than one year **plus** any long-term provisions for liabilities and charges

= Total assets less current liabilities

When **interpreting** ROCE look for the following:

- How risky is the business?
- How capital intensive is it?
- What ROCE do similar businesses have?
- How does it compare with current market borrowing rates; is it earning enough to be able to cover the costs of extra borrowing?

Problems: which items to consider to achieve comparability:

- Revaluation of assets
- Accounting policies, eg goodwill, R&D
- Whether bank overdraft is classified as a short-/long-term liability

$$\text{Return on equity} = \frac{\text{Earnings attributable to ordinary shareholders}}{\text{Shareholders'equity}}$$

This gives a more **shareholder centric view** of capital than ROCE, but the same principles apply.

$$\textbf{Asset turnover} = \frac{\text{Sales}}{\text{Capital employed}}$$

This measures how efficiently the assets have been used.

$$\text{Operating profit margin} = \frac{\text{PBIT}}{\text{Sales}}\ \% \qquad \text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Sales}}\ \%$$

It is useful to compare profit margin to gross profit % to investigate movements which do not match.

Gross profit margin

This shows the impact of:

- Sales prices, sales volume and sales mix
- Purchase prices and related costs (discount, carriage etc)
- Production costs, both direct (materials, labour) and indirect (overheads both fixed and variable)
- Inventory levels and valuation, including errors, cut-off and costs of running out of goods

Operating profit margin

This shows the impact of:

- Sales expenses in relation to sales levels
- Administrative expenses, including salary levels
- Distribution expenses in relation to sales levels

Liquidity ratios

$$\textbf{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

What constitutes an acceptable level depends on the industry. Remember that excessively large levels can indicate excessive receivables and inventories, and poor control of working capital.

Quick ratio (acid test) = $\frac{\text{Current assets} - \text{inventory}}{\text{Current liabilities}}$

Eliminates illiquid and subjectively valued inventory. Again what is acceptable depends on the industry, many supermarkets have a very low quick simply because, customers pay immediately and inventory turnover is very fast.

Receivables collection period (receivables days) = $\frac{\text{Trade receivables}}{\text{Credit sales}} \times 365$

An increase may indicate that customers are having liquidity problems.

Inventory days = $\frac{\text{Inventory}}{\text{Cost of sales}} \times 365$

Note that cost of sales excludes depreciation of any production equipment.

Generally the quicker the turnover the better. But remember:

- Lead times
- Seasonal fluctuations in orders
- Alternative uses of warehouse space
- Bulk buying discounts
- Likelihood of inventory perishing or becoming obsolete

Payables payment period = $\frac{\text{Trade payables}}{\text{Purchases}} \times 365$

Use **cost of sales (excluding depreciation)** if purchases are not disclosed.

Cash operating cycle

= Average time raw materials are in inventory

– Period of credit taken from suppliers

+ Time taken to produce goods

+ Time taken by customers to pay for goods

Reasons for changes in liquidity

- Credit control efficiency altered
- Altering payment period of suppliers as a source of funding
- Reducing inventory holdings to maintain liquidity

Shareholders' investment ratios (stock market ratios)

Total shareholder return (TSR) = $\frac{\text{Dividend per share + capital gain (or loss)}}{\text{Share price at the start of the year}} \times 100$

TSR measures the actual return generated by a company, this can be compared to the expected return (ie the cost of equity) to evaluate whether TSR is acceptable to shareholders.

Dividend yield = $\frac{\text{Dividend per share}}{\text{Market price per share}}$ %

- **Low yield**: The company retains a large proportion of profits to reinvest
- **High yield**: This is a risky company or slow-growing (a low share price can explain high dividend yield)

Earnings per share (EPS) = $\frac{\text{Profits distributable to ordinary shareholders}}{\text{Number of ordinary shares issued}}$

Investors look for growth; earnings levels need to be sustained to pay dividends and invest in the business.

$$\textbf{Dividend cover} = \frac{\text{EPS}}{\text{Dividend per share}}$$

This shows how easy it was to pay this years dividend, and so how likely it is to be maintained at the current level in future years should earnings dip. Variations are often due to maintaining dividends when profits are declining.

The converse of dividend cover is the **dividend payout ratio**.

$$\textbf{Dividend payout ratio} = \frac{\text{Dividend per share}}{\text{EPS}}$$

$$\textbf{P/E ratio} = \frac{\text{Market price per share}}{\text{EPS}}$$

The **higher the better** here: it reflects the confidence of the market in high earnings growth and/or low risk.

P/E ratio will be affected by interest rate changes; a rise in rates will mean a fall in the P/E ratio as shares become less attractive. P/E ratio also depends on market expectations and confidence.

Debt and gearing ratios

$$\text{Financial gearing} = \frac{\text{Prior charge capital}}{\text{Equity capital (including reserves)}}$$ (based on statement of financial position values)

Financial gearing measures the relationship between shareholders' capital plus reserves, and either prior charge capital or borrowings or both.

Prior charge capital is capital which has a right to the receipt of interest or of preferred dividends in precedence to any claim on distributable earnings on the part of the ordinary shareholders.

Or

$$\text{Financial gearing} = \frac{\text{Market value of prior charge capital}}{\text{Market value of equity + Market value of prior charge capital}}$$ (based on market values)

$$\text{Operational gearing} = \frac{\text{Contribution}}{\text{Profit before interest and tax (PBIT)}}$$

Contribution is sales minus variable cost of sales. This shows, indirectly, the level of fixed costs incurred by a business. If operational gearing is high, then a business's cash flows are likely to fall significantly if sales fall (because it has a high level of fixed costs).

$$\text{Interest coverage ratio} = \frac{\text{Profit before interest and tax}}{\text{Interest}}$$

A safe level is generally felt to be about 3, but it depends on the business.

3.1 Uses of ratio analysis

The key to obtaining meaningful information from ratio analysis is **comparison**; comparing ratios over time within the same business to establish whether the business is **improving** or **declining**, and comparing ratios between similar businesses to see whether the company you are analysing is better or worse than average within its own business sector.

A vital element in effective ratio analysis is understanding the needs of the person for whom the ratio analysis is being undertaken.

(a) **Investors** will be interested in the **risk and return** relating to their investment, so will be concerned with dividends, market prices, level of debt vs equity etc.

(b) **Suppliers** and **lenders** are interested in receiving the payments due to them, so will want to know how liquid the business is.

(c) **Managers** are interested in ratios that indicate how well the business is being run, and also how the business is doing in relation to its **competitors**.

3.2 Limitations of ratio analysis

Although ratio analysis can be a very useful technique, it is important to realise its limitations.

(a) **Availability of comparable information**

When making comparisons with other companies in the industry, industry averages may hide **wide variations** in figures. Figures for 'similar' companies may provide a better guide, but then there are problems identifying which companies are similar, and obtaining enough detailed information about them.

(b) **Use of historical/out of date information**

Comparisons with the previous history of a business may be of limited use if the business has recently undergone, or is about to undergo, **substantial changes**.

(c) **Ratios are not definitive**

'Ideal levels' vary industry by industry, and even they are not definitive. Companies may be able to exist without any difficulty with ratios that are rather worse than the industry average.

(d) **Need for careful interpretation**

For example, if comparing two businesses' liquidity ratios, one business may have higher levels. This might appear to be 'good', but further investigation might reveal that the higher ratios are a result of higher inventory and receivable levels which are a result of poor working capital management by the business with the 'better' ratios.

(e) **Manipulation**

Any ratio including profit may be distorted by **choice of accounting policies**. For smaller companies, working capital ratios may be distorted depending on whether a big customer pays, or a large supplier is paid, before or after the year end.

(f) **Other information**

Ratio analysis on its own is not sufficient for interpreting company accounts, and it will be important to examine the strategic review and notes to the accounts to obtain further important information concerning performance.

4 Analysing risk

This section covers some basic knowledge, mainly from the Strategic Business Leader exam. None of it is likely to be crucial, but it is regarded as useful background knowledge and is briefly recapped here.

4.1 Examples of business risk

4.1.1 Political risk

When a multinational company invests in another country, either by setting up a subsidiary or by entering into a joint venture, it may face a political risk of action by that country's government which may affect the operation of the company. The ultimate political risk is the expropriation of the

company's investment by the Government of the host country. Although expropriation or nationalisation is not very common today, a multinational company is still exposed to political risk in the form of various restrictions.

(a) Import quotas could be used to limit the quantities of goods that a subsidiary can buy from its parent company and import for resale in its domestic markets.

(b) Exchange control regulations could be applied that may affect the ability of the subsidiary to remit profits to the parent company.

(c) Government actions could restrict the ability of foreign companies to buy domestic companies, especially those that operate in politically sensitive industries, such as defence contracting, communications and energy supply.

(d) Government legislation may specify minimum shareholding in companies by residents. This would force a multinational to offer some of the equity in a subsidiary to investors in the country where the subsidiary operates.

There are a large number of factors that can be considered to assess political risk, for example government stability, remittance restrictions and product boycotting as a result of deterioration in the relationships between the host country and the country where the parent company is based. Measurement is often by subjective weighting of these factors. Industry-specific factors are also important.

4.1.2 Economic risk

Examples include the following:

(a) A highly restricted monetary policy may lead to high interest rates and a recession affecting aggregate demand and the demand for the products of the multinational in the host country. On the other hand, inflation in the host country may lead to a devaluation of the currency and it may decrease the value of remittances to the parent company.

(b) Currency inconvertibility for a limited period of time.

(c) The host country may be subjected to economic shocks, eg falling commodity prices which may also affect its exchange rate of fiscal and monetary policy which may in turn affect the state of the economy and the exchange rate.

4.1.3 Fiscal risk

Fiscal risks include:

- The imposition of indirect taxes, such as VAT on the products of the company, raising the price of its products and potentially reducing demand
- The imposition of excise duties on imported goods and services that are used by the subsidiary
- An increase in the corporate tax rate
- The abolition of the accelerated tax depreciation allowances for new investments
- Changes in the tax law regarding admissibility of expenses for tax deductibility

4.1.4 Regulatory risk

For example, a change in employment legislation making the dismissal of workers more difficult may increase costs of production and affect the profitability of a company. Anti-monopoly laws may also restrict the capacity of a company to expand and it may restrict its profitability. Disclosure requirements or stricter corporate governance may also affect the freedom of a company to operate in the host country. In addition, legal standards of safety or quality (non-tariff barriers) could be imposed on imported goods to prevent multinationals from selling goods through a subsidiary which have been banned as dangerous in other countries.

4.1.5 Operational risk

Operational risk includes such risks as human error, breakdowns in internal procedures and systems or external events. It is difficult to identify and assess the extent of operational risk – many organisations historically accepted this risk as an inevitable cost of doing business. However, it is becoming more common for organisations to collect and analyse data relating to losses arising from, for example, systems failures or fraud.

4.1.6 Reputational risk

Damage to an organisation's reputation can result in lost revenues or significant reductions (permanent or temporary) in shareholder value.

Reputational risk can be seen as one of the consequences of operational risk. Damage to an organisation's reputation can arise from **operational failures** and the way in which stakeholders react to such events.

When risks materialise that threaten an organisation's reputation, the organisation should act in a way that minimises the risk and the potential damage. The best course of action will depend on the individual circumstances, including what it is the organisation has done (or is perceived to have done), the likely impact on the organisation's reputation, the effect a damaged reputation may have on the organisation as a whole and the 'damage limitation' options available.

Increasingly, organisations are realising that ignoring the risk and not responding is unlikely to be effective. By not addressing concerns directly, an organisation is likely to be seen as guilty of the accusations and also of not caring. This double whammy is likely to increase significantly the damage to the organisation's reputation. The general public, as well as clients and customers, expect senior management to listen to the concerns of stakeholders and of society – and to respond appropriately.

4.2 Risk mapping

Risk management systems involve the assessment of risk and the management of risk to an acceptable level. This often involves **risk mapping**.

		Severity	
		Low	High
Frequency	Low	**Accept** Risks are not significant. Keep under review, but costs of dealing with risks unlikely to be worth the benefits.	**Transfer** Insure risk or implement contingency plans. Reduction of severity of risk will minimise insurance premiums.
	High	**Reduce or control** Take some action, eg enhanced control systems to detect problems or contingency plans to reduce impact.	**Abandon or avoid** Take immediate action, eg changing major suppliers or abandoning activities.

These policy options can be remembered as **TARA**.

DCF techniques

3

Essential reading

3 DCF techniques

1 Post-audits

Post-audits are an important part of the capital monitoring process.

Ideally post-audits should be carried out by an independent team who were not involved in the initial investment decision and are therefore prepared to make criticisms where appropriate. In larger companies it is common for the internal audit department to be involved.

Ideally a post-audit should be carried out soon after the project is launched, so that any issues raised can be addressed and resolved during the project's life. Care should be taken to avoid allocating blame to the original project team as this runs the risk of creating a blame culture and discouraging future investment.

1.1 Benefits of post-auditing

(a) **Incentive for strategic planning**

The knowledge that a post-audit will take place will **discourage investment without** proper strategic **analysis** and **planning**.

(b) **Problem identification**

They **identify problems** which have occurred since the investment has gone live, identify whether these were unexpected or whether contingency plans had been made, and ensure

that management confront the problems.

(c) **Forecasting methods assessment**

By **analysing results** against **forecasts** made before the investment, they provide valuable feedback on the **reliability** of the **forecasting** and **planning** methods used.

(d) **Future plans**

They identify **factors** which may have been **overlooked** and which need to be incorporated into future investment proposals.

2 Basics of discounting

This section covers some brought forward knowledge, mainly from the Financial Management exam. A sound knowledge of discounted cash flow (DCF) techniques is important for the Advanced Financial Management exam.

You have already come across the need to discount future cash flows so that they are expressed in terms of their **present value**. The following exercise allows you to check your understanding of the basics of discounting and the use of discount factor tables. The solution is shown on the **following page**.

Activity 1: Basic discounting exercises

(a) **Discounting a single cash flow**

Calculate the present value of a cash flow of $5,000 in one year's time; assume a cost of capital of 10%.

Time 1

(b) **Discounting a constant cash flow (an annuity)**

Calculate the present value of a constant annual cash inflow **(an annuity)** of $5,000 received for the next five years assuming a discount rate of 10%.

Time 1–5

(c) **Discounting a delayed annuity**

Calculate the present value of a constant cash inflow of $5,000 received in three years' time and also for the next four years assuming a discount rate of 10%.

Time 3–7

(d) **Discounting a cash flow received into perpetuity**

Calculate the present value of a constant annual cash inflow **(an annuity)** of $5,000 received for the foreseeable future assuming a discount rate of 10%.

Time 1–infinity

2.1 Relevant costs

The figures put into the NPV working must be incremental cash flows that are relevant to the decision being considered:

(a) **Cash flows only** – eg depreciation and allocated overheads should be ignored
(b) **Future amounts** – questions might refer to costs which have already been incurred

2.2 Finance-related cash flows

Finance-related cash flows are normally excluded from project appraisal because discounting accounts for for the minimum return required by and equity investors.

2.3 Opportunity costs

Remember to include opportunity costs; these are the costs incurred, or revenues lost, from diverting existing resources from their existing use; eg an overseas investment might cause **lost contribution** from existing exports. This is a relevant cost of the investment.

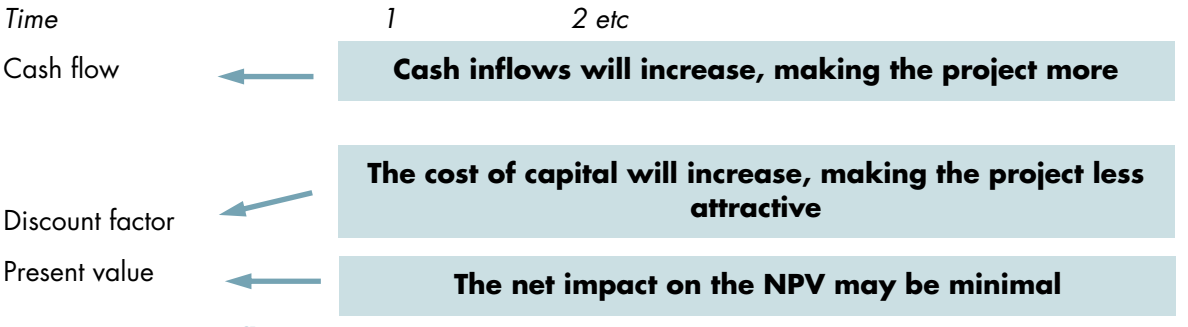
2.4 Working capital

Projects need funds to finance the level of working capital required (normally assumed to be inventory). The relevant cash flows are the **incremental cash flows from one year's requirement to the next**. At the end of the project, the full amount invested will be released.

2.5 Inflation

Key terms	Explanation
Real terms	At current prices
Nominal or money	Adjusted for inflation

Inflation has two impacts on NPV:



2.5.1 Ignoring inflation

If there is one rate of inflation, inflation has no impact on the NPV of a **domestic investment**. In this case it is normally **quicker to ignore inflation** in the cash flows (ie real cash flows) and to use an uninflated (real) cost of capital. However, this approach is rarely examined.

2.5.2 Including inflation

In exam questions, it will normally be the case that cash flows inflate at a variety of different rates. If so, inflation will have an impact on profit margins and therefore **inflation must be included in the cash flows and the cost of capital**.

Providers of capital will expect inflation and will build it into their return expectations ie a cost of capital will include inflation already. So there will be no need to adjust the cost of capital for the general rate of inflation **unless** it is stated to be 'in real terms'. When this happens, which is rare in the exam, the following equation is provided and can be used to adjust a cost of capital for inflation.

Formula provided

[1 + real cost of capital] × [1 + general inflation rate] = [1 + inflated cost of capital]

or **(1 + r) (1 + h) = (1 + i)**

2.6 Impact of corporation tax

Corporation tax can have **two impacts** on project appraisal:

1 **Tax will need to be paid on the cash profits from the project**

The effect of taxation will not necessarily occur in the same year as the relevant cash flow that causes it; you will need to follow the instructions given in the exam question about the timing of tax payments.

2 **Tax will be saved if tax allowable depreciation (also known as writing down allowances or capital allowances) can be claimed**

Again the type and the rate will be specified in an exam question.

These impacts can be built into project appraisal calculations in one of **two ways**:

- As **two separate cash flows** – one for the **tax paid on profits**, and another for the **tax saved on tax allowable depreciation**
- As **a single cash flow** showing the tax paid **after** tax allowable depreciation is taken into account

Which method you use is a matter of choice. You may be more familiar with the first method (two separate cash flows) from your FM studies, but for the more complicated NPV questions involving double taxation (see Chapter 5) or tax exhaustion (see Chapter 3), the **method that uses a single cash flow is often easier to apply**.

3 Proof of IRR re-investment assumption

This proof is **for your general understanding only**.

One of the limitations of IRR is said to be that it assumes that the cash flows after the investment phase (here time 0) are reinvested at the project's IRR. In activity 2 from Chapter 3, we calculated the return on the cash flows (shown below) was 21%. Here is the proof that there is a 21% reinvestment assumption.

Time	*1*	*2*	*3*	*4*	*5*
$'000	(90)	1,126	823	5,527	(345)
Reinvest to time 5 **at 21%**	$\times 1.21^4$	$\times 1.21^3$	$\times 1.21^2$	$\times 1.21$	
Value at **time 5**	(193)	1,995	1205	6,688	(345)
Terminal value	**9,350**				

The total project return (ie its IRR) is 9,350/3,570 = 2.62 so the annual return = $\sqrt[5]{2.62}$ = 1.21, **ie 21%**.

Given that the actual expected return is 12%, the reinvestment assumption here looks unrealistic.

A better assumption is that the funds **are reinvested at the investors' minimum required return (WACC)**, here 12%. If we use this re-investment assumption we can calculate an alternative, modified version of IRR as shown below.

Time	*1*	*2*	*3*	*4*	*5*
$'000	(90)	1,126	823	5,527	(345)
Reinvest to time 5 **at 12%**	$\times 1.12^4$	$\times 1.12^3$	$\times 1.12^2$	$\times 1.12$	
Value at **time 5**	(142)	1,582	1,032	6,190	(345)
Terminal value	**8,317**				

The total return is 8,317/3,570 = 2.33 so the annual return is $\sqrt[5]{2.33}$ = 1.184 = **18.4%**

The modified IRR is 18.4%

You are provided with a formula to calculate MIRR; this should be used in the exam and is illustrated in Activity 3 in Chapter 3 of the Workbook. This delivers the same answer, but the above method **shows the logic behind the formula and is shown to aid your understanding of the MIRR approach.**

4 Brought-forward knowledge of analysing risk and uncertainty

4.1 Brought forward techniques

This section covers some brought forward knowledge, mainly from the Financial Management exam.

4.1.1 Expected values

Risk can also be incorporated into project appraisal using **expected values**, whereby each possible outcome is given a probability. The expected value is obtained by multiplying each present value by its probability and adding the results together.

Illustration 1

A project has the following possible outcomes, each of which is assigned a probability of occurrence.

	Probability	*Present value*
		$
Low demand	0.3	20,000
Medium demand	0.6	30,000
High demand	0.1	50,000

What is the expected value of the project?

Solution

The expected value is the sum of each present value multiplied by its probability.

Expected value = (20,000 × 0.3) × (30,000 × 0.6) × (50,000 × 0.1) = $29,000

4.1.2 Payback and discounted payback period

These techniques examine the degree of uncertainty of a project; the quicker the payback, the less reliant a project is on the later, more uncertain, cash flows.

Illustration 2

Calculate the **discounted payback period** for the following cash flows. The initial investment was $3,570,000.

Time	*0*	*1*	*2*	*3*	*4*	*5*
Present value $'000		(80)	897	586	3,515	(196)

Solution

Time	*0*	*1*	*2*	*3*	*4*	*5*
PV	(3,570)	(80)	897	586	3,515	(196)
Cumulative		(3,650)	(2,753)	(2,167)	1,348	1,152

Discounted payback = 3 years + 2,167/3,515 = 3.6 years (assuming the Year 4 cash flow is received evenly during the year)

4.1.3 Sensitivity analysis

This analysis **one variable at a time**, to assess the percentage change in **one variable** (eg sales) that would be needed for the NPV of a project to fall to zero.

Illustration 3

Using the analysis of Activity 1 from Chapter 3, reproduced below, calculate its sensitivity of this project to changes in the rate of corporation tax (sometimes called **fiscal risk**).

Time	*0*	*1*	*2*	*3*	*4*	*5*
Operating cash flows		135	1,190	1,181	1345	
Tax allowable depreciation		(135)	(171)	(99)	(195)	
Taxable profit		0	1,019	1,082	1,150	
Taxation at 30% in arrears			**0**	**(306)**	**(325)**	**(345)**
Land and buildings	(2,705)					
Fixture and fittings	(700)					
Resale value					4,000	
Add back TAD (used)		135	171	99	195	
Working capital cash flows	(165)	(225)	(64)	(52)	506	
Net nominal cash flows	(3,570)	(90)	1,126	823	5,526	(345)
12% discount rate	1.0	0.893	0.797	0.712	0.636	0.567
Present values	(3,570)	(80)	897	586	3,515	(196)
NPV						**1,152**

Solution

The present value of the tax cash flows, shaded in the previous Illustration.

Time	*0*	*1*	*2*	*3*	*4*	*5*
$'000				(306)	(325)	(345)
DF @ 12%	1.000	0.893	0.797	0.712	0.636	0.567
PV				(218)	(207)	(196)
Total PV	(621)					

Sensitivity = 1,152/621 = 1.86 ie the tax rate would need to increase by 186% ie to 30% × 2.86 = 86% (!) before the project NPV would fall to 0.

Fiscal risk is therefore low for this project.

Weaknesses of sensitivity analysis include:

(a) The method requires that **changes** in each key variable are **isolated**. However, management is usually more interested in the combination of the effects of changes in **two or more key variables**.

Looking at factors in isolation is unrealistic since they are often **interdependent**.

(b) Sensitivity analysis does not examine the **probability** that any particular variation in costs or revenues might occur.

(c) In itself it does not provide a decision rule.

4.1.4 Monte Carlo simulation

A simulation model could be constructed by assigning a range of random number digits to each possible value for each of the uncertain variables. The number of random numbers allocated to represent each value must exactly match the probability of that value occurring. Note that you will **not** have to do this in the exam.

A computer would calculate the NPV many times over using the values established in this way with more random numbers, and the results would be analysed to provide the following.

(a) An **expected NPV** for the project

(b) A **statistical distribution** pattern for the possible variation in the NPV above or below this average

The decision whether to go ahead with the project would then be made on the basis of **expected return** and **risk**.

Illustration 4

The following probability estimates have been prepared for a proposed project.

	Year	*Probability*	
			$
Cost of equipment	0	1.00	(40,000)
Revenue each year	1–5	0.15	40,000
		0.40	50,000
		0.30	55,000
		0.15	60,000
Running costs each year	1–5	0.10	25,000
		0.25	30,000
		0.35	35,000
		0.30	40,000

The cost of capital is 12%. Assess how a simulation model might be used to assess the project's NPV.

Solution

A simulation model could be constructed by assigning a range of random number digits to each possible value for each of the uncertain variables. The random numbers must exactly match their respective probabilities.

	Revenue				*Running costs*	
$	*Prob*	*Random numbers*		$	*Prob*	*Random numbers*
40,000	0.15	00–14	*	25,000	0.10	00–09
50,000	0.40	15–54	**	30,000	0.25	10–34
55,000	0.30	55–84	***	40,000	0.35	35–69
60,000	0.15	85–99		40,000	0.30	70–99

* Probability is 0.15 (15%). Random numbers are 15% of range 00–99.

** Probability is 0.40 (40%). Random numbers are 40% of range 00–99 but starting at 15.

*** Probability is 0.30 (30%). Random numbers are 30% of range 00–99 but starting at 55.

For revenue, the selection of a random number in the range 00 and 14 has a probability of 0.15. This probability represents revenue of $40,000. Numbers have been assigned to cash flows so that when numbers are selected at random, the cash flows have exactly the same probability of being selected as is indicated in their respective probability distribution above.

Random numbers would be generated, for example by a computer program, and these would be used to assign values to each of the uncertain variables.

For example, if random numbers 37, 84, and 20, 01 were generated, the values assigned to the variables would be as follows.

	Revenue		*Costs*	
Calculation	*Random number*	*Value*	*Random number*	*Value*
		$		$
1	37	50,000	84	40,000
2	20	50,000	01	25,000

The resulting NPVs would be calculated and reported. The overall simulation would show the **range of NPVs that could be expected and would allow the probability of a negative NPV to be assessed**.

5 Brought forward knowledge: capital rationing

5.1 Soft and hard capital rationing

If an organisation is in a capital rationing situation it will not be able to invest in all available projects (whether involving organic growth or acquisition) because there is not enough capital for all of the investments. Capital is **a limiting factor**.

Capital rationing may be necessary in a business due to **internal factors** (soft capital rationing) or **external factors** (hard capital rationing).

5.1.1 Soft capital rationing

Soft capital rationing may arise for one of the following reasons:

(a) Management may be **reluctant to issue additional share capital** because of concern that this may lead to outsiders gaining control of the business.

(b) Management may be **unwilling to issue additional share capital** if it will lead to a dilution of earnings per share.

(c) Management may **not want to raise additional debt capital** because they do not wish to be committed to large fixed interest payments.

(d) **Capital expenditure budgets** may restrict spending.

Note that whenever an organisation adopts a policy that restricts funds available for investment, such a policy may be less than optimal, as the organisation may reject projects with a positive NPV and forgo opportunities that would have enhanced the market value of the organisation.

5.1.2 Hard capital rationing

Hard capital rationing may arise for one of the following reasons:

(a) Raising money through the stock market may not be possible if **share prices are depressed**.

(b) There may be **restrictions on bank lending** due to government control.

(c) Lending institutions may consider an organisation to be too **risky** to be granted further loan facilities.

(d) The **costs** associated with making small issues of capital may be too great.

5.2 Divisible and non-divisible projects

(a) **Divisible projects** are those which can be undertaken completely or in fractions. Suppose that project A is divisible and requires the investment of $15,000 to achieve an NPV of $4,000. $7,500 invested in project A will earn an NPV of ½ × $4,000 = $2,000.

(b) **Indivisible projects** are those which must be undertaken completely or not at all. It is not possible to invest in a fraction of the project.

You may also encounter **mutually exclusive** projects when one, and only one, of two or more choices of project can be undertaken.

5.2.1 Single-period capital rationing with divisible projects

With single-period capital rationing, investment funds are a limiting factor in the current period. The total return will be maximised if management follows the decision rule of maximising the return per unit of the limiting factor. They should therefore select those projects whose cash **inflows have the highest present value per $1 of capital invested**. In other words, rank the projects according to their **profitability index**.

Formula to learn

$$\textbf{Profitability index} = \frac{\text{NPV of project}}{\text{Initial cash outflow}}$$

5.2.2 Single-period capital rationing with non-divisible projects

The main problem if projects are non-divisible is that there is likely to be small amounts of unused capital with each combination of projects. The best way to deal with this situation is to use trial and error and test the NPV available for different combinations of projects. This can be a laborious process if there is a large number of projects available.

5.3 Practical methods of dealing with capital rationing

A company may be able to limit the effects of capital rationing and exploit new opportunities.

(a) It might **seek joint venture partners** with which to share projects.

(b) As an alternative to direct investment in a project, the company may be able to consider a **licensing** or **franchising agreement** with another enterprise, under which the licensor/franchisor company would receive royalties.

(c) It may be possible to **contract** out parts of a project to reduce the initial capital outlay required.

(d) The company may seek to delay one or more of the projects.

Activity answers

(a)	Time	1
	$	5,000
	DF	0.909
	PV	4,545
(b)	Time	1–5
	$	5,000
	DF	3.791
	PV	18,955
(c)	Time	3–7
	$	5,000
	DF	3.791
	PV at time 2	18,955
	DF at time 2	0.826
	PV at time 0	15,657
(d)	Time	1–infinity
	$	5,000
	DF (1/r)	10.0
	PV	50,000

Application of option pricing theory to investment decisions

4

Essential reading

4 Application of option pricing theory to investment decisions

1 Determinant of option value

1.1 Call options

Chapter 4 of the Workbook illustrated that the value of a call option was determined by intrinsic value and time value. A summary of the factors and how they would have to change to increase the value of a call option is shown below.

Determinant	Change needed to increase the value of a call option
Current asset price	Increase
Exercise price	Decrease
Volatility	Increase
Time to expiry of option	Increase
Interest rates	Increase

1.2 Put options

The value of a put option is also determined by intrinsic value and time value.

Illustration 1

Consider a put option giving the holder the right to sell a share for $4 in three years' time; the share price today is $5.00. In recent years the share price has been highly variable. Interest rates are currently high.

Intrinsic value is the difference between the current value of the asset and the exercise price of the option. However, here the difference of $1 is not 'value' because if the option holder sold a share at the option rate of $4 instead of the market rate of $5 they would make a loss. So here the option would not be exercised and its intrinsic value is zero.

However, this option will be worth more than zero because it will have a time value. As with a call option, time value for a put option reflects the possibility of an increase in intrinsic value between now and the expiry of the option; it is influenced by the same variables.

In the case of the put option, relevant factors are:

(a) Variability adds to the value of an option: this is because if the share price falls this will result in gain for the put option holder but if the share price rises further the option holder does not make losses (because the option does not have to exercised).

(b) Time until expiry of the option is three years, this gives considerable scope for variability as above. If this was longer the option would be more valuable because there would greater potential for variability.

(c) Interest rates; if interest rates are high then it will more attractive to sell shares that are held to earn interest at this high rate. So the higher interest rates are then the lower the value of a put option.

The change required in these determinants to increase the value of a put option is shown below.

Determinant	Change needed to increase the value of a put option
Current asset price	Decrease
Exercise price	Increase
Volatility	Increase*
Time to expiry of option	Increase*
Interest rates	Decrease

* As for call options.

5 International investment and financing decisions

Essential reading

5 International investment and financing decisions

1 Economic risk

Economic risk, in the context of exchange rate risk, is the degree to which a firm's present value of future cash flows is affected by fluctuations in exchange rates.

Although especially relevant to international investment decisions, as discussed earlier in the Workbook, economic risk may even affect the value of the firm even though the firm is not involved in foreign currency transactions. It is more long term in nature.

Illustration 1

Trends in exchange rates

Suppose a US company sets up a subsidiary in an Eastern European country. The Eastern European country's currency depreciates continuously over a five-year period. The cash flows remitted back to the US are worth less in dollar terms each year, causing a reduction in the investment project.

Another US company buys raw materials which are priced in euros. It converts these materials into finished products which it exports mainly to Singapore. Over a period of several years the US dollar depreciates against the euro but strengthens against the Singapore dollar. The US dollar value of the company's income declines while the US dollar value of its materials increases, resulting in a drop in the value of the company's net cash flows.

The value of a company depends on the **present value** of its **expected future cash flows**. If there are fears that a company is exposed to the type of exchange rate movements described above, this may reduce the company's value. Protecting against economic exposure is therefore necessary to protect the company's share price.

A company need not even engage in any foreign activities to be subject to economic exposure. For example, if a company trades only in the UK but sterling strengthens significantly against other world currencies, it may find that it loses UK sales to an overseas competitor who can now afford to charge cheaper sterling prices.

One-off events

As well as trends in exchange rates, one-off events such as a major stock market crash or major economic events such as the UK's referendum vote in favour of exit from the European Union in June 2016 may administer a 'shock' to exchange rate levels.

1.2 Hedging economic risk

Various actions can reduce economic risk, including the following:

(a) **Matching assets and liabilities**

A foreign subsidiary can be financed, as far as possible, with a loan in the currency of the country in which the subsidiary operates. A depreciating currency results in reduced income but also reduced loan service costs. A multinational will try to match assets and liabilities in each country as far as possible.

(b) **Diversifying the supplier and customer base**

For example, if the currency of one of the supplier countries strengthens, purchasing can be switched to a cheaper source.

(c) **Diversifying operations worldwide**

On the principle that companies which confine themselves to one country suffer from economic exposure, international diversification is a method of reducing such exposure.

2 Purchasing power parity theory

This theory argues that the change in the exchange rate ensures that the price of goods in one country will be equal to the price of the same goods in another country.

Illustration 2

A basket of goods cost £100. The current exchange rate (the spot rate) is GBP/USD 1.40. The same basket of goods currently costs $140.

Inflation in the UK is forecast to be 5%, and in the US inflation is forecast to be 2%.

In one years' time the basket of goods would cost £105 in the UK, and $142.8 in the US. The exchange rate would therefore be forecast to move to 142.8/105 = 1.36.

If the exchange rate had not changed then it would be cheaper to buy the goods in the US for $142.8/1.40 = £102. The exchange rate therefore changes to ensure that the price of goods in one country will be equal to the price of the same goods in another country.

In the real world, purchasing power parity only holds over the long term.

3 Alternative approaches to international project appraisal

There are two alternative approaches for calculating the NPV from an overseas project.

First approach (as covered earlier in the Workbook, and as normally examined)

(a) Forecast foreign currency cash flows including inflation
(b) Forecast exchange rates and therefore the home currency cash flows
(c) Discount home currency cash flows at the domestic cost of capital

Second approach

(a) Forecast foreign currency cash flows including inflation
(b) Discount at foreign currency cost of capital and calculate the foreign currency NPV
(c) Convert into a home currency NPV at the spot exchange rate

The second approach is useful because it does not require an exchange rate to be forecast. However, **exam questions to date have all been based on using the first approach** – this approach is more useful where project's cash flows are in a variety of currencies.

Illustration 3

Bromwich Inc, a US company, is considering undertaking a new project in the UK. This will require initial capital expenditure of £1,250 million, with no scrap value envisaged at the end of the five-year lifespan of the project. There will also be an initial working capital requirement of £500 million, which will be recovered at the end of the project. The initial capital will therefore be £1,750 million. Pre-tax net cash inflows of £800 million are expected to be generated each year from the project.

Company tax will be charged in the UK at a rate of 40%, with depreciation on a straight-line basis being an allowable deduction for tax purposes. UK tax is paid at the end of the year following that in which the taxable profits arise.

There is a double taxation agreement between the US and the UK, which means that no US tax will be payable on the project profits.

The current £/$ spot rate is £0.625 = $1. Inflation rates are 3% in the US and 4.5% in the UK. A project of similar risk recently undertaken by Bromwich Inc in the US had a required post-tax rate of return of 10%.

Required

Calculate the present value of the project using each of the two alternative approaches.

Solution

Method 1 – convert sterling cash flows into $ and discount at $ cost of capital

Firstly we have to estimate the exchange rate for each of years 1–6. This can be done using purchasing power parity.

Year	£/$ expected spot rate
0	0.625
1	0.625 × (1.045/1.03) = 0.634
2	0.634 × (1.045/1.03) = 0.643
3	0.643 × (1.045/1.03) = 0.652
4	0.652 × (1.045/1.03) = 0.661
5	0.661 × (1.045/1.03) = 0.671
6	0.671 × (1.045/1.03) = 0.681

Time	*0*	*1*	*2*	*3*	*4*	*5*	*6*
	£m	£m	£m	£m	£m	£m	£m
Capital	(1,750)					500	
Cash inflows		800	800	800	800	800	
Depreciation		250	250	250	250	250	
Tax			(220)	(220)	(220)	(220)	(220)
Net cash flows	(1,750)	800	580	580	580	1080	(220)
Exchange rate $/£	0.625	0.634	0.643	0.652	0.661	0.671	0.681
Cash flows in $m	(2,800)	1,262	902	890	877	1,610	(323)
Discount factor	1	0.909	0.826	0.751	0.683	0.621	0.564
Present value	(2,800)	1,147	745	668	599	1,000	(182)

NPV in $m 1,177

Method 2 – discount sterling cash flows at adjusted cost of capital

When we use this method we need to find the cost of capital for the project in the host country. If we are to keep the cash flows in sterling they need to be discounted at a rate that takes account of both the US discount rate (10%) and different rates of inflation in the two countries. This is an application of the International Fisher effect.

(1 + 10%) × (1.045/1.03) = 1.116

Therefore, the foreign (UK) discount rate is 11.6%.

Foreign (sterling) cash flows should be discounted at this rate.

Time	*0*	*1*	*2*	*3*	*4*	*5*	*6*
	£m	£m	£m	£m	£m	£m	£m
Capital	(1,750)					500	
Cash inflows		800	800	800	800	800	
Depreciation		250	250	250	250	250	
Tax			(220)	(220)	(220)	(220)	(220)
Net cash flows	(1,750)	800	580	580	580	1080	(220)
Df (11.6%)	1	0.896	0.803	0.719	0.645	0.578	0.518
Present value	(1,750.00)	717	466	417	374	624	(114)

NPV in £m 734

Translating this present value at the spot rate of 0.625 gives:

NPV in $m = 1,174m

Note that the two answers are almost identical (with differences being due to rounding). In the first approach the dollar is appreciating due to the relatively low inflation rate in the US (not good news when converting sterling to dollars).

In the second approach the UK discount rate is higher due to the relatively high inflation rate in the UK (again, this is bad news, as the NPV of the project will be lower).

4 Exchange controls

Another potential problem is that some countries impose delays on the payment of a dividend from an overseas investment. These exchange controls create liquidity problems and add to exchange rate risk because the exchange rate may have worsened by the time that dividends are permitted.

The impact of the delay in the timing of remittances may have to be incorporated into the international project appraisal.

Illustration 4

Fulton plc is considering entering a 50% joint venture with a central European company for the manufacture and supply of sportswear in central Europe. Fulton plc will provide £2.2 million as 50% of the initial capital whilst the joint venture partner will provide the equivalent amount in Central European Crowns (CeK).

The joint venture net cash flows **attributable to Fulton plc**, in nominal terms, are expected to be:

	CeK'000	*Forward rates of exchange to the £ sterling*
Year 1	10,500	10
Year 2	16,000	14
Year 3	21,000	19

Required

Calculate Fulton's NPV under the two assumptions below, using a UK discount rate of 15% for each assumption; ignore tax. No interest is earned on any cash retained in the European country.

Assumption 1

Exchange controls in the central European country prohibit dividends above 50% of annual cash flows due to overseas investors being paid for the first two years of any project. The accumulated balance can be repatriated at the end of the third year.

Assumption 2

The central European country removes control restrictions on repatriation of profits.

Solution

Assumption 1

Year	*Profits*	*50% retained*	*Remittance*	*£ Sterling*	*PV @ 15%*
1	10,500	5,250	5,250	525	457
2	16,000	8,000	8,000	571	432
3	21,000	–	34,250	1,803	1,185
					2,074
				Cost	(2,200)
				NPV	**(126)**

Assumption 2

Year	*Remittance*	*£ Sterling*	*PV @ 15%*
1	10,500	1,050	913
2	16,000	1,143	864
3	21,000	1,105	727
			2,504
		Cost	(2,200)
		NPV	**304**

The impact of the exchange controls can be seen by comparing the NPV under the two assumptions.

5 Interest rate parity theory

Under interest rate parity the difference between spot and forward rates reflects differences in interest rates.

Formula provided

$$F_0 = S_0 \frac{(1+i_c)}{(1+i_b)}$$

where F_0 is the forward rate

S_0 is the spot rate

i_c is the interest rate in the country overseas

i_b is the interest rate in the base country

This equation links the spot and forward rates to the difference between the interest rates.

Illustration 5

A US company is expecting to receive Zambian kwacha in one year's time. The spot rate is US$1 = ZMK4,819. The company could borrow in kwacha at 7% or in dollars at 9%. There is no forward rate for one year's time.

Estimate the forward rate in one year's time.

Solution

The base currency is dollars therefore the dollar interest rate will be on the bottom of the fraction.

$$F_0 = 4{,}819\frac{(1+0.07)}{(1+0.09)} = 4{,}730.58$$

5.1 Use of IRP to compute the effective cost of foreign loans

Loans in some currencies are cheaper than in others. However, when the likely strengthening of the exchange rate is taken into consideration, the cost of apparently cheap international loans becomes much more expensive and may not offer any saving compared to a domestic loan.

Illustration 6

Cato, a Polish company, needs a one-year loan of about 50 million złotys. It can borrow in złotys at 10.80% p.a. but is considering taking out a sterling loan which would cost only 6.56% p.a. The current spot exchange rate is złoty/£5.1503. The company decides to borrow £10 million at 6.56% per annum. Converting at the spot rate, this will provide 51.503 million złotys. Interest will be paid at the end of one year along with the repayment of the loan principal.

Assuming the exchange rate moves in line with interest rate parity, you are required to show the złoty values of the interest paid and the repayment of the loan principal. Compute the effective interest rate paid on the loan.

Solution

By interest rate parity, the złoty will have weakened in one year to:

$$5.1503 \times \frac{1.1080}{1.0656} = 5.3552$$

Time		£'000	*Exchange rate*	Złoty '000
Now	Borrows	10,000	5.1503	51,503
In one year	6.56% interest	(656)		
	Repayment	(10,000)	5.3552	
		(10,656)		(57,065)

The effective interest rate paid is $\frac{57{,}065}{51{,}503} - 1 = 10.80\%$, the same as it would have paid in sterling.

6 Eurobonds

Key term

Eurobond (or international bond): a bond sold outside the jurisdiction of the country in whose currency the bond is denominated.

In recent years, a strong market has built up which allows very large companies to borrow in this way, long term or short term. Again, the market is not subject to national regulations.

Eurobonds are **long-term loans raised by international companies** or other institutions and **sold to investors in several countries** at the same time. Eurobonds are normally repaid after 5 to 15 years, and are for major amounts of capital ie $10m or more.

6.1 How are eurobonds issued?

Step 1 A lead manager is appointed from a major merchant bank; the lead manager liaises with the credit rating agencies and organises a **credit rating** of the eurobond.

Step 2 The lead manager organises an **underwriting syndicate** (of other merchant banks) who agree the terms of the bond (eg interest rate, maturity date) and buy the bond.

Step 3 The underwriting syndicate then organise the sale of the bond; this normally involves **placing** the bond with **institutional investors**.

6.2 Advantages of eurobonds

(a) Eurobonds are '**bearer instruments**', which means that the owner does not have to declare their identity.

(b) Interest is paid gross and this has meant that eurobonds have been used by investors to avoid tax.

(c) Eurobonds create a liability in a foreign currency to **match** against a foreign currency asset.

(d) They are often **cheaper** than a foreign currency bank loan because they can be sold on by the investor, who will therefore accept a lower yield in return for this greater liquidity.

(e) They are also extremely **flexible**. Most eurobonds are fixed rate but they can be floating rate or linked to the financial success of the company.

(f) They are typically issued by companies with excellent credit ratings and are normally **unsecured**, which makes it easier for companies to raise debt finance in the future.

(g) Eurobond issues are not normally advertised because they are **placed** with institutional investors and this reduces issue costs.

6.3 Disadvantages of eurobonds

Like any form of debt finance, there will be **issue costs** to consider (approximately 2% of funds raised in the case of eurobonds) and there may also be problems if gearing levels are too high.

A borrower contemplating a eurobond issue must consider the **foreign exchange risk** of a long-term foreign currency loan. If the money is to be used to purchase assets which will earn revenue in a currency **different** to that of the bond issue, the borrower will run the risk of exchange losses if the currency of the loan strengthens against the currency of the revenues out of which the bond (and interest) must be repaid.

7 Alternatives to international investment

7.1 Exporting and licensing

Exporting and licensing are alternatives to foreign direct investment (FDI).

Exporting may be direct selling by the firm's own export division into the overseas markets, or it may be indirect through agents.

Licensing involves conferring rights to make use of the licensor company's production process on producers located in the overseas market.

7.1.1 Advantages of licensing

(a) It can allow fairly **rapid penetration of** overseas markets.

(b) It does **not require substantial financial resources**.

(c) **Political risks** are **reduced** since the licensee is likely to be a local company.

(d) **Licensing** may be a **possibility** where direct investment is restricted or prevented by a country.

(e) For a multinational company, licensing agreements provide a way for **funds** to be **remitted** to the parent company in the form of licence fees.

7.1.2 Disadvantages of licensing

(a) The arrangement may give the licensee **know-how** and **technology** which it can use in competing with the licensor after the license agreement has expired.

(b) It may be more **difficult to maintain quality standards**, and lower quality might affect the standing of a brand name in international markets.

(c) It might be possible for the licensee to **compete** with the licensor by exporting the produce to markets outside the licensee's area.

(d) Although relatively insubstantial financial resources are required, on the other hand **relatively small cash inflows** will be **generated**.

7.2 Joint ventures

7.2.1 Advantages of joint ventures

- Relatively **low-cost access** to new markets
- **Easier access** to **local capital markets**, possibly with accompanying tax incentives or grants
- **Use of joint venture partner's existing management expertise**, local knowledge, distribution network, technology, brands, patents and marketing or other skills
- **Sharing of risks**
- **Sharing of costs**, providing economies of scale

7.2.2 Disadvantages of joint ventures

- **Managerial freedom** may be **restricted** by the need to take account of the views of all the joint venture partners.
- There may be **problems** in **agreeing on partners' percentage ownership**, transfer prices, reinvestment decisions, nationality of key personnel, remuneration and sourcing of raw materials and components.
- Finding a **reliable joint venture partner** may take a long time.
- Joint ventures are **difficult to value**, particularly where one or more partners have made intangible contributions.

Cost of capital and changing risk

6

Essential reading

6 Cost of capital and changing risk

1 Theories of capital structure

1.1 The traditional view of WACC

The **traditional view** is as follows:

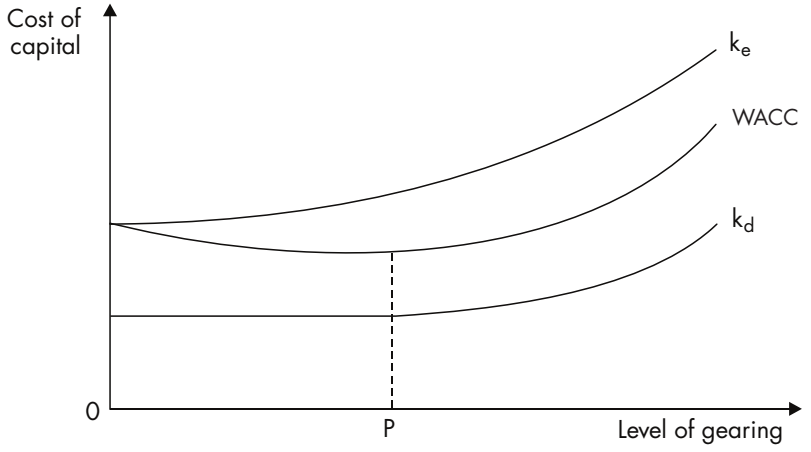
(a) As the **level of gearing increases**, the **cost of debt** remains **unchanged** up to a certain level of gearing. Beyond this level, the cost of debt will increase as interest cover falls, the amount of assets available for security falls and the risk of bankruptcy increases.

(b) The **cost of equity** rises as the level of **gearing increases** and **financial risk increases**.

(c) The **WACC** does **not remain constant**, but rather falls initially as the proportion of debt capital increases, and then begins to increase as the rising cost of equity (and possibly of debt) becomes more significant.

(d) The **optimum level of gearing** is where the **company's WACC is minimised**.

The traditional view about the cost of capital is illustrated in the following figure. It shows that the WACC will be minimised at a particular level of gearing P.



Where k_e is the cost of equity in the geared company

k_d is the cost of debt

k_0 is the WACC

The traditional view is that the WACC, when plotted against the level of gearing, is saucer shaped. The optimum capital structure is where the WACC is lowest, at point P.

1.2 The net operating income (MM) view of WACC

The net operating income approach takes a different view of the effect of gearing on WACC. In their 1958 theory, Modigliani and Miller (MM) (quoted in Watson and Head 2013, p. 299) proposed that the total MV of a company, in the absence of tax, will be determined only by two factors:

- The **total earnings** of the company
- The **level of operating (business) risk** attached to those earnings

The total MV would be computed by discounting the total earnings at a rate that is appropriate to the level of operating risk. This rate would represent the WACC of the company.

Thus Modigliani and Miller concluded that **the capital structure of a company would have no effect on its overall value or WACC**.

1.2.1 Assumptions

Modigliani and Miller made various assumptions in arriving at this conclusion, including:

(a) A **perfect capital market** exists, in which investors have the same information, on which they act rationally, to arrive at the same expectations about future earnings and risks.

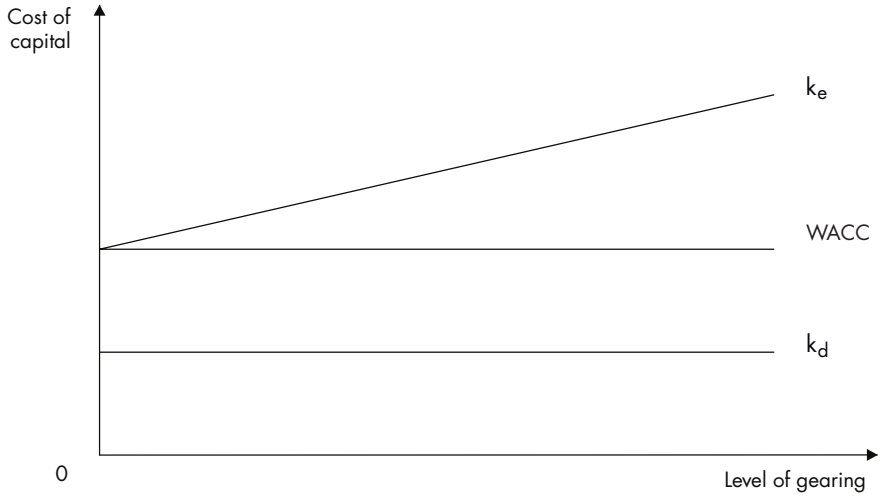
(b) There are no **tax or transaction costs**.

(c) **Debt is risk free** and freely available at the same cost to investors and companies alike.

If MM's theory holds, it implies:

(a) The **cost of debt remains unchanged** as the level of gearing increases.
(b) The **cost of equity rises** in such a way as to keep the **WACC constant**.

This would be represented on a graph as shown below.

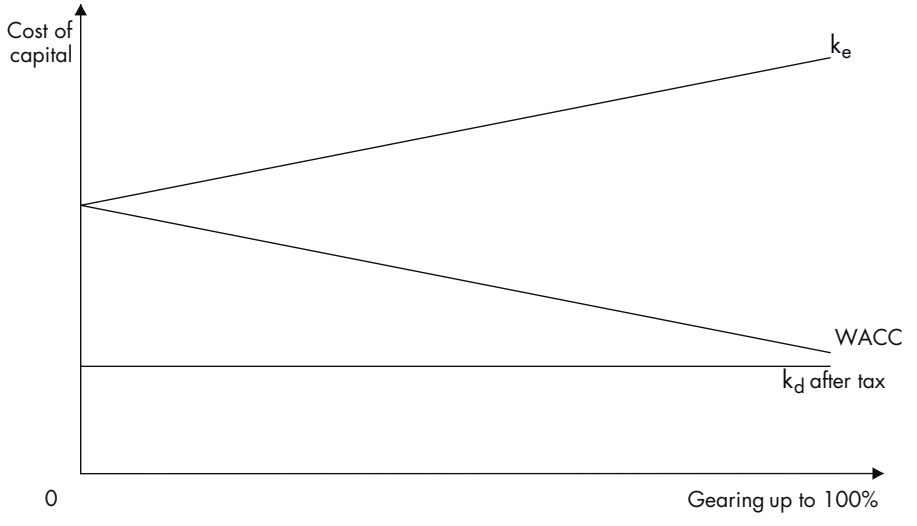


1.3 MM theory adjusted for taxation

Having argued that debt has no benefit in the absence of taxation, MM then went on to demonstrate that debt can be beneficial where tax relief applies.

Allowing for **taxation reduces the cost of debt capital** by multiplying it by a factor (1 – t) where t is the rate of tax (assuming the debt to be irredeemable).

MM modified their theory to admit that tax relief on interest payments does makes debt capital cheaper to a company, and therefore **reduces the WACC** where a company has debt in its capital structure. They claimed that the WACC will continue to fall, up to gearing of 100%.



1.3.1 Formula for cost of equity

The principles of the MM theory with tax gave rise to the following formula for cost of equity.

Formula provided

$$k_e = k_e^i + (1-T)(k_e^i - k_d)\frac{V_d}{V_e}$$

Where k_e is the cost of equity in a geared company

k_e^i is the cost of equity in an ungeared company

V_d, V_e are the MVs of debt and equity respectively

k_d is the cost of debt pre-tax

Illustration 1

Shiny Inc is an ungeared company with a cost of equity of 10%. Shiny is considering introducing debt to its capital structure, as it is tempted by a loan with a rate of 5%, which could be used to repurchase shares. Once the equity is repurchased, the ratio of debt to equity will be 1:4. Assume that corporation tax is 30%.

(a) What will be the revised cost of equity if Shiny takes out the loan?
(b) At what discount rate will Shiny now appraise its projects? Comment on your results.

Solution

(a) $k_e = 0.10 + (1 - 0.3)(0.10 - 0.05) \times 0.25 = 10.9\%$
(b) WACC = $(0.2 \times 0.7 \times 0.05) + (0.8 \times 0.109) = 9.42\%$

The new WACC figure is lower than that for the ungeared company. This means that future investments will be able to bring greater wealth to the shareholders. More projects will become acceptable to management, given that they are being discounted at a lower discount rate.

1.3.2 Weaknesses in MM theory

MM theory has been criticised as follows:

(a) MM theory assumes that **capital markets are perfect**. For example, a company will always be able to raise finance to fund worthwhile projects. This ignores the danger that higher gearing can lead to **financial distress costs**.

(b) **Transaction costs** will restrict the arbitrage process.

(c) Investors are **assumed to act rationally** which may not be the case in practice.

1.4 Pecking order theory

Managers will prefer to **issue equity** when the **share price is high** (even to the point of being overvalued). They will prefer not to issue equity when the share price is considered to be low (or undervalued).

Investors will use the issue of equity as a **signal** from managers as to the true worth of the company's shares. Managers typically have better information than investors that can be used to value the shares (**information asymmetry**).

1.4.1 Market signals

If equity is issued, the market will take this as a signal that shares are overvalued. This may result in investors selling their shares (thus making substantial gains) which will lead to a fall in the share

price. If this happens, the cost of equity may rise, which will result in a higher marginal cost of finance. To avoid this possibility, managers may decide to issue debt even if shares are seen as being overvalued.

Conversely, an issue of debt may be interpreted as an undervaluation of the shares. Investors will want to 'get a bargain' and will thus start to buy the shares, leading to an increase in share price.

1.4.2 Issues costs

In addition a new issue of equity is normally significantly more expensive than a debt issue, this again makes an issue of new equity less attractive.

1.4.3 Pecking order

For the above reasons, the preferred 'pecking order' for financing instruments is as follows:

(a) **Retained earnings**. To avoid any unwanted signals, managers will try to finance as much as possible through internal funds. Also no issue costs.

(b) **Debt**. When internal funds have been exhausted and there are still positive NPV opportunities, managers will use debt to finance any further projects until the company's debt capacity has been reached. **Secured debt** (which is less risky) should be **issued first**, followed by unsecured (risky) debt.

(c) **Equity**. The 'finance of last resort' is the issue of equity.

1.5 Agency effects and capital structure

A practical advantage of debt finance is that it enforces financial discipline on the management of a company. If a company is all equity financed there is less pressure on cash flow, and managers will often embark on 'vanity projects' such as ill-judged acquisitions. Higher gearing creates a discipline that can effectively deal with this agency problem.

2 Adjusted present value

This section provides a numerical illustration of how to deal with a subsidised loan as part of an APV calculation.

2.1 Subsidy

Illustration 2

Gordonbear is about to start a project requiring $6 million of initial investment. The company normally borrows at 10% but a government loan will be available to finance the entire project at 8%. Tax is payable at 30% with no delay. The project is scheduled to last for four years.

Calculate the **effect on the APV calculation** if Gordonbear finances the project by means of the government loan.

Solution

(a) Step 2 of the APV would be as follows.

We assume that the loan is for the duration of the project (four years) only.

Annual interest = $6 million × 10%
= $600,000

Tax relief = $600,000 × 0.3
= $180,000

This needs to be discounted over Years 1 to 4 at the normal cost of debt of 10%.

NPV tax relief = \$180,000 × Discount factor Years 1 to 4

= \$180,000 × 3.170

= \$570,600

However, we also need to take into account the benefits of **being able** to pay a **lower interest rate**.

Benefits = \$6 million × (10% – 8%) × 10% discount factor Years 1 to 4

= \$6 million × 2% × 3.170

= **\$380,400**

Total effect = \$570,600 + \$380,400 = \$951,000.

2.2 Debt capacity

If a projects involves the acquisition of assets on which a loan could be secured, then it said to increase a company's borrowing (or debt capacity). Where this occurs then the full amount of the debt capacity should be used in Step 2 of APV. This benefit should be included in the APV calculation, even if some of the debt capacity is utilised elsewhere to finance another project.

3 Changing business risk

This section provides a further numerical illustration of how to use information about a beta factor from a comparative quoted company to create a project-specific cost of capital.

3.1 Recap of approach

If a company plans to invest in a project which involves diversification into a new business, the investment will involve a different level of systematic risk from that applying to the company's existing business. A discount rate should be calculated which is specific to the project, and which takes account of both the project's systematic risk and the company's gearing level. The discount rate can be found using the CAPM.

Step 1

Get an estimate of the systematic risk characteristics of the project's operating cash flows by obtaining published beta values for a company or companies in the industry into which the company is planning to diversify.

Adjust these beta values to allow for the company's capital gearing level. First by converting the beta values of the other company/companies in the industry to ungeared betas, using the formula (adjusted assuming that the debt beta is zero):

$$\beta_a = \beta_e \left(\frac{V_e}{V_e + V_d(1-T)} \right)$$

Step 2

Having obtained an ungeared beta value β_a, regear to reflect the capital structure of the company looking to appraise the project.

Step 3

Having estimated a project-specific geared beta, use the CAPM to estimate a project-specific cost of equity and then a project-specific WACC.

Illustration 3

Backwoods is a major international company with its head office in the UK, wanting to raise £150 million to establish a new production plant in the eastern region of Germany. Backwoods evaluates its investments using NPV, but is not sure what cost of capital to use in the discounting process for this project evaluation.

The company is also proposing to increase its equity finance in the near future for UK expansion, resulting overall in little change in the company's market-weighted capital gearing.

The summarised financial data for the company before the expansion are shown below.

STATEMENT OF PROFIT OR LOSS (EXTRACTS) FOR THE YEAR ENDED 31 DECEMBER 20X1

	£m
Revenue	1,984
Gross profit	432
Profit after tax	81
Dividends	37
Retained earnings	44

STATEMENT OF FINANCIAL POSITION (EXTRACTS) AS AT 31 DECEMBER 20X1

	£m
Non-current assets	846
Working capital	350
	1,196
Medium-term and long-term loans (see note below)	210
	986
Shareholders' funds	
Issued ordinary shares of £0.50 each nominal value	225
Reserves	761
	986

Illustration 4

Note on borrowings

These include £75m 14% fixed rate bonds due to mature in five years' time and redeemable at their nominal value. The current market price of these bonds is £120.00 and they have an after-tax cost of debt of 9%. Other medium- and long-term loans are floating rate UK bank loans at LIBOR plus 1%, with an after-tax cost of debt of 7%.

Company rate of tax may be assumed to be at the rate of 30%. The company's ordinary shares are currently trading at 376 pence.

The equity beta of Backwoods is estimated to be 1.18. The systematic risk of debt may be assumed to be zero. The risk-free rate is 7.75% and market return 14.5%.

The estimated equity beta of the main German competitor in the same industry as the new proposed plant in the eastern region of Germany is 1.5, and the competitor's capital gearing is 35% equity and 65% debt by book values, and 60% equity and 40% debt by MVs.

Required

Estimate the cost of capital that the company should use as the discount rate for its proposed investment in eastern Germany. State clearly any assumptions that you make.

Solution

The discount rate that should be used is the WACC, with weightings based on the market values of debt and equity. The cost of capital should take into account the systematic risk of the new investment, and therefore it will not be appropriate to use the company's existing equity beta. Instead, the estimated equity beta of the main German competitor in the same industry as the new proposed plant will be ungeared, and then the capital structure of Backwoods applied to find the WACC to be used for the discount rate.

Since the systematic risk of debt can be assumed to be zero, the German equity beta can be 'ungeared' using the following expression.

$$\beta_a = \beta_e \frac{V_e}{V_e + V_d(1-T)}$$

where: β_a = asset beta

β_e = equity beta

V_e = proportion of equity in capital structure

V_d = proportion of debt in capital structure

T = tax rate

For the German company:

$$\beta_a = 1.5 \left(\frac{60}{60 + 40(1-0.30)} \right) = 1.023$$

The next step is to calculate the debt and equity of Backwoods based on MVs.

		£m
Equity	450m shares at 376p	1,692
Debt: bank loans	(210 – 75)	135
Debt: bonds	(75 million × 1.20)	90
Total debt		225
Total MV		1,917

The beta can now be regeared

$$\beta_a = \beta_e \frac{V_e}{V_e + V_d(1-T)}$$

$$1.023 = \beta_e \frac{1,692}{1,692 + 225(1-0.3)}$$

so

$$\beta_e = 1.023 \div \frac{1,692}{1,692 + 225(1-0.3)} = 1.118$$

This can now be substituted into the CAPM to find the cost of equity.

$$E(r_i) = R_f + \beta (E(r_m) - R_f)$$

where: $E(r_i)$ = cost of equity

R_f = risk-free rate of return

$E(r_m)$ = market rate of return

$E(r_i) = 7.75\% + (14.5\% - 7.75\%) \times 1.118 = 15.30\%$

The WACC can now be calculated:

$$\left[15.3\times\frac{1,692}{1,917}\right] + \left[7\times\frac{135}{1,917}\right] + \left[9\times\frac{90}{1,917}\right] = 14.4\%$$

Financing and credit risk

7

Essential reading

7 Financing and credit risk

1 Credit ratings

1.1 Calculating credit ratings

Statistical models like the **Kaplan–Urwitz model** are used to calculate the risk of a bond.

Formula provided if relevant to a question

$4.41 + 0.0014F + 6.4\pi - 2.56S - 2.72L + 0.006C - 0.5\sigma$

The higher the score the higher the rating. For example, >6.76 = AAA rating, >3.28 = A, >1.57 = BBB.

F = Firm size (total assets $m)	π = Profitability (net income/total assets)
L = long term debt/total assets	C = Interest cover
σ = std deviation/average earnings	S = Debt status (if unsecured = 1, if secured = 0)

The main message from this model is not surprising; large, highly profitable firms have a lower default risk than small, low profit firms.

Illustration 1

A credit rating agency is assessing a bond due to be issued by NT Ltd. It has extracted the following data relating to NT Ltd:

Firm size (F) = £100m	Net income/total assets (π) = 10%
Gearing (L = long term debt/total assets) = 10%	Interest cover (C) = 5
Risk (σ, std deviation/average earnings) = 5%	Debt status (S, if subordinated = 1 if not 0) = 0

The agency uses the following version of the Kaplan–Urwitz model to obtain a risk score:

Formula provided (if required)

$4.41 + 0.0014F + 6.4\pi - 2.56S - 2.72L + 0.006C - 0.53\sigma$

If the score is >6.76 a rating of AAA is given, if >3.28 a rating of A is given and if >1.57 a rating of BBB is given.

Required

Calculate the likely credit rating for NT Ltd's bond issue.

Solution

Score = $4.41 + (0.0014 \times 100) + (6.4 \times 0.1) - (2.56 \times 0) - (2.72 \times 0.1) + (0.006 \times 5) - (0.53 \times 0.05) = 4.92$

Credit rating = A

In reality this model would support an analysis of NT's risk which would also involve judgements over the quality of NT's management and systems.

1.2 Credit risk

Credit risk arises from the inability of a party to fulfil its obligation under the terms of a contract.

The credit risk of an individual loan or bond is determined by the following two factors.

- **The probability of default (PD)** – the probability that the borrower will default on its contractual obligations to repay its debt.
- **The recovery rate** – this is the fraction of the face value of an obligation that can be recovered once the borrower has defaulted. The loss given default (LGD) is the difference between the amount of money owed by the borrower less the amount of money recovered. For example, a bond has a face value of $100 and the recovery rate is 80%. The LGD in this case is: $100 – $80 = $20.

The expected loss (**EL**) from credit risk shows the amount of money the lender should expect to lose from the investment in a bond or loan with credit risk.

- The EL is calculated as loss given default (LGD) × probability of default (PD).

If the PD is, say, 10%, the EL from investing in the above bond is:

$EL = 0.10 \times 20 = \$2$

1.3 Credit rating agencies

The measurement of **credit risk** is slightly more complex. All the approaches concentrate on the estimation of the **default probability** and the **recovery rate**.

The oldest and most common approach is to assess the probability of default using financial and other information on the borrowers and assign a rating that reflects the expected loss (EL) from investing in the particular bond.

This assignment of **credit risk ratings** is done by **credit rating companies**, such as Standard & Poor's, Moody's Investor Services and Fitch. These ratings are widely accepted as indicators of the credit risk of a bond. The table below shows the credit rating used by Moody's and Standard & Poor's.

Credit risk rating

Standard & Poor's	Moody's	Description of category
AAA	Aaa	Highest quality, lowest default risk
AA	Aa	High quality
A	A	Upper medium grade quality
BBB	Baa	Medium grade quality
BB	Ba	Lower medium grade quality
B	B	Speculative
CCC	Caa	Poor quality (high default risk)
CC	Ca	Highly speculative
C	C	Lowest grade quality

For Standard & Poor's ratings, those ratings from 'AA' to 'CCC' may be modified by the addition of a plus (+) or minus (–) sign to show relative standing within the major rating categories. For example, a company with BB+ rating is considered to have a better credit rating than a company with a BB rating, although they are in the same major rating category.

With Moody's, numerical modifiers 1, 2 and 3 are added to each ratings category from Aa to Caa, with 1 indicating a higher ranking within the category. For example, a rating of Baa1 is higher than Baa2.

Both credit rating agencies estimate default probabilities from the **empirical performance** of issued **corporate bonds** of each category. The table below shows the probability of default for certain credit categories over different investment horizons. The probability of default within a year for AAA, AA, or A bonds is practically zero whereas for a CCC bond it is 26.38%. However, although the probability of default for a AAA company is **practically zero** over a single year, it becomes 0.98% over a 15-year period (this is consistent with the theory that, the longer the time horizon, the riskier the investment).

Standard & Poor's cumulative default probabilities (Standard & Poor's, 2015)

Initial rating Term	1	5	10	15
AAA	0.00%	0.36	0.74	0.98
AA	0.02%	0.35	0.82	1.19
A	0.07%	0.57	1.51	2.32
BBB	0.20%	1.95	4.06	5.84
BB	0.76%	7.71	13.74	16.77
B	3.88%	18.70	25.91	29.49
CCC	26.38%	46.28	450.73	53.38

2 Bond duration

This section provides an activity to practice calculating the duration of a bond, the solution is on the next page.

Activity: Duration

A company has a bond in issue, with a nominal value of $100 and redeemable their nominal value:

Bond B 10% maturing in three years

The required yield is 4%.

Required

Calculate the duration of Bond B.

Solution

3 Sources of finance

This section introduces a variety of sources of finance (many of which have been introduced in Chapter 2, and also feature in Financial Management (FM)) considering their appropriateness for different organisations.

3.1 Short-term debt

Short-term debt consists mainly of overdrafts and short-term loans.

The advantage of overdrafts is that they can be arranged relatively quickly and offer the company a degree of flexibility with regard to the amount borrowed. Interest is only paid when the account is overdrawn. However, if the account is overdrawn beyond the authorised amount, penalties can be severe.

Overdrafts are usually most appropriate when a company wants help to finance 'day to day' trading and cash flow requirements. The company is unlikely to be short of cash all the time therefore an informal overdraft agreement that can be called on where necessary would be the best choice of funding.

Short-term loans are more formal than overdrafts in that they are for fixed amounts for a specified period of time. The company knows how much it has to pay back at regular intervals and does not have to worry about the bank withdrawing or reducing an overdraft facility. However, interest has to be paid for the duration of the loan, rather than just when the account is overdrawn.

It may be that a mixture of short-term loans and overdrafts is the most appropriate method of funding. For example, if you are purchasing a shop with inventory, the shop premises might be financed by a loan while the inventory could be funded by an overdraft.

3.2 Long-term finance

Long-term finance is most appropriate for major investments. It tends to be more expensive and less flexible than short-term finance.

Long-term debt comes in various forms including bank loans, and bonds whose price will vary according to the product and prevailing market conditions. For example, where the coupon rate is fixed at the time of issue, it will be set after considering the credit rating of the company issuing the debt. Although subsequent changes in market and company conditions may cause the market value

of the debt to fluctuate, the interest charged (the price of the debt) will remain at the fixed percentage of the nominal value.

Long-term debt tends to be most appropriate for long-term investments. One of the main advantages of long-term debt is that interest is tax deductible, making it cheaper than equity finance.

3.2.1 Redeemable bonds

Bonds are usually **redeemable**. They are issued for a term of 10 years or more, and perhaps 25 to 30 years. At the end of this period, they will 'mature' and become redeemable (normally at their nominal value).

Some redeemable bonds have an earliest and a latest redemption date. For example, 12% Loan Notes 2010/12 are redeemable at any time between the earliest specified date (in 2010) and the latest date (in 2012). The issuing company can choose the date. The decision by a company when to redeem a debt will depend on **how much cash** is available to the company to repay the debt, and on the **nominal rate of interest** on the debt.

Some bonds do not have a redemption date, and are **'irredeemable'** or **'undated'**. Undated bonds might be redeemed by a company that wishes to pay off the debt, but there is no obligation on the company to do so.

3.2.2 Equity finance

Raising new equity finance through the sale of ordinary shares to investors, either as a **new issue** or as a **rights issue**.

The issue of equity is at the bottom of the pecking order when it comes to raising funds for investments, not only because of the cost of issue but also because equity finance is more expensive in terms of required returns. Equity shareholders are the ultimate bearers of risk, as they are at the bottom of the creditor hierarchy if a company becomes insolvent. This means that there is a significant risk that they will receive nothing at all after all other trade payables' claims have been met.

This high risk means that equity shareholders expect the highest returns of long-term providers of finance. The cost of equity finance is therefore always **higher** than the cost of debt.

As with long-term debt, equity finance will be used for long-term investments. Companies may choose to raise equity rather than debt finance if:

(a) Their gearing ratios are approaching the maximum allowable
(b) Any further increases in gearing will be perceived as a significant increase in risk by investors

A listing on a stock market (an **initial public offering or IPO**) makes it easier to obtain equity by issuing new shares to investors either via a placing or an offer for sale.

A listing on a stock market makes it easier to obtain equity.

UK main market

Requirements

- Three years of successful trading history
- Comply with the corporate governance rules of the Corporate Governance Code
- Minimum 25% of shares in public hands

Advantages

- Higher public profile
- Higher investor confidence (audited accounts, regular briefings, NEDs)
- Access to wider pool of equity finance

- Allows owners to realise some of their investment (private companies sometimes have restrictions on who you can sell shares to)
- Allows use of share issues for incentive schemes and takeovers

Costs/disadvantages

- Membership fees, compliance costs
- Pressure for short-term profits
- Takeover target

Process

- Hire a sponsor (issuing house) – an investment bank will advise on the best method (placing/offer for sale) and the on the suitability of the directors. The issuing house ill also be responsible for the prospectus, and for assuring investors that the regulatory requirements (see above) have been fulfilled, advise on the issue price and act as an underwriter
- Hire a broker – to represent the company to investors to stimulate interest, and to advise on the timing of the issue; often the sponsor is the broker

The cheapest and quickest way of raising equity from new investors is to sell large blocks of shares at a fixed price to a narrow group of external institutional investors. This is a **placing**.

Alternatively shares can be sold to the general public, normally at a fixed price, this is an **offer for sale**. With an offer for sale, a prospectus is produced outlining the company's future plans and past performance. The issue is advertised in the national press and is normally underwritten. This is normally used for larger share issues.

Occasionally an **offer for sale is made by tender**. Here, no prior issue price is announced; instead shareholders are invited to bid for shares at a variety of different prices. The share issue is underwritten at a guaranteed minimum price. This is designed to minimise the risk of underpricing the share issue.

In any form of listing, restrictions are normally imposed to prevent directors from selling shares for a specified period (often six months) after the listing. This is called an **IPO lock-up period**. If this was not in place then there would be a danger that the directors would sell their shares immediately after the listing. If directors have significant shareholdings (as in the previous example) this may well mean that the share price would fall sharply, immediately after a listing. This is what an IPO lock-up period is designed to prevent.

3.2.3 Venture capital

Venture capital is risk capital which is generally provided in return for an equity stake in the business. It is most suited to private companies with high growth potential. Venture capitalists seek a high return (usually at least 20%), although their principal return is achieved through an **exit strategy**.

Venture capitalists generally like to have a predetermined target exit date (usually 3–7 years). At the outset of their investment, they will have established various exit routes, including the sale of shares to the public or to institutional investors following a flotation of the company's shares.

As well as providing funding for start-up businesses, venture capital is an important source of finance for **management buy-outs** (these are discussed later in the Workbook).

3.2.4 Business angels

Business angels are wealthy individuals who invest in start-up and growth businesses in return for an equity stake. The investment can involve both time and money depending on the investor. These individuals are prepared to take **high risks** in the hope of **high returns**. As a result, business angel finance can be expensive for the business.

Investments made by business angels can vary but, in the UK, most investments are in the region of £25,000.

Business angels are a useful source of finance to fill the gap between venture capital and debt finance, particularly for start-up businesses. One of the main advantages of business angels is that they often follow up their initial investment with later rounds of financing as the business grows. New businesses benefit from their expertise in the difficult early stages of trying to establish themselves.

3.2.5 Leasing

Some leases, often short-term leases, are rental agreements between a lessor and a lessee, that are structured so that the lessor retains most of the risks of ownership ie the **lessor** is **responsible** for **servicing and maintaining** the leased equipment.

However, some leases are **long-term arrangements** that transfer the risks and rewards of ownership of an asset to the lessee. These are agreements between the lessee and the lessor for most or all of the asset's expected useful life. The **lessee** is responsible for the **upkeep**, **servicing** and **maintenance** of the asset. This can be a cheaper source of finance than a bank loan if the lessor buys a large quantity of assets (eg aircraft) and obtains bulk purchase discounts as a result; some of the savings from such discounts can be shared with the lessee in the form of lower rental payments.

Illustration 2

Burma's national carrier has signed a nearly $1 billion (£584 million) deal to lease 10 new Boeing 737 jets as it looks to revamp and expand its ageing fleet.

Myanma Airways will be working with GE Capital Aviation Services (GECAS), the world's largest leasing company, to upgrade its planes and flight routes.

The state-run company flies mainly within Burma, also known as Myanmar.

GECAS – a unit of US conglomerate General Electric – said the aircraft would be delivered by 2020.

(BBC 2014)

3.2.6 Private equity

Private equity consists of equity securities in companies that are not publicly traded on a stock exchange.

In Europe, private equity represents the entire spectrum of the investment sector that includes venture capital and management buy-ins and buy-outs (therefore venture capital is a specific type of private equity). In the US, private equity and venture capital are treated as different types of investment.

In Europe, private equity funds tend to invest in more mature companies with the aim of eliminating inefficiencies and driving growth. Venture capitalists, as we have seen above, are more likely to invest in start-ups and companies in the early stages of development.

Private equity funds might require:

- A 20–30% shareholding
- Special rights to appoint a number of directors
- The company to seek their prior approval for new issues or acquisitions

3.2.7 Asset securitisation

Asset securitisation involves the aggregation of assets into a pool then issuing new securities backed by these assets and their cash flows. The securities are then sold to investors who share the risk and reward from these assets.

Securitisation is similar to 'spinning off' part of a business, whereby the holding company 'sells' its right to future profits in that part of the business for immediate cash. The new investors receive a premium (usually in the form of interest) for investing in the success or failure of the segment.

Most securitisation pools consist of 'tranches'. Higher tranches carry less risk of default (and therefore lower returns) whereas junior tranches offer higher returns but greater risk.

The main reason for securitising a cash flow is that it allows companies with a credit rating of (for example) BB but with AAA rated cash flows to possibly borrow at AAA rates. This will lead to greatly reduced interest payments, as the difference between BB rates and AAA rates can be hundreds of basis points.

However, securitisation is expensive due to management costs, legal fees and continuing administration fees.

This topic is returned to later in the Workbook.

4 Pros and cons of Islamic finance

4.1 Advantages of Islamic finance

Islamic finance operates on the underlying principle that there should be a link between the economic activity that creates value and the financing of that economic activity. The main advantages of Islamic finance are as follows:

(a) Following the principles of Islamic finance allows access to a source of worldwide funds. Access to Islamic finance is also not just restricted to Muslim communities, which may make it appealing to companies that are focused on investing ethically.

(b) Gharar (speculation) is not allowed, reducing the risk of losses.

(c) Excessive profiteering is also not allowed; only reasonable mark-ups are allowed.

(d) Banks cannot use excessive leverage and are therefore less likely to collapse.

(e) The rules encourage all parties to take a longer-term view and focus on creating a successful outcome for the venture, which should contribute to a more stable financial environment.

(f) The emphasis of Islamic finance is on mutual interest and co-operation, with a partnership based on profit creation through ethical and fair activity benefiting the community as a whole.

4.2 Drawbacks of Islamic finance

The use of Islamic finance does not remove all commercial risk. Indeed, there may even be additional risk from the use of Islamic finance. There are the following drawbacks from the use of Islamic finance:

(a) There is **no international consensus on Sharia interpretations**, eg some Murabaha contracts have been criticised because their products have been based on prevailing interest rates rather than economic or profit conditions.

(b) There is no standard Sharia model for the Islamic finance market, meaning that documentation is often tailor-made for the transaction, leading to **higher transaction costs** than for the conventional finance alternative.

(c) Trading in Sukuk products has been limited. Since the financial crisis, issuance of new Sukuk products has decreased.

(d) Corporations may not be able to demonstrate that contracts are effectively debt and they therefore **may not attract a tax shield**, meaning that their cost of capital will increase.

(e) **Restrictions** are placed on a company's business operations and financial structure.

(f) Approval of new products can **take time**.

Activity answers

Bond B

Time	*1*	*2*	*3*	*Total*	
Cash	10	10	110		
DF 4%	0.962	0.925	0.889		
PV	9.6	9.3	97.8	116.7	
% in year	8%	8%	84%		
x year	0.08	0.16	2.51	**2.76**	years

Alternative solution:

Bond B

Time	*1*	*2*	*3*	*Total*	
Cash	10	10	110		
DF 4%	0.962	0.925	0.889		
PV	9.6	9.3	97.8	116.7	
x year	9.6	18.6	293.4		
	(9.6 + 18.6 + 293.4)/116.7 =			**2.76**	years

8 Valuation for acquisition and mergers

Essential reading

8 Valuation for acquisition and mergers

1 Asset-based models – extra notes

1.1 Replacement values

In a book value-plus valuation the **replacement value** of the assets may be more useful than the book value, and may be provided in an examination question. The replacement value of the assets of the acquisition target would quantify the cost of setting up the company from scratch without an acquisition ie by acquiring the assets on the open market.

1.2 Lev's method for valuing intangibles

This method is a modification of the approach used in CIV and involves adjusting the valuation to reflect that growth will not be zero (as assumed in the CIV approach).

This is similar to CIV, but this model then proposes a three-step discounting procedure:

Step 1 Discount the first five years at the firm's current rate of growth.

Step 2 Discount the next five years at a declining rate that moves towards the industry average.

Step 3 Discount after this at the industry average growth rate.

Lev (Ryan, 2007, p.408) argues that the discount rate used should be high to reflect the uncertain nature of intangible assets. This contrasts with CIV which normally uses a weighted average cost of capital.

2 Market–based approaches – extra notes

2.1 Earnings yield

Earnings yield is calculated as EPS/share price. In other words, it is the reciprocal of the P/E ratio: ie 1 ÷ earnings yield = P/E ratio.

If an exam question provides you with an earnings yield figure, divide it into 1 (ie 1 ÷ earnings yield) to get the P/E ratio. **Then you can apply the P/E ratio technique.**

Illustration 1

For example, an earnings yield of 5% is equal to a P/E ratio of 1: 0.05 = 20.

2.2 Market-to-book ratio

The market-to-book ratio approach assumes that there is a consistent relationship between market value and net book value.

Some sample price-to-book value relationships for the US in 2014 are shown below:

Industry sector averages

Advertising	5.5
Auto parts	2.7
Defence	3.6
Home building	1.7

Source: NYU Stern School of Business

These industry average ratios can be used to give an approximate value of a potential acquisition by multiplying the net book value of the assets (see Section 3) of the potential acquisition by the industry average market-to-book ratio.

However, these ratios do not take into account the potential acquisition's differing business and/or financial risk.

3 Black–Scholes and company valuation – extra notes

3.1 Valuing start-ups

The valuation of **start-ups** presents a number of challenges for the methods that we have considered so far due to their unique characteristics which are summarised below. These effectively mean that traditional valuation techniques are not effective.

(a) Most start-ups typically have no track record
(b) Ongoing losses
(c) Few revenues, untested products
(d) Unknown market acceptance, unknown product demand
(e) Unknown competition
(f) Unknown cost structures, unknown implementation timing
(g) High development or infrastructure costs
(h) Inexperienced management

3.2 Default risk

Option pricing can be used to explain why companies facing severe financial distress can still have positive equity values. A company facing severe financial distress would presumably be one where the equity holders' call option is well out-of-money ie has no intrinsic value.

However, as long as the debt on the option is not at expiry, then that call option will still have a time value attached to it. Therefore, the positive equity value reflects the time value of the option, even where the option is out-of-money, and this will diminish as the debt comes closer to expiry. The time value indicates that even though the option is currently out-of-money, there is a possibility that due to the volatility of asset values, by the time the debt reaches maturity, the company will no longer face financial distress and will be able to meet its debt obligations.

Acquisitions: strategic issues and regulation

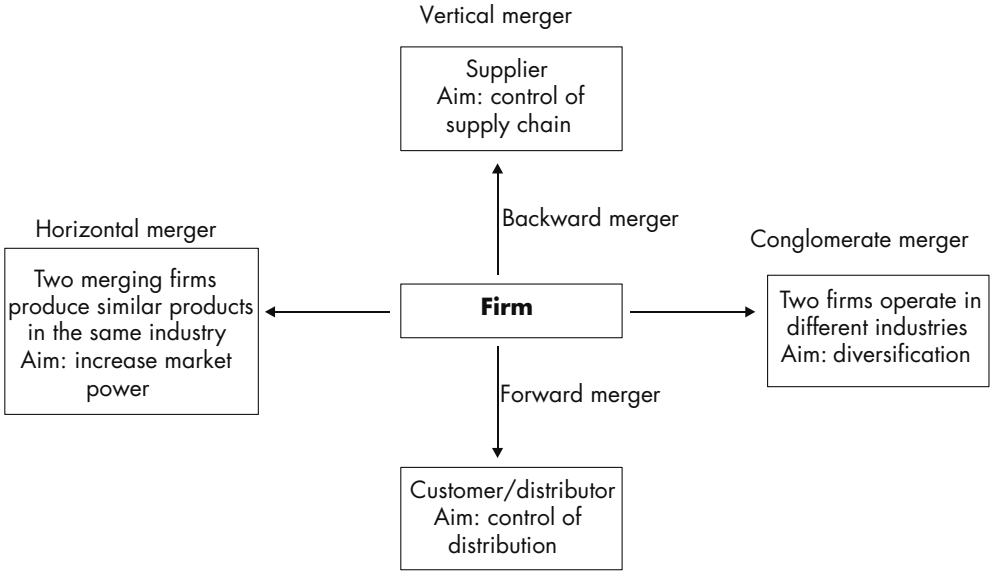
9

Essential reading

9 Acquisitions: strategic issues and regulation

1 Types of mergers

Mergers and acquisitions can be classified in terms of the company that is acquired or merged with, as **horizontal**, **vertical** or **conglomerate**. Each type of merger represents a **different way** of **expansion** with **different benefits** and **risks**.



1.1 Horizontal mergers

A **horizontal merger** is one in which one company acquires another company in the **same line of business**. A horizontal merger happens between firms which were formerly competitors and who produce products that are considered **substitutes** by their buyers. The main impact of a horizontal merger is therefore to **reduce competition** in the market in which both firms operate. These firms are also likely to purchase the same or substitute products in the input market. A **horizontal merger** is said to achieve **horizontal integration**.

Illustration 1

US food giant Heinz is to merge with Kraft Foods Group, creating what the companies say will be the third-largest food and beverage company in the US.

Heinz shareholders will own 51% of the combined company with Kraft shareholders owning a 49% stake.

The combined firm, Kraft Heinz Company, expects to make annual cost savings of $1.5 billion (£1 billion) by the end of 2017. Its brands will include Kraft, Heinz, and hotdog maker Oscar Mayer, with combined sales worth some $29 billion.

Alex Behring, chairman of Heinz and the managing partner at 3G Capital, said: 'By bringing together these two iconic companies through this transaction, we are creating a strong platform for both US and international growth.'

(BBC 2015)

The impact on **market power** is one of the most important aspects of an acquisition. By acquiring another firm, in a horizontal merger, the competition in the industry is reduced and the company may be able to charge higher prices for its products. However, competition regulation may prevent this

type of acquisition. To the extent that both companies purchase for the same suppliers, the merged company will have greater bargaining power when it deals with its suppliers.

1.2 Vertical mergers

Vertical mergers are mergers between firms that operate at different stages of the same production chain, or between firms that produce complementary goods, such as a newspaper acquiring a paper manufacturer. Vertical mergers are either backward when the firm merges with a supplier or forward when the firm merges with a customer.

Vertical mergers create the possibility of creating **barriers to entry** through **vertical acquisitions** of production inputs.

1.3 Conglomerate mergers

Conglomerate mergers are mergers which are neither vertical nor horizontal. In a conglomerate merger a company acquires another company in an different, possibly unrelated, line of business.

Illustration 2

In 2015 US computer giant Dell agreed a deal to buy data storage company EMC for $67bn (£44bn).

Falling demand for PCs means Dell is looking to expand into more lucrative businesses, and it has identified data storage as a key growth area.

'Our new company will be exceptionally well-positioned for growth in the most strategic areas of next-generation IT,' said Dell boss Michael Dell.

Analysts suggested the deal was a brave move by Dell.

'Dell wants to become the old IBM Corp, a one-stop shop for corporate clients,' said Erik Gordon from the University of Michigan's Ross School of Business.

'That model fell apart a couple of decades ago. Reviving it would be a stunning coup for Dell.'

(BBC 2015)

2 Consequence of different % stakes

Normally, a potential offeror will wish to build a stake prior to making an offer. Any person can acquire a stake of up to 29.9% in a listed or Alternative Investment Market company without being subject to any timing restrictions. Some of the important share stakes (in the UK) and their consequences are outlined below.

%	Consequence
Any	Ability of the company to enquire as to the ultimate ownership
3%	Requirement to disclose interest in the company (the material interests rules).
10%	Shareholders controlling not less than 10% of the voting rights may requisition the company to serve notices to identify another shareholder. Notifiable interests rules become operative for institutional investors and non-beneficial stakes.
30%	City Code definition of effective control. Mandatory bid triggered and takeover offer becomes compulsory. If the bidder holds between 30% and 50% (normally due to earlier attempts at a takeover) a mandatory offer is triggered with any additional purchase.

%	Consequence
50%+	CA definition of control (since at this level the holder will have the ability to pass ordinary resolutions). First point at which a full offer could be declared unconditional with regard to acceptances. Minimum acceptance condition.
75%	Major control boundary since at this level the holder will be able to pass special resolutions.
90%	Minorities may be able to force the majority to buy out their stake. Equally, the majority may, subject to the way in which the stake has been acquired, require the minority to sell out their position. Compulsory acquisition of remaining 10% is now possible.

3 Regulatory authorities

3.1 Competition and Markets Authority

A UK company might have to consider whether its proposed takeover would be drawn to the attention of the Competition and Markets Authority.

If a transaction is referred to the Competition and Markets Authority and the Authority finds that it results in a substantial lessening of competition in the defined market, it will specify action to remedy or prevent the adverse effects identified, or it may decide that the merger does not take place (or, in the case of a completed merger, is reversed).

Any person aggrieved by a decision of the Competition and Markets Authority in connection with a reference or possible reference may apply to the Competition Appeal Tribunal for a review of that decision.

A number of tests may be used to decide whether there has been a **substantial lessening** of **competition** (SLC). These normally include:

(a) **The revenue test**

No investigation will normally be conducted if the target's revenue is less than £70 million.

(b) **The share of supply test**

An investigation will not normally be conducted unless, following the merger, the combined entity supplies 25%. The 25% share will be assessed by the commission.

(b) **The SLC test**

Even if the thresholds in (a) and (b) above are met, the Competition and Markets Authority will only be involved if there has been an SLC in the market.

3.2 The European Union

Mergers fall within the exclusive jurisdiction of the European Union where, following the merger, the following two tests are met:

(a) **Worldwide revenue** of more than **€5 billion per annum**
(b) **European Union** revenue of more than **€250 million per annum**

The European Union will assess the merger in a similar way as the Competition and Markets Authority in the UK by considering the effect on competition in the market.

The merger will be blocked if the merged company results in a market oligopoly or results in such a dominant position in the market that consumer choice and prices will be affected.

4 Summary of defensive tactics

Tactic	Explanation
Golden parachute	Large compensation payments made to the top management of the target firm if their positions are eliminated due to hostile takeover. This may include cash or bonus payments, stock options or a combination of these.
Poison pill	This is an attempt to make a company unattractive normally by giving the right to existing shareholders to buy shares at a very low price. Poison pills have many variants.
White knights	This would involve inviting a firm that would rescue the target from the unwanted bidder. The white knight would act as a friendly counter-bidder.
Crown jewels	The firm's most valuable assets may be the main reason that the firm became a takeover target in the first place. By selling these or entering into arrangements such as sale and leaseback, the firm is making itself less attractive as a target.
Pacman defence	This defence is carried out by mounting a counter-bid for the attacker. The Pacman defence is an aggressive rather than defensive tactic and will only work where the original acquirer is a public company with diverse shareholdings. This tactic also appears to suggest that the company's management are in favour of the acquisition but that they disagree about which company should be in control.
Litigation or regulatory defence	The target company can challenge the acquisition by inviting an investigation by the regulatory authorities or through the courts. The target may be able to sue for a temporary order to stop the bidder from buying any more of its shares.

Financing acquisitions and mergers

10

Essential reading

10 Financing acquisitions and mergers

1 Alternative forms of paper

Alternative forms of paper consideration, including bonds, loan notes and preference shares, are not so commonly used, due to:

- Difficulties in establishing a rate of return that will be attractive to target shareholders
- The effects on the gearing levels of the acquiring company
- The change in the structure of the target shareholders' portfolios
- The securities being potentially less marketable, and possibly lacking voting rights

Issuing **convertible loan notes** will overcome some of these drawbacks, by offering the target shareholders the option of partaking in the future profits of the company if they wish.

The use of other financing instruments is fairly rare, but convertible debt or convertible preference shares allow the target shareholder the possibility of sharing the benefit of any gains from the acquisition. More commonly, convertibles are issued by a company in order to raise finance for a **cash bid**.

2 Other points about financing

2.1 Managing the re-financing of the target's debt

Many debt agreements carry a **change of control clause** which means that when a company completes an acquisition it may well have to refinance the target company's debt. The acquiring company will need to ensure that it has factored this into its financial planning. This may require a short-term line of credit to act as a bridging loan while refinancing is being arranged.

2.2 Earn-out arrangements

With any form of financing the acquirer can reduce risk by including deferred payments which are linked to future performance targets – these are often referred to as earn-out arrangements. This is also a method of keeping previous owner-managers motivated post-acquisition, as they continue to benefit (often considerably) from good performance.

3 Effect of an offer on financial position and performance of the acquiring company

3.1 Effects on earnings

One obvious place to start is to assess how the merger will affect earnings and earnings per share.

P/E ratios (price to earnings per share) can be used as a rough indicator for assessing the impact on earnings. The higher the P/E ratio of the acquiring firm compared to the target company, the greater the increase in EPS to the acquiring firm.

Dilution of EPS occurs when the P/E ratio paid for the target exceeds the P/E ratio of the acquiring company.

The following illustration will demonstrate this.

Illustration 1

Romer Company will acquire all the outstanding stock of Dayton Company through an exchange of stock. Romer is offering $65.00 per share for Dayton. Financial information for the two companies is as follows.

	Romer	*Dayton*
Net income	$50,000	$10,000
Shares outstanding	5,000	2,000
EPS	$10.00	$5.00
Market price of stock	$150.00	
P/E ratio	15	

Required

(a) Calculate the shares to be issued by Romer
(b) Calculate the combined EPS
(c) Calculate P/E ratio paid: price offered/EPS of target
(d) Compare P/E ratio paid to current P/E ratio
(e) Calculate maximum price before dilution of EPS

Solution

(a) Shares to be issued by Romer: $65/$150 × 2,000 shares = 867 shares to be issued.

(b) Combined EPS: ($50,000 + $10,000)/(5,000 + 867) = $10.23

(c) Calculate P/E ratio paid: price offered/EPS of target or $65.00/$5.00 = 13

(d) P/E ratio paid to current P/E ratio: since 13 is less than the current ratio of 15, there should be no dilution of EPS for the combined company.

(e) Maximum price before dilution of EPS: 15 = price/$5.00 or $75.00 per share. $75.00 is the maximum price that Romer should pay before EPS is diluted.

3.2 Effects on the statement of financial position

The main issue to be aware of here is that the difference between the value of a take-over bid and the net assets of the company being acquired is accounted for as '**goodwill**' in the consolidated statement of financial position.

The consolidated statement of financial position may need to be analysed using ratio analysis. Basic ratios have been covered earlier in the Workbook and will be returned to in Chapter 14.

Illustration 2

ABC Co is planning to bid for DEZ Co.

The acquisition will be funded by cash, which ABC will borrow.

INFORMATION RELATING TO ABC

	Romer	*Dayton*
Net income	$50,000	$10,000
Shares outstanding	5,000	2,000
EPS	$10.00	$5.00
Market price of stock	$150.00	
P/E ratio	15	

STATEMENT OF FINANCIAL POSITION OF DEZ CO

	$m		$m
Assets		*Equity and liabilities*	
Non-current assets	80	Current liabilities	10
Equity investments	5	Non-current liabilities	10
Receivables	25	Equity capital	20
Cash	10	Share premium	30
		Earnings	50
	120		120

This is a cash offer funded entirely by the issue of debt. The company makes an offer of $120m which is raised by issuing corporate bonds worth $120m.

The value of the net assets of DEZ CO is $120m assets – $10m current liabilities – $10m non-current liabilities = $100m.

The difference between the amount paid of $120m and the value of the net assets of $100m will be treated as **goodwill** in the consolidated accounts, as shown.

STATEMENT OF FINANCIAL POSITION OF ABC AFTER THE OFFER

	$m		$m
Assets		*Liabilities*	
Non-current assets	600	Current liabilities	30
Equity investments	20	Non-current liabilities	220
Receivables	15	Equity capital	15
Cash	45	Share premium	35
Investment	120	Earnings	500
	800		800

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

	$m		$m
Assets		*Liabilities*	
Non-current assets	680	Current liabilities	40
Equity investments	25	Non-current liabilities	230
Receivables	40	Equity capital	15
Cash	55	Share premium	35
Goodwill	**20**	Earnings	500
	820		820

The role of the treasury function 11

Essential reading

11 The role of the treasury function

1 Treasury organisation

A treasury department might be managed either as a cost centre or as a profit centre.

It is important that the organisation of a treasury department reflects a company's attitude to risk. If a company operates in a stable business environment it may be more likely to accept certain risks than a company that operates in a less stable environment.

Cost centre	Profit centre
Treasury managers have an incentive only to keep the costs of the department within budget. The cost centre approach implies that the treasury is there to perform a service of a certain standard to other departments in the enterprise.	Some companies expect to make significant profits from their treasury activities. Divisions are billed for services provided at market rates. Motivational for Treasury staff. May expose the company to high levels of risk unless controlled.

1.1 Cost centre or profit centre

If a profit centre approach is being considered, the following issues should be addressed.

(a) **Competence of staff**

Local managers may not have sufficient expertise in the area of treasury management to carry out speculative treasury operations competently. Mistakes in this specialised field may be costly. It may only be appropriate to operate a larger centralised treasury as a profit centre, and additional specialist staff demanding high salaries may need to be recruited.

(b) **Controls**

Adequate controls must be in place to prevent costly errors and overexposure to risks such as foreign exchange risks. It is possible to enter into a very large foreign exchange deal over the telephone.

(c) **Information**

A treasury team which trades in futures and options or in currencies is competing with other traders employed by major financial institutions who may have better knowledge of the market because of the large number of customers they deal with. In order to compete effectively, the team needs to have detailed and up to date market information.

(d) **Attitudes to risk**

The more aggressive approach to risk taking which is characteristic of treasury professionals may be difficult to reconcile with the more measured approach to risk which may prevail within the board of directors. The recognition of treasury operations as profit-making activities may not fit well with the main business operations of the company.

(e) **Internal charges**

If the department is to be a true profit centre, then market prices should be charged for its services to other departments. It may be difficult to put realistic prices on some services, such as arrangement of finance and general financial advice.

(f) **Performance evaluation**

Even with a profit centre approach, it may be difficult to measure the success of a treasury team for the reason that successful treasury activities sometimes involve **avoiding** the incurring of costs, for example when a currency devalues. For example, a treasury team which hedges a future foreign currency receipt over a period when the domestic currency undergoes devaluation may avoid a substantial loss for the company.

1.2 Organisational restructuring

Organisational restructuring involves changing the way a company is organised.

Organisational restructuring may involve changing the structure of divisions in a business (for example, centralising the treasury department), changing business processes (for example, changing the treasury department into a profit centre) and other changes such as corporate governance.

Managing currency risk 12

Essential reading

12 Managing currency risk

1 Internal hedging techniques

Internal hedging techniques are cheaper than external techniques and should therefore be considered first. There are various internal techniques available which are discussed below.

1.1 Leading and lagging

Leading involves **accelerating payments** to avoid potential additional costs due to currency rate movements.

Lagging is the practice of **delaying payments** if currency rate movements are expected to make the later payment cheaper.

Companies might try to use lead payments (payments in advance) or lagged payments (delayed payments) in order to take advantage of foreign exchange rate movements.

Illustration 1

Williams Inc – a company based in the US – imports goods from the UK. The company is due to make a payment of £500,000 to a UK supplier in one month's time. The current exchange rate is as follows.

£0.6450 = $1

If the dollar is expected to appreciate against sterling by 2% in the next month and by a further 1% in the second month, what would be Williams Inc's strategy in terms of leading and lagging and by how much would the company benefit from this strategy?

Solution

If the dollar appreciates against sterling, this means that the dollar value of payments will be smaller in two months' time than if payment was made when due. Williams Inc will therefore adopt a 'lagging' approach to its payment – that is, it will delay payment by an extra month to reduce the dollar cost.

Payment to UK supplier

	One month's time	*Two months' time*
Exchange rate	£0.6450 × 1.02 = £0.6579	£0.6579 × 1.01 = £0.6645
$ value of payment	£500,000/0.6579 = $759,994	£500,000/0.6645 = $752,445

By delaying the payment by an extra month, Williams Inc will save $7,549.

1.2 Invoicing in domestic currency

One way of avoiding transaction risk is for an **exporter** to invoice **overseas customers in its own domestic currency**, or for an **importer** to arrange with its overseas supplier **to be invoiced in its home currency**.

(a) If a Hong Kong exporter is able to quote and invoice an overseas customer in Hong Kong dollars, then the transaction risk is transferred to that customer.

(b) If a Hong Kong importer is able to arrange with its overseas supplier to be invoiced in Hong Kong dollars, then the transaction risk is transferred to that supplier.

Although either the exporter or the importer avoids transaction risk, the other party to the transaction will bear the full risk. Who ultimately bears the risk may depend on bargaining strength or the exporter's competitive position (it is unlikely to insist on payment in its own currency if it faces strong competition).

An alternative method of achieving the same result is to negotiate contracts expressed in the foreign currency but at a predetermined fixed rate of exchange.

1.3 Matching receipts and payments

A company can reduce or eliminate its transaction risk exposure by matching receipts and payments. Wherever possible, a company that expects to make payments and have receipts in the same foreign currency should plan to **offset its payments against its receipts in that currency**. The process of matching is made simpler by having **foreign currency accounts** with a bank.

Offsetting (matching payments against receipts) will be **cheaper** than arranging a forward contract to buy currency and another forward contract to sell the currency, provided that:

- Receipts occur before payments
- The time difference between receipts and payments in the currency is not too long

Any differences between the amounts receivable and the amounts payable in a given currency may be covered by a forward exchange contract (covered later in this chapter) to buy or sell the amount of the difference.

1.4 Netting

This was covered in Chapter 11 of the main workbook.

Unlike matching, netting is not technically a method of managing transaction risk. The objective is simply to save transactions costs by netting off inter-company balances before arranging payment. Many **multinational groups** of companies engage in **intra-group trading**. Where related companies located in different countries trade with each other, there is likely to be inter-company indebtedness denominated in different currencies.

1.4.1 Bilateral netting

In the case of bilateral netting, only two companies are involved. The lower balance is netted off against the higher balance and the difference is the amount remaining to be paid.

Illustration 2

Barlow plc and Orange Inc are respectively UK and US subsidiaries of a Swiss-based holding company. On 30 September 20X1 Barlow owed Orange SFr650,000 and Orange owed Barlow SFr450,000. Bilateral netting can reduce the value of the inter-company debts – the two inter-company balances are set against each other, leaving a net debt owed by Barlow to Orange of SFr200,000 (SFr650,000 – SFr450,000).

1.4.2 Multilateral netting

Multilateral netting is a more complex procedure in which the debts of more than two group companies are netted off against each other. There are different ways of arranging multilateral netting. The arrangement might be co-ordinated by the company's own central treasury or alternatively by the company's bankers.

2 Forward contracts

2.1 Failure to satisfy a forward contract

A company might be unable to satisfy a forward contract for any one of a number of reasons.

(a) An **importer** might find that:

  (i) Its supplier **fails to deliver the goods** as specified, so the importer will not accept the goods delivered and will not agree to pay for them.

  (ii) The **supplier sends fewer goods** than expected, perhaps because of supply shortages, and so the importer has less to pay for.

  (iii) The supplier is **late with the delivery**, and so the importer does not have to pay for the goods until later than expected.

(b) An **exporter** might find the same types of situation, but in reverse, so that it do not receive any payment at all, or it receives more or less than originally expected, or it receives the expected amount, but only after some delay.

2.2 Close-out of forward contracts

If a customer cannot satisfy a forward exchange contract, the bank will make the customer fulfil the contract.

(a) If the customer has arranged for the bank to buy currency but then cannot deliver the currency for the bank to buy, the bank will:

  (i) **Sell currency** to the **customer** at the **spot rate** (when the contract falls due for performance)

  (ii) **Buy** the **currency back**, under the terms of the **forward exchange contract**

(b) If the customer has contracted for the bank to sell them currency, the bank will:

  (i) Sell the customer the specified amount of currency at the forward exchange rate

  (ii) Buy back the unwanted currency at the spot rate

Thus, the bank arranges for the customer to perform their part of the forward exchange contract by either selling or buying the 'missing' currency at the spot rate. These arrangements are known as **closing out** a forward exchange contract.

2.3 Interest rate parity theory

As we have seen in Chapter 5, interest rate parity (IRP) shows that **the forward rate is determined by interest rate differences for the period of the contract.**

Illustration 3

In September 2015 the spot rate quoted by HSBC was €1.353 to £1.

The one-year forward rate quoted by HSBC on the same date was €1.340 to £1.

At this time the one-year LIBOR rate in the UK was approximately 1% and the Euro LIBOR rate was approximately 0.05%.

The actual forward rate can be predicted using the formula for IRP:

$$F_0 = S_0 \frac{(1+i_c)}{(1+i_b)}$$

Using this formula the forward rate is calculated as

$$F_0 = 1.353\frac{(1+0.0005)}{(1+0.01)} = 1.340$$ (this was the **actual** forward rate quoted above)

The forward rate reflects interest rate differences. It is not a forecast of what the spot rate will be on a given date in the future. It will be a coincidence if the forward rate turns out to be the same as the spot rate on that future date.

The forward rate can be calculated today without making any estimates of future exchange rates. **Future exchange rates** depend largely on future events and will often turn out to be very different from the forward rate. However, the forward rate is probably an **unbiased predictor of the expected value of the future exchange rate**, based on the information available today

2.4 Synthetic foreign exchange agreements

In order to reduce the volatility of their exchange rates, some governments have banned foreign currency trading. Examples of affected currencies include the Russian ruble, Indian rupee and Philippine peso.

In such markets, **synthetic foreign exchange agreements (SAFEs)** – also known as non-deliverable forwards – are used. These instruments resemble forward contracts but no currency is actually delivered. Instead the two counterparties settle the profit or loss (calculated as the difference between the agreed SAFE rate and the prevailing spot rate) on a notional amount of currency (the SAFE's face value). At no time is there any intention on the part of either party to exchange this notional amount.

Illustration 4

A lender enters into a three month SAFE with a counterparty to buy $5m worth of Philippine pesos at a rate of PHP44.000 = $1. The spot rate is PHP43.850 = $1.

When the SAFE is due to be settled in three months' time, the spot rate is PHP44.050 = $1. This means that the lender will have to pay 5m × (44.050 – 44.000) = PHP250,000 to the counterparty.

As this will be settled in dollars at the prevailing spot rate, the payment to the counterparty will be PHP250,000/44.050 = $5,675.

3 Money market hedging

3.1 Hedging payments

Suppose a British company needs to **pay** a US supplier in US dollars in three months' time. It does not have enough cash to pay now, but will have sufficient in three months' time. Instead of negotiating a forward contract, the company could:

- Borrow the appropriate amount in pounds now
- Convert the pounds to dollars immediately
- Put the dollars on deposit in a US dollar bank account
- When the time comes to pay the company:
  - Pay the supplier out of the dollar bank account
  - Repay the pound loan account

In the exam a tabular approach may be helpful.

	Importer	
	UK £s	**USA $s**
Now	**4** Withdraw funds from UK account (1 + borrowing rate)*	**3** Put money into US account (1 + deposit)*
Three months	**5** To compare to a forward	**1** Pay $ invoice from supplier **2** Pay off with $ deposit

* Remember to take the interest rate quoted and multiply by 3/12 if you have a three month loan.

A money market hedge will usually cost almost exactly the same as a forward (Step 5 above gives you the cost of the money market hedge to compare to the cost of a forward contract). If the results from a money market hedge were very different from a forward hedge, speculators could make money without taking a risk. Therefore, market forces ensure that the two hedges produce very similar results.

Illustration 5

A UK company owes a Danish supplier Kr3,500,000 in three months' time. The spot exchange rate is Kr7.5509–7.5548 = £1. The company can borrow in sterling for three months at 8.60% per annum and can deposit kroner for three months at 10% per annum.

Required

Calculate the cost in sterling with a money market hedge.

Solution

The interest rates for three months are 2.15% to borrow in pounds and 2.5% to deposit in kroner. The company needs to deposit enough kroner now so that the total including interest will be Kr3,500,000 in three months' time. This means depositing:

Kr3,500,000/(1 + 0.025) = Kr3,414,634.

These kroner will cost £452,215 (spot rate 7.5509 – remember the company will always receive the worst rate). The company must borrow this amount and, with three months' interest of 2.15%, will have to repay:

£452,215 × (1 + 0.0215) = £461,938

This can be shown in tabular form as follows.

	Importer	
	UK £s	**Danish Kr**
Now	**4** Withdraw funds from UK account Kr3,414,634/7.5509 = £452,215	**3** Put money into Kr account Kr3,500,000/1.025 = Kr3,414,634
	8.6% × 3/12 = 2.15% (ie 1.0215)	10% × 3/12 = 2.5% (ie 1.025)
Three months	**5** To compare to a forward £452,215 × 1.0215 = £461,938	**1** Pay Kr invoice from supplier 3,500,000 **2** Pay off with Kr deposit (3,500,000)

* Remember to take the interest rate quoted and multiply by 3/12.

Cost of hedge = £461,938.

3.2 Hedging receipts

A similar technique can be used to cover a foreign currency **receipt** from a customer. To manufacture a forward exchange rate, follow the steps below.

- Borrow an appropriate amount in the foreign currency today
- Convert it immediately to home currency
- Place it on deposit in the home currency
- When the supplier's cash is received:
  - Repay the foreign currency loan
  - Take the cash from the home currency deposit account

This can be shown in tabular form as follows (using an example of a UK exporter receiving $ from a US customer).

	Exporter	
	UK £	**US $**
Now	**4** Pay $ loan into UK bank account (1 + deposit rate)	**3** Take out $ loan (1 + borrowing rate)
Three months	**5** To compare to a forward	**1** Receive $ from export **2** Pay off $ loan with export revenue

Illustration 6

A US company is owed SFr2,500,000 in three months' time by a Swiss company. The spot exchange rate is SFr2.2498–2.2510 = $1. The company can deposit in dollars for three months at 8.00% per annum and can borrow Swiss francs for three months at 7.00% per annum. What is the receipt in dollars with a money market hedge and what effective forward rate would this represent?

	Exporter	
	US $	**Swiss Fr**
Now	**4** Pay SFr loan into US account SFr2,457,002/2.2510 = $1,091,516	**3** Take out SFr loan SFr2,500,000/1.0175 = SFr2,457,002
	8% × 3/12 = 2% (ie 1.02)	7% × 3/12 = 1.75% (ie 1.0175)
Three months	**5** To compare to a forward $1,091,516 × 1.02 = $1,113,346	**1** Receive SFr from export 2,500,000 **2** Pay off SFr loan with export revenue (2,500,000)

The exporter would receive $1,113,346.

The effective forward rate that has been manufactured is

SF2,500,000/$1,113,346 = 2.2455 – that is, SFr2.2455 = $1

This effective forward rate shows the Swiss franc at a premium to the US dollar, as the Swiss franc interest rate is lower than the US dollar rate.

3.3 Compared to a forward contract

Is one of these methods of hedging likely to be cheaper than the other? The answer is 'perhaps', but not by much. There will be very little difference between borrowing in foreign currency and repaying the loan with currency receivables and borrowing in the domestic currency and selling forward the currency receivables. This is because the premium or discount on the forward exchange rate reflects the interest differential between the two countries.

Interest rate parity theory suggests that the spot rate in a year forward will reflect differences in interest rates. However, if the difference between the spot rate now and the forward rate being offered now does not reflect differences in the two countries' interest rates, investors can exploit differences. They can:

- Borrow in currency A
- Deposit what they have borrowed in currency B for a period of time
- Take out a forward contract to sell currency B at the end of the period
- At the end of the period, liquidate the investment and convert the currency B proceeds to currency A under the forward contract
- Repay the amount borrowed in currency A and retain the surplus

4 Currency futures

4.1 Comparing the quick method to the longer method

The table below shows the quicker method and the longer method give the same answer in the illustrations used in Chapter 12 of the Workbook.

Beneath the table is a mathematical approach and shows that the two approaches essentially do the same thing.

This is for interest only and will not be expected knowledge in the AFM exam.

Footnote – comparison of the two methods

Longer method

Opening future 1.9556	Closing future 1.9880	Change –0.0324
	Closing spot 1.9900	
Effective rate	Closing spot – change in future 1.9900 – 0.0324 = **1.9576**	

Quick method

Opening future 1.9556	
	Closing basis –0.0020
Effective rate	Opening future rate – closing basis 1.9556 – –0.0020 = **1.9576**

Mathematical analysis

Longer method

Opening future **a**	Closing future **b**	Change **a–b**
	Closing spot **c**	
Effective rate	Closing spot + change in future c + (a–b) = c + a – b or a – b + c	

Quick method

Opening future **a**	
	Closing basis b – c
Effective rate	Opening future rate – closing basis a – (b–c) = a – b + c

Managing interest rate risk

13

Essential reading

13 Managing interest rate risk

1 Interest rate risk – introduction

1.1 Managing a debt portfolio

Corporate treasurers will be responsible for managing the company's debt portfolio; that is, in deciding how a company should obtain its short-term funds so as to:

(a) Be able to repay debts as they mature

(b) Minimise any inherent risks, notably invested foreign exchange risk, in the debts the company owes and is owed

There are a number of situations in which a company might be exposed to risk from interest rate movements.

1.2 Risks from interest rate movements

(a) **Fixed rate versus floating rate debt**

A company can get caught paying **higher interest rates** by having fixed rather than floating rate debt, or floating rather than fixed rate debt, as market interest rates change.

Expectations of interest rate movements will determine whether a company chooses to borrow at a fixed or floating rate. The term structure of interest rates – the rates available on loans of different length – should help businesses determine the market's view on how interest rates are likely to move in the future.

Fixed rate finance may be more expensive; however, the business runs the risk of **adverse upward rate movements** if it chooses floating rate finance.

Other factors include:

(i) **Finance term** (the longer the term the more difficult interest rates are to predict)

(ii) The **differences between fixed and floating rates**, plus arrangement costs or new finance

(iii) The **finance risk tolerance** of the directors

(iv) **Existing debt mix** (greater finance diversification may be desirable to hedge all possibilities)

(v) **Current pressures on liquidity** – if the business is stretched in the short term, it may prefer to take the lower rate available on floating rate debt. In doing so, it is taking the risk that rates may rise and borrowing eventually becomes more expensive. However, the directors are calculating that if this happens, the company will have accumulated sufficient cash to be able to bear the higher rates.

(b) **Currency of debt**

A company can face higher costs if it borrows in a currency for which exchange rates move adversely against the company's domestic currency. The treasurer should seek to **match the currency of the loan** with the **currency of the underlying operations/assets** that generate revenue to pay interest/repay the loans.

(c) **Term of loan**

A company can be exposed by having to **repay a loan earlier** than it can afford to, resulting in a need to reborrow, perhaps at a higher rate of interest.

(d) **Term loan or overdraft facility**

A company might prefer to **pay for borrowings only when it needs the money** as with an overdraft facility: the bank will charge a commitment fee for such a facility. Alternatively, a term loan might be preferred, but this will cost interest even if it is not needed in full for the whole term.

(e) **Rises in interest rates**

A company may plan to take out borrowing at some time in the future, but face the possibility that **interest rates may rise before the term of borrowing commences**. This problem can be addressed by using financial instruments to fix or cap the rate of interest. This is described later in this chapter.

1.3 Interest rate risk management

If the organisation faces interest rate risk, it can seek to **hedge the risk**. Alternatively, where the magnitude of the risk is **immaterial** in comparison with the company's overall cash flows or appetite for risks, one option is to **do nothing**. The company then accepts the effects of any movement in interest rates which occur.

The company may also decide to do nothing if **risk management costs are excessive**, both in terms of the costs of using derivatives and the staff resources required to manage risk effectively. **Appropriate products** may not be available and of course the company may consider hedging unnecessary, as it believes that the **chances of an adverse movement** are **remote**.

The company's **tax situation** may also be a significant determinant of its decision whether or not to hedge risk. If hedging is likely to **reduce variability of earnings**, this may have tax advantages if the company faces a higher rate of tax for higher earnings levels. The directors may also be unwilling to undertake hedging because of the need to **monitor the arrangements**, and the **requirements to fulfil the disclosure requirements** of International Financial Reporting Standards.

Illustration 1

Tate & Lyle's approach to interest rate management is noted in its annual report and is a good illustration of interest management in practice. In 2016 its annual report stated that:

The Group has an exposure to interest rate risk arising principally from changes in US dollar, sterling and euro interest rates. This risk is managed by fixing or capping portions of debt using interest rate derivatives to achieve a target level of fixed/floating rate net debt, which aims to optimise net finance expense and reduce volatility in reported earnings. The Group's policy is that between 30% and 75% of Group net debt is fixed or capped for more than one year and that no interest rates are fixed for more than 12 years. At 31 March 2016, the longest term of any fixed rate debt held by the Group was until October 2027. The proportion of net debt at 31 March 2016 … that was fixed or capped for more than one year was 60% (2015 – 31%).

(Tate & Lyle annual report 2016, p.131)

1.4 Simple techniques

Simple methods of reducing interest rate risk include the following:

- **Netting** – aggregating all positions, assets and liabilities, and hedging the net exposure
- **Smoothing** – maintaining a balance between fixed and floating rate borrowing
- **Matching** – matching assets and liabilities to have a common interest rate (eg a bank with mainly variable rate finance from deposits might look to offer mainly variable rate mortgages)
- **Pooling** – asking the bank to pool the amounts of all its subsidiaries when **considering interest levels and overdraft limits**. It should **reduce the interest payable, stop overdraft limits being breached** and **allow greater control by the treasury department**. It also gives the company the potential to take advantage of **better rates of interest** on **larger cash deposits**.

14 Financial reconstruction

Essential reading

14 Financial reconstruction

1 Leveraged buy-outs and taking a company private

In a leveraged buy-out (LBO) a publicly quoted company is acquired by a specially established private company. The private company funds the acquisition by substantial borrowing.

1.1 Procedures for going private

A public company **'goes private'** when a **small group of individuals**, possibly including existing shareholders and/or managers and with or without support from a financial institution, **buys all the company's shares**. This form of restructuring is relatively common in the US and may involve the shares in the company ceasing to be listed on a stock exchange.

1.2 Advantages

(a) The **costs of meeting listing requirements** can be saved.

(b) The **company is protected** from **volatility** in share prices which financial problems may create.

(c) The company will be **less vulnerable** to hostile takeover bids.

(d) Management can **concentrate** on the **long-term needs** of the business rather than the short-term expectations of shareholders.

(e) It may be felt that the stock market is **undervaluing the company**.

1.3 Disadvantages

The main disadvantage with LBOs is that the company loses its ability to have its shares publicly traded. If a share cannot be **traded** it may **lose some of its value**. However, one reason for seeking private company status is that the company has had difficulties as a quoted company, and the prices of its shares may be low anyway.

Business reorganisation 15

Essential reading

15 Business reorganisation

1 Demergers: advantages and disadvantages

Advantages of demergers

(a) The main advantage of a demerger is its **greater operational efficiency and the greater opportunity to realise value**. A two-division company with one loss-making division and one profit-making, fast-growing division may be better off splitting the two divisions. The profitable division may acquire a valuation well in excess of its contribution to the merged company.

(b) Even if both divisions are profit making, a demerger may still have benefits. Management can focus on **creating value for both companies individually and implementing a suitable financial structure** for each company. The full value of each company may then become appropriate.

(c) Shareholders will continue to own both companies, which means that the **diversification of their portfolio** will **remain unchanged**.

(d) The **ability** to raise **extra finance**, especially debt finance, to support new investments and expansion may be reduced.

Disadvantages of demergers

(a) The **demerger process may be expensive**.

(b) **Economies of scale** may be **lost**, where the demerged parts of the business had operations (and skills) in common to which economies of scale applied.

(c) The **smaller companies** which result from the demerger will have **lower revenue**, profits and status than the group before the demerger.

(d) There may be **higher overhead** costs as a percentage of revenue, resulting from (b).

(e) The **ability** to raise **extra finance**, especially debt finance, to support new investments and expansion may be reduced.

(f) **Vulnerability to takeover** may be **increased**. The impact on a firm's risk may be significant when a substantial part of the company is spun off. The result may be a loss in shareholder value if a relatively low beta element is unbundled.

Illustration 1

In 2010 FIAT split itself into two parts; its automotive business and its industrial business (called Fiat Industrial and including its trucks business and farm gear maker). Owners of a share in FIAT received one share in each new company. The motive was not to raise cash but to unlock value by creating a separately listed automotive group. The owners also wanted to retain their stake in both parts of the business.

Planning and trading issues for multinationals

16

Essential reading

16 Planning and trading issues for multinationals

1 General issues in trading for multinationals

A company does not become 'multinational' simply by virtue of exporting or importing products: ownership and the control of facilities abroad are involved.

Key term

Multinational enterprise: one which owns or controls production facilities or subsidiaries or service facilities outside the country in which it is based.

Multinationals operate in an international trading environment.

Here we consider some of the general advantages and disadvantages of free trade and the arguments for and against introducing restrictions against free trade (protectionism).

1.1 Theory of international trade

In the modern economy, production is based on a high degree of **specialisation**. Within a country individuals specialise, factories specialise and whole regions specialise. Specialisation increases productivity and raises the standard of living. International trade extends the principle of the division of labour and specialisation to countries. International trade originated on the basis of nations exchanging their products for others which they could not produce for themselves.

International trade arises for a number of reasons:

- Different goods require **different proportions** of **factor inputs** in their production.
- Economic resources are **unevenly distributed** throughout the world.
- The **international mobility** of **resources** is extremely **limited**.

Since it is difficult to move resources between nations, the goods which 'embody' the resources must move. The main reason for trade therefore is that there are differences in the relative efficiency with which different countries can produce different goods and services.

1.2 The law of comparative advantage

The significance of the law of comparative advantage is that it provides a justification for the following beliefs:

(a) Countries should **specialise** in what they produce, even when they are less efficient (in absolute terms) in producing every type of good. They should specialise in the goods where they have a **comparative advantage** (they are **relatively** more efficient in producing).

(b) **International trade** should be allowed to take place **without restrictions** on imports or exports – ie there should be **free trade**.

1.2.1 Does the law apply in practice?

Although countries do specialise to a degree in the production of certain goods and services, there are certain limitations or restrictions on how it operates:

(a) **Free trade does not always exist**. Some countries take action to protect domestic industries and discourage imports. This means that a country might produce goods in which it does not have a comparative advantage.

(b) **Transport costs** can be **very high** in international trade so that it is cheaper to produce goods in the home country rather than to import them.

1.3 The advantages of international trade

The law of comparative advantage is perhaps the major advantage of encouraging international trade. However, there are other advantages to the countries of the world from encouraging international trade. These are as follows:

(a) Some countries have a **surplus** of **raw materials** to their needs, and others have a deficit. A country with a surplus (eg oil) can take advantage of its resources to export them. A country with a deficit of a raw material must either import it, or accept restrictions on its economic prosperity and standard of living.

(b) International trade **increases competition** among suppliers in the world's markets. Greater competition reduces the likelihood of a market for a good in a country being dominated by a monopolist. The greater competition will force firms to be competitive and so will increase the pressures on them to be **efficient**, and also perhaps to produce goods of a high quality.

(c) International trade creates larger markets for a firm's output, and so some firms can benefit from **economies of scale** by engaging in export activities.

(d) There may be **political advantages** to international trade, because the development of **trading links** provides a foundation for **closer political links**. An example of the development of political links based on trade is the **European Union**.

1.4 Barriers to entry

Key term

Barriers to entry: factors which make it difficult for suppliers to enter a market.

Multinationals may face various entry barriers. All these barriers may be more difficult to overcome if a multinational is investing abroad because of such factors as unfamiliarity with local consumers and government favouring local firms.

Strategies of expansion and diversification imply some logic in carrying on operations. It might be a better decision, although a much harder one, to cease operations or to pull out of a market completely. There are likely to be **exit barriers** making it difficult to pull out of a market.

1.4.1 Product differentiation

An **existing major supplier** would be able to exploit its position as supplier of an established product that the consumer/customer can be persuaded to believe is better. A new entrant to the market would have to design a better product, or convince customers of the product's qualities, and this might involve spending substantial sums of money on R&D, advertising and sales promotion.

1.4.2 Cost barriers

These can exist where an existing supplier has access to **cheaper raw material sources** or know-how that the new entrant would not have. This gives the existing supplier an advantage because its input costs would be cheaper in absolute terms than those of a new entrant.

Also, existing firms may be large so new entrants to the market would have to be able to achieve a substantial market share before they could be competitive in terms of matching the economies of scale of existing firms.

1.4.3 Legal barriers

These are barriers where a supplier is fully or partially protected by law. For example, there are some legal monopolies (nationalised industries perhaps) and a company's products might be protected by patent (for example, computer hardware and software).

1.5 Protectionist measures

Protection can be applied in several ways, including the following.

1.5.1 Tariffs

Tariffs or customs duties are taxes on imported goods. The effect of a tariff is to raise the price paid for the imported goods by domestic consumers, while leaving the price paid to foreign producers the same, or even lower. The difference is transferred to the government sector.

For example, if goods imported to the UK are bought for £100 per unit, which is paid to the foreign supplier, and a tariff of £20 is imposed, the full cost to the UK buyer will be £120, with £20 going to the Government.

1.5.2 Quotas

Import quotas are restrictions on the **quantity** of a product that is allowed to be imported into the country. The quota has a similar effect on consumer welfare to that of import tariffs, but the overall effects are more complicated.

- Both domestic and foreign suppliers enjoy a higher price, while consumers buy less.
- Domestic producers supply more.
- There are fewer imports (in volume).
- The Government collects no revenue.

An **embargo** on imports from one particular country is a total ban, ie effectively a zero quota.

1.5.3 Tariffs

An enormous range of government subsidies and assistance for exports and deterrents against imports have been practised, such as:

(a) **For exports** – export credit guarantees (government-backed insurance against bad debts for overseas sales), financial help (such as government grants to the aircraft or shipbuilding industry) and State assistance via the Foreign Office

(b) **For imports** – complex import regulations and documentation, or special safety standards demanded from imported goods and so on

1.6 Arguments against protection

Arguments against protection are as follows:

Reduced international trade

Because protectionist measures taken by one country will almost inevitably provoke retaliation by others, protection will reduce the volume of international trade. This means that the following benefits of international trade will be reduced:

(a) **Specialisation**

(b) **Greater competition**, and so greater efficiency among producers

(c) The advantages of **economies of scale** among producers who need world markets to achieve their economies and so produce at lower costs

Retaliation

Obviously it is to a nation's advantage if it can apply protectionist measures while other nations do not. But because of **retaliation by other countries**, protectionist measures to reverse a balance of trade deficit are unlikely to succeed. Imports might be reduced, but so too would exports.

Effect on economic growth

It is generally argued that widespread protection will damage the **prospects for economic growth** among the countries of the world, and protectionist measures ought to be restricted to 'special cases' which might be discussed and negotiated with other countries.

Political consequences

Although from a nation's own point of view protection may improve its position, protectionism leads to a **worse outcome for all**. Protection also creates political ill-will among countries of the world and so there are **political disadvantages** in a policy of protection.

1.7 Arguments in favour of protection

Imports of cheap goods

Measures can be taken against imports of cheap goods that compete with higher priced domestically produced goods, and so **preserve output and employment** in domestic industries. In the UK, advocates of protection have argued that UK industries are declining because of competition from overseas, especially the Far East, and the advantages of more employment at a reasonably high wage for UK labour are greater than the disadvantages that protectionist measures would bring.

Dumping

Measures might be necessary to counter **'dumping'** of surplus production by other countries at an uneconomically low price. Although dumping has short-term benefits for the countries receiving the cheap goods, the longer-term consequences would be a **reduction** in **domestic output** and **employment**, even when domestic industries in the longer term might be more efficient.

Retaliation

This is why protection tends to spiral once it has begun. Any country that does not take protectionist measures when other countries are doing so is likely to find that it suffers all of the disadvantages and none of the advantages of protection.

Infant industries

Protectionism can protect a country's **'infant industries'** that have not yet developed to the size where they can compete in international markets. **Less developed countries** in particular might need to protect industries against competition from advanced or developing countries.

Declining industries

Without protection, the industries might collapse and there would be severe problems of sudden mass unemployment among workers in the industry.

2 International institutions and markets

2.1 Country-specific central banks

2.1.1 European Central Bank

The European Central Bank (ECB) was established in 1998 and is based in Frankfurt. It is responsible for administering the monetary policy of the EU Eurozone member states and is thus one of the world's most powerful central banks.

The main objective of the ECB is to maintain price stability within the Eurozone (keep inflation low). Its key tasks are to define and implement monetary policy for the Eurozone member states and to conduct foreign exchange operations.

The main relevance of the ECB to a multinational organisation is that by keeping inflation low, the ECB can help to create long-term financial stability. For example, low inflation should help to protect the value of the euro over the long-term. This is helpful to multinational organisations with assets and profits denominated in euros.

2.1.2 Bank of England

The Bank of England is the central bank of the UK. In 1997 it became an independent public organisation with independence on setting monetary policy.

One of the key roles of the Bank of England is the maintenance of price stability and support of British economic policies (thus promoting economic growth).

Stable prices and market confidence in sterling are the two main criteria for **monetary stability**. The bank aims to meet inflation targets set by the Government by adjusting interest rates (determined by the Monetary Policy Committee which meets on a monthly basis).

Financial stability is maintained by protecting against threats to the overall financial system. Such threats are detected through the bank's surveillance and market intelligence functions and are dealt with through domestic and international financial operations.

The bank can also operate as a **'lender of last resort'** – that is, it will extend credit when no other institution will. There are several examples of this function during the global financial crisis, for example Northern Rock in 2007. This function is now performed by UK Financial Investments Ltd (set up by the Government) but the Bank of England still remains 'lender of last resort' in the event of any further major shocks to the UK financial system.

2.1.3 US Federal Reserve System

The Federal Reserve System (known as the Fed) is the central banking system of the US. Created in 1913, its responsibilities and powers have evolved significantly over time. Its current main duties include conducting the US monetary policy, maintaining stability of the financial system and supervising and regulating banking institutions.

While the Board of Governors states that the Fed can make decisions without ratification by the President or any other member of government, its authority is derived from US Congress and subject to its oversight.

The Fed also acts as the 'lender of last resort' to those institutions that cannot obtain credit elsewhere and the collapse of which would have serious repercussions for the economy. However, the Fed's role as lender of last resort has been criticised, as it shifts risk and responsibility from the lenders and borrowers to the general public in the form of inflation.

2.1.4 Bank of Japan

The Bank of Japan is Japan's central bank and is based in Tokyo. Following several restructures in the 1940s, the bank's operating environment evolved during the 1970s whereby the closed economy and fixed foreign currency exchange rate was replaced with a large open economy and variable exchange rate.

In 1997, a major revision of the Bank of Japan Act was intended to give the bank greater independence from the Government, although the bank had already been criticised for having excessive independence and lack of accountability before these revisions were introduced. However, the Act has tried to ensure a certain degree of dependence by stating that the bank should always maintain in close contact with the Government to ensure harmony between its currency and monetary policies and those of the Government.

2.2 International financial markets

One of the main developments of the last few decades has been the globalisation of the financial markets.

This globalisation has been buoyed by the expansion of the EU, the rise of China and India as important trading players in the world economy and the creation of the WTO. The globalisation in financial markets is manifested in developments in international equity markets, in international bond markets and in international money markets.

2.2.1 Development of emerging markets

Private capital flows are important for emerging economies, and the transfer of flows has increased significantly as a result of the development in international capital markets. The capital flows to emerging markets take three forms.

(a) **Foreign direct investment** by multinational companies.

(b) **Borrowing from international banks**. Borrowing from international banks is becoming more important. There are several advantages in borrowing from international banks. It is possible to obtain better terms and in currencies which may be more appropriate in terms of the overall risk exposure of the company.

(c) **Portfolio investment** in emerging markets capital markets. Emerging markets equity has become a distinct area for investment, with many specialist investment managers dedicated to emerging markets.

3 Transfer pricing

Multinational companies (MNCs) supply their affiliates with capital, technology and managerial skills, for which the parent firm receives a stream of dividend and interest payments, royalties and licence fees. At the same time, significant intra-firm transfers of goods and services occur.

For example, the subsidiary may provide the parent company with raw materials, whereas the parent company may provide the subsidiary with final goods for distribution to consumers in the host country. For intra-firm trade both the parent company and the subsidiary need to charge prices. These prices for goods, technology or services between wholly or partly owned affiliates of the multinational are called transfer prices.

3.1 Types

Cost-based methods of transfer pricing

The supplying division has its costs of manufacturing refunded and may also be allowed a mark-up to encourage the transfer. Standard costing should be used where possible to encourage the division providing the transferred good or service (the selling division) to control its own costs.

(a) Variable/marginal cost

The selling division (S) should transfer goods to the buying division at the marginal cost of production if S has spare capacity as the marginal costs reflects the true cost to the company of the transfer taking place.

(b) Full cost

Full cost = variable costs plus fixed overheads and sometimes this also includes a mark-up.

This may lead to high transfer price and therefore the receiving division look to use an external supplier instead, and this may not be a correct decision because fixed costs and profit-mark-up are not relevant costs for decision-making.

(c) Dual pricing and two-part tariff systems

Fixed costs can be considered in a variable/marginal cost-based transfer pricing system using a two-part tariff. This involves setting transfer prices are set at variable cost and once a year there is a transfer of a fixed fee to the supplying division representing an allowance for its fixed costs. This should allow the supplying division to cover its fixed costs and make a profit.

Market-based approaches to transfer pricing

Where a market price exists it can be used as the basis for a transfer. If the supplying division is at full capacity then the revenue it loses as a result of an internal transfer shows the true cost (revenue foregone) to the division of an internal transfer.

If a division would have to incur marketing costs to sell externally then the market price should be adjusted to reflect the fact that an internal transfer would not incur this cost. So the transfer price becomes lower ie market price – marketing costs.

Opportunity cost approach to transfer pricing

Transfer price is calculated as marginal cost to selling division + opportunity cost of resources used.

Opportunity cost is contribution lost from the external sale forgone or, if no external market for the intermediate product exists, the opportunity cost (or shadow price) is the opportunity lost by not using resources on alternative products.

3.2 Disputes

The size of the transfer price will affect the costs of one profit centre and the revenues of another. Since profit centre managers are held accountable for their costs, revenues and profits, they are likely to **dispute** the size of transfer prices with each other, or disagree about whether one profit centre should do work for another or not. Transfer prices affect the behaviour and decisions of profit centre managers.

If managers of individual profit centres are tempted to make decisions that are harmful to other divisions and are not congruent with the goals of the organisation as a whole, the problem is likely to emerge in disputes about the transfer price.

Disagreements about output levels tend to focus on the transfer price. There is presumably a profit-maximising level of output and sales for the organisation as a whole. However, unless each profit centre also **maximises** its **own profit** at the corresponding level of output, there will be **interdivisional disagreements** about output levels and the profit-maximising output will not be achieved.

3.2.1 Advantages of market value transfer prices

Giving profit centre managers the freedom to negotiate prices with other profit centres as though they were independent companies will tend to result in **market-based transfer prices**.

(a) In most cases where the transfer price is at market price, internal transfers should be expected, because the buying division is likely to benefit from a **better quality of service**, **greater flexibility** and **dependability of supply**. However, this may not always be the case.

(b) Both divisions may benefit from **lower costs** of **administration**, **selling** and **transport**.

A market price as the transfer price would therefore result in decisions which would be in the best interests of the company or group as a whole, and will reduce the risk of disputes.

3.2.2 Disadvantages of market value transfer prices

Market value as a transfer price does have certain disadvantages.

(a) The **market price** may be **temporary**, induced by adverse economic conditions or dumping, or it might depend on the volume of output supplied to the external market by the profit centre.

(b) A **transfer price** at market value might, under some circumstances, act as a **disincentive** to use up any spare capacity in the divisions. A price based on incremental cost, in contrast, might provide an incentive to use up the spare resources in order to provide a marginal contribution to profit.

(c) Many products do **not have** an **equivalent market price**, so that the price of a similar product might be chosen. In such circumstances, the option to sell or buy on the open market does not exist.

(d) There might be an **imperfect external market** for the transferred item so that, if the transferring division tried to sell more externally, it would have to reduce its selling price.

(e) **Internal transfers** are often **cheaper** than **external sales**, with savings in selling costs, bad debt risks and possibly transport costs. It would therefore seem reasonable for the buying division to expect a discount on the external market price, and to negotiate for such a discount.

3.3 Motivations for transfer pricing

In deciding on their transfer pricing policies, MNCs take into account many internal and external factors or motivations for transfer pricing. In terms of internal motivations these include the following:

Performance evaluation

When different affiliates within a multinational are treated as standalone profit centres, transfer prices are needed internally by the multinational to determine profitability of the individual divisions. Transfer prices which deviate too much from the actual prices will make it difficult to properly monitor the performance of an affiliated unit.

Management incentives

If transfer prices used for internal measures of performance by individual affiliates deviate from the true economic prices, and managers are evaluated and rewarded on the basis of the distorted profitability, then it may result in corporate managers behaving in an irresponsible way.

Cost allocation

When units within the multinational are run as cost centres, subsidiaries are charged a share of the costs of providing the group service function so that the service provider covers its costs plus a small mark-up. Lower or higher transfer prices may result in a subsidiary bearing less or more of the overheads.

Financing considerations

Transfer pricing may be used in order to boost the profitability of a subsidiary, with the parent company undercharging the subsidiary. Such a boost in the profitability and its credit rating may be needed by the subsidiary in order to succeed in obtaining funds from the host country.

Transfer pricing can also be used to disguise the profitability of the subsidiary in order to justify high prices for its products in the host country and to be able to resist demands for higher wages.

Several external motivations can affect the multinational's choice of transfer prices. Because multinationals operate in two or more jurisdictions, transfer prices must be assigned for intra-firm trade that crosses national borders.

Tariffs

Border taxes, such as tariffs and export taxes, are often levied on crossborder trade. Where the tax is levied on an ad valorem basis, the higher the transfer price, the larger the tax paid per unit. Whether an MNC will follow high transfer price strategy or not may depend on its impact on the tax burden. When border taxes are levied on a per-unit basis (ie specific taxes), the transfer price is irrelevant for tax purposes.

Rule of origin rule

Another external factor is the need to meet the rule of origin that applies to crossborder flows within a free trade area. Since border taxes are eliminated within the area, rules of origin must be used to determine eligibility for duty-free status. Over- or under-invoicing inputs is one way to avoid customs duties levied on products that do not meet the rule of origin test.

Exchange control and quotas

Transfer pricing can be used to avoid currency controls in the host country. For example, a constraint in profit repatriation could be avoided by the parent company charging higher prices for raw materials, or higher fees for services provided to the subsidiary. The parent company will have

higher profits and a higher tax liability and the subsidiary will have lower profitability and a lower tax liability.

When the host country restricts the amount of foreign exchange that can be used to import goods, then a lower transfer price allows a greater quantity of goods to be imported.

Taxes

MNCs use transfer pricing to channel profits out of high tax rate countries into lower ones. A parent company may sell goods at lower than normal prices to its subsidiaries in lower tax rate countries and buy from them at higher than normal prices. The resultant loss in the parent's high-tax country adds significantly to the profits of the subsidiaries. An MNC reports most of its profits in a low-tax country, even though the actual profits are earned in a high-tax country.

Illustration 2

A multinational company based in Beeland has subsidiary companies in Ceeland and in the UK. The UK subsidiary manufactures machinery parts which are sold to the Ceeland subsidiary for a unit price of B$420 (420 Beeland dollars), where the parts are assembled. The UK subsidiary shows a profit of B$80 per unit; 200,000 units are sold annually.

The Ceeland subsidiary incurs further costs of B$400 per unit and sells the finished goods on for an equivalent of B$1,050.

All the profits from the foreign subsidiaries are remitted to the parent company as dividends. Double taxation treaties between Beeland, Ceeland and the UK allow companies to set foreign tax liabilities against their domestic tax liability.

The following rates of taxation apply:

	UK	*Beeland*	*Ceeland*
Tax on company profits	25%	35%	40%
Withholding tax on dividends	–	12%	10%

Required

Show the tax effect of increasing the transfer price between the UK and Ceeland subsidiaries by 25%.

Solution

The current position is as follows:

	UK company B$'000	*Ceeland company* B$'000	*Total* B$'000
Revenues and taxes in the local country			
Sales	84,000	210,000	294,000
Production expenses	(68,000)	(164,000)	(232,000)
Taxable profit	16,000	46,000	62,000
Tax (1)	(4,000)	(18,400)	(22,400)
Dividends to Beeland	12,000	27,600	39,600
Withholding tax (2)	0	2,760	2,760
Revenues and taxes in Beeland			
Dividend	12,000	27,600	39,600
Add back foreign tax paid	4,000	18,400	22,400
Taxable income	16,000	46,000	62,000
Beeland tax due	5,600	16,100	21,700
Foreign tax credit	(4,000)	(16,100)	(20,100)
Tax paid in Beeland (3)	1,600	–	1,600
Total tax (1) + (2) + (3)	5,600	21,160	26,760

An increase of 25% in the transfer price would have the following effect:

	UK company B$'000	*Ceeland company* B$'000	*Total* B$'000
Revenues and taxes in the local country			
Sales	105,000	210,000	315,000
Production expenses	(68,000)	(185,000)	(253,000)
Taxable profit	37,000	25,000	62,000
Tax (1)	(9,250)	(10,000)	(19,250)
Dividends to Beeland	27,750	15,000	42,750
Withholding tax (2)	0	1,500	1,500
Revenues and taxes in Beeland			
Dividend	27,750	15,000	42,750
Add back foreign tax paid	9,250	10,000	19,250
Taxable income	37,000	25,000	62,000
Beeland tax due	12,950	8,750	21,700
Foreign tax credit	(9,250)	(8,750)	(18,000)
Tax paid in Beeland (3)	3,700	–	3,700
Total tax (1) + (2) + (3)	12,950	11,500	24,450

The total tax payable by the company is therefore reduced by B$2,310,000 to B$24,450,000.

3.4 Regulations

3.4.1 Transfer price manipulation

As we have discussed in the previous section, transfer pricing is a normal, legitimate and, in fact, required activity. Firms set prices on intra-firm transactions for a variety of perfectly legal and rational internal reasons and, even where pricing is not required for internal reasons, governments may require it in order to determine how much tax revenues and customs duties are owed by the MNC. **Transfer price manipulation**, on the other hand, exists when MNCs use transfer prices to evade or avoid payment of taxes and tariffs, or other controls that the Government of the host country has put in place.

Governments worry about transfer price manipulation because they are concerned with the loss of revenues through tax avoidance or evasion and they dislike the loss of control. Overall MNC profits after taxes may be raised by either under- or over invoicing the transfer price; such manipulation for tax purposes, however, comes at the expense of distorting other goals of the firm; in particular, evaluating management performance.

Illustration 3

Starbucks became the poster child for corporate tax avoidance in 2012 after details of its meagre tax contribution emerged. It was accused of using artificial corporate structures to shift profits out of the UK into lower tax jurisdictions.

The furore prompted a deal with HMRC to waive tax deductions and pay £20 million in voluntary corporation tax over two years, including £11.2 million last year.

(Starbucks said that it sourced UK coffee from its wholesale trading subsidiary in Switzerland. It has been suggested that while this may be sensible to have one team responsible for sourcing all of Starbucks' coffee, it is hard to escape the conclusion that Switzerland would not be a major centre for coffee trading in the first place if it did not charge a lowly 12% tax rate on the trading profits. Starbucks also charges its UK operations for use of its brand name, technology and engineering support.)

Starbucks paid nearly as much corporation tax in 2015 as it did in its first 14 years in the UK, after bowing to pressure to scrap its complex tax structures.

(Davies, 2015)

3.4.2 The arm's length standard

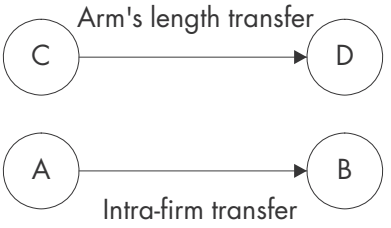
Key term

Arm's length standard: states that intra-firm trade of multinationals should be priced as if they took place between unrelated parties acting at arm's length in competitive markets.

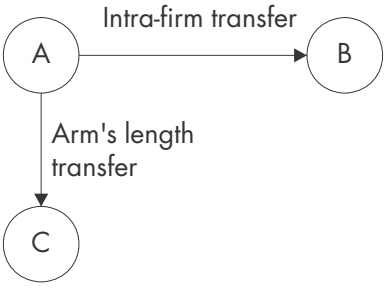
The most common solution that tax authorities have adopted to reduce the probability of the transfer price manipulation is to develop particular transfer pricing regulations as part of the corporate income tax code. These regulations are generally based on the concept of the arm's length standard, which says that all MNC intra-firm activities should be priced as if they took place between unrelated parties acting at arm's length in competitive markets.

The arm's length standard has two methods.

Method 1: Use the price negotiated between two unrelated parties C and D to proxy for the transfer between A and B.



Method 2: Use the price at which A sells to unrelated party C to proxy for the transfer price between A and B.



In practice, the method used will depend on the available data. That is the existence of unrelated parties that engage in the same, or nearly the same, transactions under the same or nearly the same circumstances. Does one of the related parties also engage in the same, or nearly the same, transactions with an unrelated party under the same, or nearly the same circumstances? Where there are differences, are they quantifiable? Do the results seem reasonable in the circumstances?

If the answers to these questions are yes, then the arm's length standard will yield a reasonable result. If the answers are no, then alternative methods must be used.

The main methods of establishing 'arm's length' transfer prices of tangible goods include the following.

Method	Explanation
Comparable uncontrolled price (CUP)	The CUP method looks for a comparable product to the transaction in question, either in terms of the same product being bought or sold by the MNC in a comparable transaction with an unrelated party, or the same or similar product being traded between two unrelated parties under the same or similar circumstances. The product so identified is called a **product comparable**. All the facts and circumstances that could materially affect the price must be considered. Tax authorities prefer the CUP method over all other pricing methods for at least two reasons. First, it incorporates more information about the specific transaction than does any other method; ie it is transaction and product specific. Second, CUP takes the interests of both the buyer and seller into account since it looks at the price as determined by the intersection of demand and supply.

Method	Explanation
Resale price (RP)	Where a product comparable is not available, and the CUP method cannot be used, an alternative method is to focus on one side of the transaction, either the manufacturer or the distributor, and to estimate the transfer price using a functional approach. Under the RP method, the tax auditor looks for firms at similar trade levels that perform similar distribution functions (ie a **functional comparable**). The **RP** method is best used when the distributor adds relatively little value to the product so that the value of its functions is easier to estimate. The assumption behind the **RP** method is that competition among distributors means that similar margins (returns) on sales are earned for similar functions.
Cost plus (C+)	The C+ method starts with the costs of production, measured using recognised accounting principles, and then adds an appropriate mark-up over costs. The appropriate mark-up is estimated from those earned by similar manufacturers. The assumption is that in a competitive market the percentage mark-ups over cost that could be earned by other arm's length manufacturers would be roughly the same. The C+ method works best when the producer is a simple manufacturer without complicated activities so that its costs and returns can be more easily estimated.
Profit split (PS)	When there are no suitable product comparables (the CUP method) or functional comparables (the RP and C+ methods), the most common alternative method is the PS method, whereby the profits on a transaction earned by two related parties are split between the parties. The PS method allocates the consolidated profit from a transaction, or group of transactions, between the related parties. Where there are no comparables that can be used to estimate the transfer price, this method provides an alternative way to calculate or 'back into' the transfer price. The most commonly recommended ratio to split the profits on the transaction between the related parties is return on operating assets (the ratio of operating profits to operating assets). The PS method ensures that both related parties earn the same ROA.

4 Developments in world financial markets

4.1 Credit default swaps and the credit crunch

Credit default swaps (CDSs) act in a similar way to insurance policies. When two parties enter into a credit default swap, the buyer agrees to pay a fixed **spread** to the seller (see below). In return, the seller agrees to purchase a specified financial instrument from the buyer at the instrument's nominal value in the event of default. You could liken this transaction to a house insurance policy – in the event of a fire, the buyer of the policy will receive whatever the damaged or destroyed goods are worth in monetary terms.

The **spread** of a CDS is the **annual amount** the protection buyer must pay the protection seller over the length of the contract (like an insurance premium), expressed as a **percentage of the notional amount**. The **more likely** the risk of default, **the larger the spread**. For example, if the CDS spread of the reference entity is 50 basis points (or 0.5%) then an investor buying

$10 million worth of protection from a bank must pay the bank $50,000 per year. These payments continue until either the CDS contract expires or the reference entity defaults.

Unlike insurance, however, CDSs are **unregulated**. This means that contracts can be traded – or swapped – from investor to investor without anyone overseeing the trades to ensure the buyer has the resources to cover the losses if the security defaults.

By the end of 2007, the CDS market was valued at more than $45 trillion – more than twice the size of the combined GDP of the US, Japan and the EU. An original CDS can go through as many as 15 to 20 trades; therefore, when a default occurs, the so-called 'insured' party or hedged party does not know who is responsible for making up the default or indeed whether the end party has the funds to do so.

When the economy is booming, CDS can be seen as a means of making 'easy' money for banks. Corporate defaults in a booming economy are few, thus swaps are a low-risk way of collecting premiums and earning extra cash.

The CDS market expanded into **structured finance** from its original confines of municipal bonds and corporate debt and then into the secondary market where **speculative investors** bought and sold the instruments without having any direct relationship with the underlying investment. Their behaviour was almost like **betting** on whether the investments would succeed or fail.

Illustration 4

A hedge fund believes that a company (Drury Inc) will shortly default on its debt of $10 million. The hedge fund may therefore buy $10 million worth of CDS protection for, say, two years, with Drury Inc as the reference entity, at a spread of 500 basis points (5%) per annum.

If Drury Inc does default after, say, one year, then the hedge fund will have paid $500,000 to the bank but will then receive $10 million (assuming zero recovery rate). The bank will incur a $9.5 million loss unless it has managed to offset the position before the default.

If Drury Inc does not default, then the CDS contract will run for two years and the hedge fund will have paid out $1 million to the bank with no return. The bank makes a profit of $1 million; the hedge fund makes a loss of the same amount.

What would happen if the hedge fund decided to liquidate its position after a certain period of time in an attempt to lock in its gains or losses? Say after one year the market considers Drury Inc to be at greater risk of default, and the spread widens from 500 basis points to 1,500. The hedge fund may decide to sell $10 million protection to the bank for one year at this higher rate. Over the two years, the hedge fund will pay the bank $1 million (2 × 5% × $10 million) but will receive $1.5 million (1 × 15% × $10 million) – a net profit of $500,000 (as long as Drury Inc does not default in the second year).

4.1.1 Use of CDS for hedging

CDSs are often used to manage the credit risk (risk of default) which arises from holding debt. For example, the holder of a corporate bond may hedge their exposure by entering into a CDS contract as the buyer of protection. If the bond goes into default, the proceeds from the CDS contract will cancel out the losses on the underlying bond.

Example

A pension fund owns $10 million of a five-year bond issued by Dru Inc. In order to manage the risk of losses in the event of a default by Dru Inc, the pension fund buys a CDS from a bank with a notional amount of $10 million. Assume the CDS trades at 300 basis points (3%) which means that the pension fund will pay the bank an annual premium of $300,000.

If Dru Inc does not default on the bond, the pension fund will pay a total premium of 5 × $300,000 = $1.5 million to the bank and will receive the $10 million back at the end of the 5 years. Although it has lost $1.5 million, the pension fund has hedged away the default risk.

If Dru Inc defaults on the bond after, say, 2 years, the pension fund will stop paying the premiums and the bank will refund the $10 million to compensate for the loss. The pension fund's loss is limited to the premiums it had paid to the bank (2 × $300,000 = $600,000) – if it had not hedged the risk, it would have lost the full $10 million.

4.1.2 CDS and the credit crunch

American International Group (AIG) – the world's largest insurer – could issue CDSs without putting up any real collateral **as long as it maintained a triple-A credit rating**. There was no real capital cost to selling these swaps; there was no limit. Thanks to **fair value accounting**, AIG could book the profit from, say, a five-year credit default swap as soon as the contract was sold, based on the **expected** default rate. In many cases, the profits it booked never materialised.

On 15 September 2007 the bubble burst when all the major credit-rating agencies downgraded AIG. At issue were the soaring losses in its CDSs. The first big write-off came in the fourth quarter of 2007, when AIG reported an $11 billion charge. It was able to raise capital once, to repair the damage. But the losses kept growing. The moment the downgrade came, AIG was forced to come up with tens of billions of additional collateral immediately. This was on top of the billions it owed to its trading partners. It didn't have the money. The world's largest insurance company was bankrupt.

As soon as AIG went bankrupt, all those institutions which had hedged debt positions using AIG CDSs had to **mark down** the value of their assets, which at once **reduced their ability to lend**. The investment banks had **no ability to borrow**, as the collapse of the CDS market meant that no one was willing to insure their debt. The credit crunch had started in earnest.

4.2 Benefits of tranching

Tranching is an aspect of securitisation. Securitisation allows a company to convert assets back into cash and to remove the risk of non-payment associated with those assets.

Tranching involves transferring assets to a special purpose vehicle (SPV) and then selling loan notes/bonds backed by the income stream from these assets. This can allow a company to obtain low cost finance because the finance is directly secured by a reliable income stream.

Tranching can attract investors because it is a good way of **dividing risk**. Anyone who invests in risky loans is taking a chance, but tranching lets you divide the chances up, so that people who want safety can buy the top (senior) tranches, get less of a profit, but know that they're not going to lose out unless things go seriously wrong. People who are willing to take their chances in the lower (junior) tranches know that they're taking a significant risk, but they can potentially make a lot more money.

4.3 Risks of tranching

(a) Tranches are very **complex**; most investors do not really understand the risks associated with each tranche.

(b) Stripping out low risk assets and transferring them to an SPV may increase the risk faced by the other investors in the company and may lead to an increase in that company's costs of capital.

4.4 Money laundering legislation

One of the side effects of globalisation and the free movement of capital has been the growth in **money laundering**.

Key term

Money laundering: constitutes any financial transactions whose purpose is to conceal the identity of the parties to the transaction or to make the tracing of the money difficult.

Money laundering is used by organised crime and terrorist organisations but it is also used in order to avoid the payment of taxes or to distort accounting information. Money laundering involves therefore a number of agents and entities from criminals and terrorists to companies and corrupt officials or states as well as tax havens.

Some businesses are at a higher risk than others of money laundering. For example, businesses dealing in luxury items of high value can be at risk of the products being resold through the black market or returned to the retailer in exchange for a legitimate cheque from them.

The increasing complexity of financial crime and its increase has prompted national governments and the EU to legislate and regulate the contact of transactions. The Fourth Money Laundering Directive of the EU has recently been implemented across the EU.

At the same time the Financial Services Authority required that professionals who engage in the provision of financial services should warn the authorities when they discover that illegal transactions have taken place.

4.4.1 Regulation

Regulations differ across various countries but it is common for companies to be required to assess the risk of money laundering in their business and take necessary action to alleviate this risk.

Assessing risk – the risk-based approach

The risk-based approach consists of a number of steps:

- Identifying the money laundering risks that are relevant to the business
- Carrying out a detailed risk assessment on such areas as customer behaviour and delivery channels
- Designing and implementing controls to manage and reduce any identified risks
- Monitor the effectiveness of these controls and make improvements where necessary
- Maintain records of actions taken and reasons for these actions

The time and cost of carrying out such assessments will depend on the size and complexity of the business but will require considerable effort to ensure compliance with regulations.

Assessing your customer base

Businesses with certain types of customers are more at risk of money laundering activities and will therefore be required to take more stringent action to protect themselves. Types of customers that pose a risk include the following:

- New customers carrying out large, one-off transactions
- Customers who have been introduced to you by a third party who may not have assessed their risk potential thoroughly
- Customers who aren't local to your business
- Customers whose businesses handle large amounts of cash

Other customers who might pose a risk include those who are unwilling to provide identification and who enter into transactions that do not make commercial sense. Before companies commence business dealings with a customer, they should conduct suitable customer due diligence.

Customer due diligence

This is an official term for taking steps to check that your customers are who they say they are. In practice, the best and easiest way to do this is to ask for official identification, such as a passport or driving licence, together with utility bills and bank statements. On a personal level, if you are trying to arrange a loan or open a bank account, it is very likely you will be asked to produce such identification.

If customers are acting on behalf of a third party, it is important to identify who the third party is.

Applying customer due diligence

Businesses should apply customer due diligence whenever they feel it necessary but at least in any of the following circumstances.

(a) When establishing a business relationship. This is likely to be a relationship that will be ongoing, therefore it is important to establish identity and credibility at the start. You may have to establish such information as the source and origin of funds that your customer will be using, copies of recent and current financial statements and details of the customer's business or employment.

(b) When carrying out an 'occasional transaction' worth for example €10,000 (this relates to EU legislation) or more – that is, transactions that are not carried out within an ongoing business relationship. You should also look out for 'linked' transactions which are individual transactions of €10,000 or more that have been broken down into smaller, separate transactions to avoid due diligence checks.

(c) When you have doubts about identification information that you obtained previously.

(d) When the customer's circumstances change – for example, a change in the ownership of the customer's business and a significant change in the type of business activity of the customer.

Ongoing monitoring of your business

It is important that you have an effective system of internal controls to protect your business from being used for money laundering. Staff should be suitably trained in the implementation of these internal controls and be alert to any potential issues. A specific member of staff should be nominated as the person to whom any suspicious activities should be reported.

Full documentation of anti money laundering policies and procedures should be kept and updated as appropriate. Staff should be kept fully informed of any changes.

Maintaining full and up to date records

Businesses are generally required to keep full and up to date records for financial reporting and auditing purposes but these can also be used to demonstrate compliance with money laundering regulations. Such records will include receipts, invoices and customer correspondence. European money laundering regulations require that such information be kept for each customer for five years beginning on either the date a transaction is completed or the date a business relationship ends.

Ownership

Businesses are often required to hold accurate information on the identity of individuals who ultimately own or control the company (eg own more than 25% of a company's shares or voting rights). Where beneficial ownership is held through a trust, the trustees (or any individuals who control the activities of the trust) will be recorded as having the relevant interest.

4.4.2 Cost of compliance

All the activities listed above do not come cheaply, especially if policies and procedures are being established for the first time. In addition, regulations in the UK state that all accountants in public practice must be supervised and monitored in their compliance and must be registered with a supervisory body.

ACCA is one of the supervisory bodies and is responsible for monitoring its own members. However, such supervision comes at a cost and monitored firms are expected to pay a fee for this service.

Further question practice

1 Mezza 49 mins

Mezza Co is a large food manufacturing and wholesale company. It imports fruit and vegetables from countries in South America, Africa and Asia, and packages them in steel cans and plastic tubs and as frozen foods, for sale to supermarkets around Europe. Its suppliers range from individual farmers to government-run co-operatives, and farms run by its own subsidiary companies. In the past, Mezza Co has been very successful in its activities, and has an excellent corporate image with its customers, suppliers and employees. Indeed Mezza Co prides itself on how it has supported local farming communities around the world and has consistently highlighted these activities in its annual reports.

However, in spite of buoyant stock markets over the last couple of years, Mezza Co's share price has remained static. Previously announcements to the stock market about growth potential led to an increase in the share price. It is thought that the current state is because there is little scope for future growth in its products. As a result the company's directors are considering diversifying into new areas. One possibility is to commercialise a product developed by a recently acquired subsidiary company. The subsidiary company is engaged in researching solutions to carbon emissions and global warming, and has developed a high carbon absorbing variety of plant that can be grown in warm, shallow sea water. The plant would then be harvested into carbon-neutral bio-fuel. This fuel, if widely used, is expected to lower carbon production levels.

Currently there is a lot of interest among the world's governments in finding solutions to climate change. Mezza Co's directors feel that this venture could enhance its reputation and result in a rise in its share price. They believe that the company's expertise would be ideally suited to commercialising the product. On a personal level, they feel that the venture's success would enhance their generous remuneration package which includes share options. It is hoped that the resulting increase in the share price would enable the options to be exercised in the future.

Mezza Co has identified the coast of Maienar, a small country in Asia, as an ideal location, as it has a large area of warm, shallow waters. Mezza Co has been operating in Maienar for many years and as a result, has a well-developed infrastructure to enable it to plant, monitor and harvest the crop, although a new facility would be needed to process the crop after harvesting. The new plant would employ local people. Mezza Co's directors have strong ties with senior government officials in Maienar and the country's politicians are keen to develop new industries, especially ones with a long-term future.

The area identified by Mezza Co is a rich fishing ground for local fishermen, who have been fishing there for many generations. However, the fishermen are poor and have little political influence. The general perception is that the fishermen contribute little to Maienar's economic development. The coastal area, although naturally beautiful, has not been well developed for tourism. It is thought that the high carbon absorbing plant, if grown on a commercial scale, may have a negative impact on fish stocks and other wildlife in the area. The resulting decline in fish stocks may make it impossible for the fishermen to continue with their traditional way of life.

Required

(a) Discuss the key issues that the directors of Mezza Co should consider when making the decision about whether or not to commercialise the new product, and suggest how these issues may be mitigated or resolved. **(17 marks)**

(b) Advise the board on what Mezza Co's integrated report should disclose about the impact of undertaking the project on Mezza Co's capitals. **(8 marks)**

(Total = 25 marks)

2 Stakeholders and ethics 29 mins

(a) Many decisions in financial management are taken in a framework of conflicting stakeholder viewpoints. Identify the stakeholders and some of the financial management issues involved in the situation of a company seeking a stock market listing. **(5 marks)**

(b) Discuss how ethical considerations impact on each of the main functional areas of a firm. **(10 marks)**

(Total = 15 marks)

3 Airline Business 39 mins

Your company, which is in the airline business, is considering raising new capital of $400 million in the bond market for the acquisition of new aircraft. The debt would have a term to maturity of four years.

The market capitalisation of the company's equity is $1.2 billion and it has a 25% market gearing ratio (market value of debt to total market value of the company). This new issue would be ranked for payment, in the event of default, equally with the company's other long-term debt and the latest credit risk assessment places the company at AA. Interest would be paid to holders annually.

The company's current debt carries an average coupon of 4% and has three years to maturity. The company's effective rate of tax is 30%.

The current yield curve suggests that, at three years, government treasuries yield 3.5% and at four years they yield 5.1%.

The current credit risk spread is estimated to be 50 basis points at AA.

If the issue proceeds, the company's investment bankers suggest that a 90 basis point spread will need to be offered to guarantee take-up by its institutional clients at its nominal value of $100.

Required

(a) Advise on the coupon rate that should be applied to the new debt issue to ensure that it is fully subscribed. **(4 marks)**

(b) Estimate the current and revised market valuation of the company's debt and the increase in the company's effective cost of debt capital. **(8 marks)**

(c) Discuss the relative advantages and disadvantages of this mode of capital financing in the context of this company. **(8 marks)**

(Total = 20 marks)

4 CD 49 mins

CD is a furniture manufacturer based in the UK. It manufactures a limited range of furniture products to a very high quality and sells to a small number of retail outlets worldwide.

At a recent meeting with one of its major customers it became clear that the market is changing and the final consumer of CD's products is now more interested in variety and choice rather than exclusivity and exceptional quality.

CD is therefore reviewing two mutually exclusive alternatives to apply to a selection of its products:

Alternative 1

To continue to manufacture, but expand its product range and reduce its quality. The net present value (NPV), internal rate of return (IRR) and modified internal rate of return (MIRR) for this alternative have already been calculated as follows:

NPV	=	£1.45 million using a nominal discount rate of 9%			
IRR	=	10.5%	MIRR	=	Approximately 13.2%
Payback	=	2.6 years	Discounted payback	=	3.05 years

Alternative 2

To import furniture carcasses in 'flat packs' from the US. The imports would be in a variety of types of wood and unvarnished. CD would buy in bulk from its US suppliers, assemble and varnish the furniture and resell, mainly to existing customers. An initial investigation into potential sources of supply and costs of transportation has already been carried out by a consultancy entity at a cost of £75,000. CD's finance director has provided estimates of net sterling and US$ cash flows for this alternative. These net cash flows, in real terms, are shown below.

Year	*0*	*1*	*2*	*3*
US$m	(25.00)	2.60	3.80	4.10
£m	0	3.70	4.20	4.60

The following information is relevant:

- CD evaluates all its investments using nominal sterling cash flows and a nominal discount rate. All non-UK customers are invoiced in US$. US$ nominal cash flows are converted to sterling at the forecast rate (see below) and discounted at the UK nominal rate.
- For the purposes of evaluation, assume the entity has a three-year time horizon for investment appraisals.
- Based on recent economic forecasts, inflation rates in the US are expected to be constant at 4% per annum. UK inflation rates are expected to be 3% per annum.
- The current exchange rate is £1 = US$1.6.

Year	*0*	*1*	*2*	*3*
Exchange rate forecast US$/£	1.600	1.616	1.631	1.647

Note. Ignore taxation. Convert.

Required

Assume you are the financial manager of CD.

(a) Evaluate Alternative 2, using NPV, discounted payback, IRR and the (approximate) MIRR. **(11 marks)**

(b) Calculate the project duration for Alternative 2 and discuss the significance of your results if you are told that the duration for Alternative 1 is 3.2 years. **(4 marks)**

(c) Evaluate the two alternatives and recommend which alternative the entity should choose. Include in your answer a discussion about what other criteria should be considered before a final decision is taken.

(10 marks)

(Total = 25 marks)

5 Bournelorth 49 mins

Bournelorth Co is an IT company which was established by three friends ten years ago. It was listed on a local stock exchange for smaller companies nine months ago.

Bournelorth Co originally provided support to businesses in the financial services sector. It has been able to expand into other sectors over time due to the excellent services it has provided and the high quality staff whom its founders recruited. The founders have been happy with the level of profits which the IT services have generated. Over time they have increasingly left the supervision of the IT services in the hands of experienced managers and focused on developing diagnostic applications (apps). The founders have worked fairly independently of each other on development work. Each has a small team of staff and all three want their teams to work in an informal environment which they believe enhances creativity.

Two apps which Bournelorth Co developed were very successful and generated significant profits. The founders wanted the company to invest much more in developing diagnostic apps. Previously they had preferred to use internal funding, because they were worried that external finance providers would want a lot of information about how Bournelorth Co is performing. However, the amount of finance required meant that funding had to be obtained from external sources and they decided to seek a listing, as two of Bournelorth Co's principal competitors had recently been successfully listed.

25% of Bournelorth Co's equity shares were made available on the stock exchange for external investors, which was the minimum allowed by the rules of the exchange. The founders have continued to own the remaining 75% of Bournelorth Co's equity share capital. Although the listing was fully subscribed, the price which new investors paid was lower than the directors had originally hoped.

The board now consists of the three founders, who are the executive directors, and two independent non-executive directors, who were appointed when the company was listed. The non-executive directors have expressed concerns about the lack of frequency of formal board meetings and the limited time spent by the executive directors overseeing the company's activities, compared with the time they spend leading development work. The non-executive directors would also like Bournelorth Co's external auditors to carry out a thorough review of its risk management and control systems.

The funds obtained from the listing have helped Bournelorth Co expand its development activities. Bournelorth Co's competitors have recently launched some very successful diagnostic apps and its executive directors are now afraid that Bournelorth Co will fall behind its competitors unless there is further investment in development. However, they disagree about how this investment should be funded. One executive director believes that Bournelorth Co should consider selling off its IT support and consultancy services business. The second executive director favours a rights issue and the third executive director would prefer to seek debt finance. At present Bournelorth Co has low gearing and the director who is in favour of debt finance believes that there is too much uncertainty associated with obtaining further equity finance, as investors do not always act rationally.

Required

(a) Discuss the factors which will determine whether the sources of finance suggested by the executive directors are used to finance further investment in diagnostic applications (apps). **(8 marks)**

(b) (i) Identify the risks associated with investing in the development of apps and describe the controls which Bournelorth Co should have over its investment in development. **(6 marks)**

(ii) Discuss the issues which determine the information Bournelorth Co communicates to external finance providers. **(3 marks)**

(c) (i) Explain the insights which behavioural finance provides about investor behaviour. **(3 marks)**

(ii) Assess how behavioural factors may affect the share price of Bournelorth Co. **(5 marks)**

(Total = 25 marks)

BPP LEARNING MEDIA

6 Four Seasons 29 mins

(a) Assume that Four Seasons International is considering taking a 20-year project which requires an initial investment of $250 million in a real estate partnership to develop time share properties with a Spanish real estate developer, and where the PV of expected cash flows is $339 million. While the NPV of $4 million is small, assume that Four Seasons International has the option to abandon this project any time by selling its share back to the developer in the next five years for $150 million. A simulation of the cash flows on this time share investment yields a variance in the PV of the cash flows from being in the partnership of 0.09. The five-year risk-free rate is 7%.

Calculate the total NPV of the project, including the option to abandon.

Normal distribution tables are in the appendix to this Workbook. **(10 marks)**

(b) Discuss the main limitations of the Black–Scholes model. **(5 marks)**

(Total = 15 marks)

7 Pandy 19 mins

Pandy Inc is considering a project that currently has an NPV of $(0.5m). However, as part of this project, Pandy Inc will be developing technology that it will be able to use in 5 years' time to break into the Asian market. The expected cost of the investment at year 5 is $20m. The Asian project is currently valued with an NPV of 0 but management believes that NPV could be positive in 5 years' time due to changes in economic conditions.

The standard deviation is 0.25, risk-free rate is 5% and Pandy's cost of capital is 12%.

Required

Evaluate the value of the option to expand.

Normal distribution tables are in the appendix to this Workbook. **(10 marks)**

8 Novoroast 49 mins

Novoroast plc, a UK company, manufactures microwave ovens which it exports to several countries, as well as supplying the home market. One of Novoroast's export markets is a South American country, which has recently imposed a 40% tariff on imports of microwaves in order to protect its local 'infant' microwave industry. The imposition of this tariff means that Novoroast's products are no longer competitive in the South American country's market but the Government there is, however, willing to assist companies wishing to undertake direct investment locally. The Government offers a 10% grant towards the purchase of plant and equipment, and a three-year tax holiday on earnings. Corporate tax after the three-year period would be paid at the rate of 25% in the year that the taxable cash flow arises.

Novoroast wishes to evaluate whether to invest in a manufacturing subsidiary in South America, or to pull out of the market altogether.

The total cost of an investment in South America is 155 million pesos (at current exchange rates), comprising:

- 50 million pesos for land and buildings
- 60 million pesos for plant and machinery (all of which would be required almost immediately)
- 45 million pesos for working capital

20 million pesos of the working capital will be required immediately and 25 million pesos at the end of the first year of operation. Working capital needs are expected to increase in line with local inflation.

The company's planning horizon is five years.

Plant and machinery is expected to be depreciated (tax allowable) on a straight-line basis over five years, and is expected to have negligible realisable value at the end of five years. Land and buildings are expected to appreciate in value in line with the level of inflation in the South American country.

Production and sales of microwaves are expected to be 8,000 units in the first year at an initial price of 1,450 pesos per unit, 60,000 units in the second year, and 120,000 units per year for the remainder of the planning horizon.

In order to control the level of inflation, legislation exists in the South American country to restrict retail price rises of manufactured goods to 10% per year.

Fixed costs and local variable costs, which for the first year of operation are 12 million pesos and 600 pesos per unit respectively, are expected to increase by the previous year's rate of inflation.

All components will be produced or purchased locally except for essential microchips which will be imported from the UK at a cost of £8 per unit, yielding a contribution to the profit of the parent company of £3 per unit. It is hoped to keep this sterling cost constant over the planning horizon.

Corporate tax in the UK is at the rate of 30% per year, payable in the year the liability arises. A bi-lateral tax treaty exists between the UK and the South American country, which permits the offset of overseas tax against any UK tax liability on overseas earnings. In periods of tax holiday assume that no UK tax would be payable on South American cash flows.

Summarised group data

NOVOROAST PLC SUMMARISED STATEMENT OF FINANCIAL POSITION

	£m
Non-current assets (net)	440
Current assets	370
Total assets	810
Financed by	
£1 ordinary shares	200
Reserves	230
	430
6% Eurodollar bonds, 8 years until maturity	180
Current liabilities	200
Total equity and liabilities	810

Novoroast's current share price is 410 pence per share, and current bond price is $800 per bond ($1,000 nominal and redemption value).

Forecast inflation rates

	UK	*South American country*
Present	4%	20%
Year 1	3%	20%
Year 2	4%	15%
Year 3	4%	15%
Year 4	4%	15%
Year 5	4%	15%

Foreign exchange rates

	Peso/£
Spot	13.421
1 year forward	15.636

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Novoroast plc believes that if the investment is undertaken the overall risk to investors in the company will remain unchanged.

The company's beta coefficients have been estimated as equity 1.25, debt 0.225.

The market return is 14% per annum and the risk-free rate is 6% per annum.

Existing UK microwave production currently produces an after-tax net cash flow of £30 million per annum. This is expected to be reduced by 10% if the South American investment goes ahead (after allowing for diversion of some production to other EU countries). Production is currently at full capacity in the UK.

Other issues

The senior management of Novoroast are concerned about the risk that would be associated with an investment in South America.

Required

Prepare a report advising whether or not Novoroast plc should invest in the South American country. Include in your report a discussion of the limitations of your analysis and suggestions about other information that would be useful to assist the decision process.

All relevant calculations must be shown in your report or as an appendix to it.

State clearly any assumptions that you make. **(25 marks)**

9 PMU 49 mins

Prospice Mentis University (PMU) is a prestigious private institution and a member of the Holly League, which is made up of universities based in Rosinante and renowned worldwide as being of the highest quality. Universities in Rosinante have benefited particularly from students coming from Kantaka, and PMU has been no exception. However, PMU has recognised that Kantaka has a large population of able students who cannot afford to study overseas. Therefore it wants to investigate how it can offer some of its most popular degree programmes in Kantaka, where students will be able to study at a significantly lower cost. It is considering whether to enter into a joint venture with a local institution or to independently set up its own university site in Kantaka. Offering courses overseas would be a first from a Holly League institution and indeed from any academic institution based in Rosinante. However, there have been less renowned academic institutions from other countries which have formed joint ventures with small private institutions in Kantaka to deliver degree programmes. These have been of low quality and are not held in high regard by the population or the Government of Kantaka.

In Kantaka, government-run universities and a handful of large private academic institutions, none of which have entered into joint ventures, are held in high regard. However, the demand for places in these institutions far outstrips the supply of places and many students are forced to go to the smaller private institutions or to study overseas if they can afford it.

After an initial investigation the following points have come to light:

1 The Kantaka Government is keen to attract foreign direct investment (FDI) and offer tax concessions to businesses which bring investment funds into the country and enhance the local business environment. However, at present the Kantaka Government places restrictions on the profits that can be remitted to foreign companies which set up subsidiaries in the country. There are no restrictions on profits remitted to a foreign company that has established a joint venture with a local company. It is also likely that PMU would need to borrow a substantial amount of money if it were to set up independently. The investment funds required would be considerably smaller if it went into a joint venture.

2 Given the past experiences of poor quality education offered by joint ventures between small local private institutions and overseas institutions, the Kantaka Government has been reluctant

to approve degrees from such institutions. The Government has also not allowed graduates from these institutions to work in national or local government, or in nationalised organisations.

3 Over the past two years the Kantaka currency has depreciated against other currencies, but economic commentators believe that this may not continue for much longer.

4 A large proportion of PMU's academic success is due to innovative teaching and learning methods, and high quality research. The teaching and learning methods used in Kantaka's educational institutions are very different. Apart from the larger private and government-run universities, little academic research is undertaken elsewhere in Kantaka's education sector.

Required

(a) Discuss the benefits and disadvantages of PMU entering into a joint venture instead of setting up independently in Kantaka. As part of your discussion, consider how the disadvantages can be mitigated and the additional information PMU needs in order to make its decision. **(20 marks)**

(b) Assuming that there are limits on funds that can be repatriated from Kantaka, briefly discuss the steps PMU could take to get around this, if it set up a subsidiary in Kantaka. **(5 marks)**

(Total = 25 marks)

10 Tampem 45 mins

The financial management team of Tampem Co is discussing how the company should appraise new investments. There is a difference of opinion between two managers.

Manager A believes that net present value (NPV) should be used as positive NPV investments are quickly reflected in increases in the company's share price. It is also simpler to calculate than modified internal rate of return (MIRR) and adjusted present value (APV).

Manager B states that NPV is not good enough as it is only valid in potentially restrictive conditions, and should be replaced by APV.

Tampem has produced estimates of relevant cash flows and other financial information associated with a new investment. These are shown below:

Year	*1*	*2*	*3*	*4*
	$'000	$'000	$'000	$'000
Investment pre-tax operating cash flows	1,250	1,400	1,600	1,800

Notes

1 The investment will cost $5,400,000 payable immediately, including $600,000 for working capital and $400,000 for issue costs. $300,000 of issue costs is for equity, and $100,000 for debt. Issue costs are not tax allowable.

2 The investment will be financed 50% equity, 50% debt which is believed to reflect its debt capacity.

3 Expected company gearing after the investment will change to 60% equity, 40% debt by market values.

4 The investment equity beta is 1.5.

5 Debt finance for the investment will be an 8% fixed rate bond.

6 Tax allowable depreciation is at 25% per year on a reducing balance basis.

7 The corporate tax rate is 30%. Tax is payable in the year that the taxable cash flow arises.

8 The risk-free rate is 4% and the market return 10%.

9 The after-tax realisable value of the investment as a continuing operation is estimated to be $1.5 million (including working capital) at the end of Year 4.

10 Working capital may be assumed to be constant during the four years.

Required

(a) Calculate the expected NPV, MIRR and APV of the proposed investment. **(15 marks)**

(b) Discuss the validity of the views of the two managers. Use your calculations in (a) to illustrate and support the discussion. **(10 marks)**

(Total = 25 marks)

11 Levante 29 mins

Levante Co is a large unlisted company which has identified a new project for which it will need to increase its long-term borrowings from $250 million to $400 million. This amount will cover a significant proportion of the total cost of the project and the rest of the funds will come from cash held by the company.

The current $250 million unsubordinated borrowing is in the form of a 4% bond which is trading at $98.71 per $100 and is due to be redeemed at its nominal value in 3 years. The issued bond has a credit rating of AA. The new borrowing will also be raised in the form of a traded bond with a nominal value of $100 per unit. It is anticipated that the new project will generate sufficient cash flows to be able to redeem the new bond at $100 nominal value per unit in 5 years. It can be assumed that coupons on both bonds are paid annually.

Both bonds would be ranked equally for payment in the event of default and the directors expect that, as a result of the new issue, the credit rating for both bonds will fall to A. The directors are considering the following two alternative options when issuing the new bond:

- Issue the new bond at a fixed coupon of 5% but at a premium or discount, whichever is appropriate to ensure full take-up of the bond; or
- Issue the new bond at a coupon rate where the issue price of the new bond will be $100 per unit and equal to its nominal value.

The following extracts are provided on the current government bond yield curve and yield spreads for the sector in which Levante Co operates:

Current government bond yield curve

Years	*1*	*2*	*3*	*4*	*5*
	3.2%	3.7%	4.2%	4.8%	5.0%

Yield spreads (in basis points)

Bond rating	*1 year*	*2 years*	*3 years*	*4 years*	*5 years*
AAA	5	9	14	19	25
AA	16	22	30	40	47
A	65	76	87	100	112
BBB	102	121	142	167	193

Required

(a) Calculate the expected percentage fall in the market value of the existing bond if Levante Co's bond credit rating falls from AA to A. **(5 marks)**

(b) Advise the directors on the financial implications of choosing each of the two options when issuing the new bond. Support the advice with appropriate calculations. **(10 marks)**

(Total = 15 marks)

12 Mercury Training 49 mins

Mercury Training was established in 20W9 and since that time it has developed rapidly. The directors are considering either a flotation or an outright sale of the company.

The company provides training for companies in the computer and telecommunications sectors. It offers a variety of courses ranging from short intensive courses in office software to high level risk management courses using advanced modelling techniques. Mercury employs a number of in-house experts who provide technical materials and other support for the teams that service individual client requirements. In recent years, Mercury has diversified into the financial services sector and now also provides computer simulation systems to companies for valuing acquisitions. This business now accounts for one-third of the company's total revenue.

Mercury currently has 10 million, 50c shares in issue. Jupiter is one of the few competitors in Mercury's line of business. However, Jupiter is only involved in the training business. Jupiter is listed on a small company investment market and has an estimated beta of 1.5. Jupiter has 50 million shares in issue with a market price of 580c. The average beta for the financial services sector is 0.9. Average market gearing (debt to total market value) in the financial services sector is estimated at 25%.

Other summary statistics for both companies for the year ended 31 December 20X7 are as follows:

	Mercury	*Jupiter*
Net assets at book value ($ million)	65	45
Earnings per share (c)	100	50
Dividend per share (c)	25	25
Gearing (debt to total market value)	30%	12%
Five-year historic earnings growth (annual)	12%	8%

Analysts forecast revenue growth in the training side of Mercury's business to be 6% per annum, but the financial services sector is expected to grow at just 4%.

Background information:

The equity risk premium is 3.5% and the rate of return on short-dated government stock is 4.5%.

Both companies can raise debt at 2.5% above the risk-free rate.

Tax on corporate profits is 40%.

Required

(a) Estimate the cost of equity capital and the weighted average cost of capital for Mercury Training. **(8 marks)**

(b) Advise the owners of Mercury Training on a range of likely issue prices for the company. **(10 marks)**

(c) Discuss the advantages and disadvantages, to the directors of Mercury Training, of a public listing versus private equity finance as a means of disposing of their interest in the company. **(7 marks)**

(Total = 25 marks)

13 Kodiak Company 49 mins

Kodiak Company is a small software design business established four years ago. The company is owned by three directors who have relied upon external accounting services in the past. The company has grown quickly and the directors have appointed you as a financial consultant to advise on the value of the business under their ownership.

The directors have limited liability and the bank loan is secured against the general assets of the business. The directors have no outstanding guarantees on the company's debt.

The company's latest statement of profit or loss and the extracted balances from the latest statement of financial position are as follows:

PROFIT/LOSS		FINANCIAL POSITION	
	$'000		$'000
Revenue	5,000	Opening non-current assets	1,200
Cost of sales	3,000	Additions	66
Gross profit	2,000	Non-current assets (gross)	1,266
Other operating costs	1,877	Accumulated depreciation	367
Operating profit	123	Net book value	899
Interest on loan	74	Net current assets	270
Profit before tax	49	Loan	(990)
Income tax expense	15	Net assets employed	179
Profit for the period	34		

During the current year:

1 Depreciation is charged at 10% per annum on the year-end non-current asset balance before accumulated depreciation, and is included in other operating costs in the statement of profit or loss.

2 The investment in net working capital is expected to increase in line with the growth in gross profit.

3 Other operating costs consisted of:

	$'000
Variable component at 15% of sales	750
Fixed costs	1,000
Depreciation on non-current assets	127

4 Revenue and variable costs are projected to grow at 9% per annum and fixed costs are projected to grow at 6% per annum.

5 The company pays interest on its outstanding loan of 7.5% per annum and incurs tax on its profits at 30%, payable in the following year. The company does not pay dividends.

6 The net current assets reported in the statement of financial position contain $50,000 of cash.

One of your first tasks is to prepare for the directors a forward cash flow projection for three years and to value the firm on the basis of its expected free cash flow to equity. In discussion with them you note the following:

- The company will not dispose of any of its non-current assets but will increase its investment in new non-current assets by 20% per annum. The company's depreciation policy matches the currently available tax write-off for tax allowable depreciation. This straight-line write-off policy is not likely to change.
- The directors will not take a dividend for the next three years but will then review the position taking into account the company's sustainable cash flow at that time.
- The level of the loan will be maintained at $990,000 and, on the basis of the forward yield curve, interest rates are not expected to change.
- The directors have set a target rate of return on their equity of 10% per annum which they believe fairly represents the opportunity cost of their invested funds.

Required

(a) Prepare a three-year cash flow forecast for the business on the basis described above, highlighting the free cash flow to equity in each year. **(12 marks)**

(b) Estimate the value of the business based upon the expected free cash flow to equity and a terminal value based upon a sustainable growth rate of 3% per annum thereafter. **(6 marks)**

(c) Advise the directors on the assumptions and the uncertainties within your valuation. **(7 marks)**

(Total = 25 marks)

14 Saturn Systems 49 mins

Mr Moon is the Chief Executive Officer of Saturn Systems, a very large listed company in the telecommunications business. The company is in a very strong financial position, having developed rapidly in recent years through a strategy based upon growth by acquisition. Currently, earnings and earnings growth are at all-time highs, although the company's cash reserves are at a low level following a number of strategic investments in the last financial year. The previous evening Mr Moon gave a speech at a business dinner and during questions made some remarks that Pluto Ltd was an attractive company with 'great assets' and that he would be a 'fool' if he did not consider the possibility 'like everyone else' of acquiring the company. Pluto is a long established supplier to Saturn Systems and if acquired would add substantially to the market capitalisation of the business.

Mr Moon's comments were widely reported in the following morning's financial newspapers and, by 10am, the share price of Pluto had risen 15% in out-of-hours and early trading. The first that you, Saturn's chief financial officer, heard about the issue was when you received an urgent call from Mr Moon's office. You have just completed a background investigation of Pluto, along with three other potential targets instigated at Saturn's last board meeting in May. Following that investigation, you have now commenced a review of the steps required to raise the necessary debt finance for a bid and the procedure you would need to follow in setting up a due diligence investigation of each company.

On arriving at Mr Moon's office you are surprised to see the Chairman of the board in attendance. Mr Moon has just put down the telephone and is clearly very agitated. They tell you about the remarks made by Mr Moon the previous evening and that the call just taken was from the Office of the Regulator for Public Companies. The regulator had wanted to know if a bid was to be made and what announcement the company intended to make. They had been very neutral in their response pending your advice but had promised to get back to the regulator within the hour. They knew that if they were forced to admit that a bid was imminent and then withdrew that they would not be able to bid again for another six months. Looking at you they ask as one: 'what do we do now?' After a short discussion you returned to your office and began to draft a memorandum with a recommendation about how to proceed.

Required

(a) Discuss the advantages and disadvantages of growth by acquisition as compared with growth by internal (or organic) investment. **(5 marks)**

(b) Assess the regulatory, financial and ethical issues in this case. **(15 marks)**

(c) Propose a course of action that the company should now pursue, including a draft of any announcement that should be made, given that the board of Saturn Systems wishes to hold open the option of making a bid in the near future. **(5 marks)**

(Total = 25 marks)

15 Gasco 49 mins

Gasco, a public limited company with a market value of around £7 billion, is a major supplier of gas to both business and domestic customers. The company also provides maintenance contracts for both gas and central heating customers using the well-known brand name Gas For All. Customers can call emergency lines for assistance with any gas-related incident, such as a suspected leak. Gasco employs its own highly trained workforce to deal with all such situations quickly and effectively. The company also operates a major new credit card, which has been extensively marketed and which gives users concessions, such as reductions in their gas bills.

Gasco has recently bid £1.1 billion for CarCare, a long-established mutual organisation (ie it is owned by its members) that is the country's leading motoring organisation. CarCare is financed primarily by an annual subscription to its 4.4 million members. In addition, the organisation obtains income from a range of other activities, such as a high profile car insurance brokerage, a travel agency and assistance with all types of travel arrangements. Its main service to members is the provision of a roadside breakdown service, which is now an extremely competitive market with many other companies involved. Although many of its competitors use local garages to deal with breakdowns, CarCare uses its own road patrols.

CarCare members have to approve the takeover, which once completed would provide them each with a windfall of around £300 each.

Gasco intends to preserve the CarCare name which is extremely well known to consumers.

Required

(a) Discuss the possible reasons why Gasco is seeking to buy CarCare. **(9 marks)**

(b) Discuss how the various stakeholders of CarCare might react to the takeover. **(8 marks)**

(c) Discuss the potential problems that Gasco may face in running CarCare now that the takeover has been achieved. **(8 marks)**

(Total = 25 marks)

16 Pursuit 70 mins

Pursuit Co, a listed company which manufactures electronic components, is interested in acquiring Fodder Co, an unlisted company involved in the development of sophisticated but high risk electronic products. The owners of Fodder Co are a consortium of private equity investors who have been looking for a suitable buyer for their company for some time. Pursuit Co estimates that a payment of the equity value plus a 25% premium would be sufficient to secure the purchase of Fodder Co. Pursuit Co would also pay off any outstanding debt that Fodder Co owed. Pursuit Co wishes to acquire Fodder Co using a combination of debt finance and its cash reserves of $20 million, such that the capital structure of the combined company remains at Pursuit Co's current capital structure level.

Information on Pursuit Co and Fodder Co

Pursuit Co

Pursuit Co has a market debt to equity ratio of 50:50 and an equity beta of 1.18. Currently Pursuit Co has a total firm value (market value of debt and equity combined) of $140 million. Pursuit Co makes sales in US, Europe and Asia and has obtained some of its debt funding from international markets.

FODDER CO, EXTRACTS FROM THE STATEMENT OF PROFIT OR LOSS

Year ended	*31 May 20X1*	*31 May 20X0*	*31 May 20W9*	*31 May 20W8*
	$'000	$'000	$'000	$'000
Sales revenue	16,146	15,229	14,491	13,559
Operating profit (after operating costs and tax-allowable depreciation)	5,169	5,074	4,243	4,530
Net interest costs	489	473	462	458
Profit before tax	4,680	4,601	3,781	4,072
Taxation (28%)	1,310	1,288	1,059	1,140
After-tax profit	3,370	3,313	2,722	2,932
Dividends	123	115	108	101
Retained earnings	3,247	3,198	2,614	2,831

Fodder Co has a market debt to equity ratio of 10:90 and an estimated equity beta of 1.53. It can be assumed that its tax-allowable depreciation is equivalent to the amount of investment needed to maintain current operational levels. However, Fodder Co will require an additional investment in assets of 22c per $1 increase in sales revenue, for the next 4 years. It is anticipated that Fodder Co will pay interest at 9% on its future borrowings.

For the next four years, Fodder Co's sales revenue will grow at the same average rate as the previous years. After the forecasted four-year period, the growth rate of its free cash flows will be half the initial forecast sales revenue growth rate for the foreseeable future.

Information about the combined company

Following the acquisition, it is expected that the combined company's sales revenue will be $51,952,000 in the first year, and its profit margin on sales will be 30% for the foreseeable future. After the first year the growth rate in sales revenue will be 5.8% per year for the following 3 years. Following the acquisition, it is expected that the combined company will pay annual interest at 6.4% on future borrowings.

The combined company will require additional investment in assets of $513,000 in the first year and then 18c per $1 increase in sales revenue for the next three years. It is anticipated that after the forecasted four-year period, its free cash flow growth rate will be half the sales revenue growth rate.

It can be assumed that the asset beta of the combined company is the weighted average of the individual companies' asset betas, weighted in proportion of the individual companies' market value.

Other information

The current annual government base rate is 4.5% and the market risk premium is estimated at 6% per year. The relevant annual tax rate applicable to all the companies is 28%.

SGF Co's interest in Pursuit Co

There have been rumours of a potential bid by SGF Co to acquire Pursuit Co. Some financial press reports have suggested that this is because Pursuit Co's share price has fallen recently. SGF Co is in a similar line of business as Pursuit Co and, until a couple of years ago, SGF Co was the smaller company. However, a successful performance has resulted in its share price rising, and SGF Co is now the larger company.

The rumours of SGF Co's interest have raised doubts about Pursuit Co's ability to acquire Fodder Co. Although SGF Co has made no formal bid yet, Pursuit Co's board is keen to reduce the possibility of such a bid. The Chief Financial Officer has suggested that the most effective way to reduce the possibility of a takeover would be to distribute the $20 million in its cash reserves to its shareholders in the form of a special dividend. Fodder Co would then be purchased using debt finance. He conceded that this would increase Pursuit Co's gearing level but suggested it may increase the company's share price and make Pursuit Co less appealing to SGF Co.

Required

Prepare a report to the board of directors of Pursuit Co that:

(a) Evaluates whether the acquisition of Fodder Co would be beneficial to Pursuit Co and its shareholders. The free cash flow to firm method should be used to estimate the values of Fodder Co and the combined company assuming that the combined company's capital structure stays the same as that of Pursuit Co's current capital structure. Include all relevant calculations. **(16 marks)**

(b) Discusses the limitations of the estimated valuations in part (a) above. **(4 marks)**

(c) Estimates the amount of debt finance needed, in addition to the cash reserves, to acquire Fodder Co and concludes whether Pursuit Co's current capital structure can be maintained. **(3 marks)**

(d) Explains the implications of a change in the capital structure of the combined company to the valuation method used in part (i) and how the issue can be resolved. **(4 marks)**

(e) Assesses whether the Chief Financial Officer's recommendation would provide a suitable defence against a bid from SGF Co and would be a viable option for Pursuit Co. **(5 marks)**

Professional marks will be awarded in this question for the format, structure and presentation of the report. **(4 marks)**

(Total = 36 marks)

17 Olivine 39 mins

Olivine is a holiday tour operator that is committed to a policy of expansion. The company has enjoyed record growth in recent years and is now seeking to acquire other companies in order to maintain its growth momentum. It has recently taken an interest in Halite, a charter airline business, as the board of directors of Olivine believes that there is a good strategic fit between the two companies. Both companies have the same level of risk. Abbreviated financial statements relating to each company are set out below.

ABBREVIATED STATEMENT OF PROFIT OR LOSS
FOR THE YEAR ENDED 30 NOVEMBER 20X3

	Olivine	*Halite*
	$m	$m
Sales	182.6	75.2
Operating profit	43.6	21.4
Interest charges	12.3	10.2
Net profit before taxation	31.3	11.2
Company tax	6.3	1.6
Net profit after taxation	25.0	9.6
Dividends	6.0	4.0
Accumulated profits for the year	19.0	5.6

SUMMARISED STATEMENTS OF FINANCIAL POSITION
AS AT 30 NOVEMBER 20X3

	Olivine $m	*Halite* $m
Non-current assets	135.4	127.2
Net current assets	65.2	3.2
	200.6	130.4
Payables due after more than one year	120.5	104.8
	80.1	25.6
Capital and reserves		
$0.50 ordinary shares	20.0	8.0
Retained profit	60.1	17.6
	80.1	25.6
Price/earnings ratio before the bid	20	15

The board of directors of Olivine is considering making an offer to the shareholders of Halite of five shares in Olivine for every four shares held. It is believed that a rationalisation of administrative functions arising from the merger would reap annual after-tax benefits of $2.4 million.

Required

(a) Calculate:

(i) The total value of the proposed offer based on current share prices

(ii) The earnings per share of Olivine following the successful acquisition of Halite

(iii) The share price of Olivine following acquisition, assuming that the benefits of the acquisition are achieved and that the price/earnings ratio declines by 5% **(10 marks)**

(b) Calculate the effect of the proposed takeover on the wealth of the shareholders of each company. **(5 marks)**

(c) Discuss your results in (a) and (b) above and state what recommendations, if any, you would make to the directors of Olivine. **(5 marks)**

(Total = 20 marks)

18 Treasury management 21 mins

Many large international organisations have a central treasury department which might be a separate profit centre within the group. The responsibilities of this department will include the management of business risk and market risk for the group as a whole.

Required

(a) Describe the functions of a central treasury department.

(b) Describe the information that the treasury department needs, from inside and outside the organisation, to perform its function.

(11 marks)

19 For4Fore 29 mins

Shares in For4Fore plc are currently trading at 444p. The standard deviation of the share price is 25% and the risk free rate of return is 4.17%. Senior management at For4Fore have been awarded European-style options to buy shares in For4Fore at 385p per share in exactly four months' time.

BPP LEARNING MEDIA

Required

(a) Using the Black–Scholes option pricing model, calculate the value of these **call options**. **(10 marks)**

(b) Evaluate whether management whether put options would be a more suitable incentive package for senior management. **(5 marks)**

(Total = 15 marks)

20 Fidden plc 49 mins

(a) Discuss briefly four techniques a company might use to hedge against the foreign exchange risk involved in foreign trade. **(8 marks)**

(b) Fidden plc is a medium-sized UK company with export and import trade with the US. The following transactions are due within the next six months. Transactions are in the currency specified.

- Purchases of components, cash payment due in three months: £116,000.
- Sale of finished goods, cash receipt due in three months: $197,000.
- Purchase of finished goods for resale, cash payment due in six months: $447,000.
- Sale of finished goods, cash receipt due in six months: $154,000.

Exchange rates (London market)

	$/£
Spot	1.7106–1.7140
Three months forward	1.7024–1.7063
Six months forward	1.6967–1.7006

Interest rates

Three months or six months	*Borrowing*	*Lending*
Sterling	12.5%	9.5%
Dollars	9%	6%

Foreign currency option prices (New York market)
Prices are cents per £, contract size £12,500

		Calls			*Puts*	
Exercise price ($)	*Mar*	*Jun*	*Sep*	*Mar*	*Jun*	*Sep*
1.60	–	15.20	–	–	–	2.7
1.70	5.65	7.75	–	–	3.45	6.4
1.80	1.70	3.60	7.90	–	9.32	15.3

Assume that it is now December with three months to the expiry of March contracts and that the option price is not payable until the end of the option period, or when the option is exercised.

Required

(a) Calculate the net sterling receipts and payments that Fidden might expect for both its three-and six-month transactions if the company hedges foreign exchange risk on:

(i) The forward foreign exchange market
(ii) The money market **(7 marks)**

(b) If the actual spot rate in six months' time turned out to be exactly the present six-month forward rate, calculate whether Fidden would have done better to have hedged through foreign currency options rather than the forward market or the money market. **(7 marks)**

(c) Explain briefly what you consider to be the main advantage of foreign currency options. **(3 marks)**

(Total = 17 marks)

21 Curropt plc 49 mins

It is now 1 March and the treasury department of Curropt plc, a quoted UK company, faces a problem. At the end of June the treasury department may need to advance to Curropt's US subsidiary the amount of $15,000,000. This depends on whether the subsidiary is successful in winning a franchise. The department's view is that the US dollar will strengthen over the next few months, and it believes that a currency hedge would be sensible. The following data is relevant.

Exchange rates US$/£
1 March spot 1.4461–1.4492; 4 months forward 1.4310–1.4351.
Futures market contract prices
Sterling £62,500 contracts:
March contract 1.4440; June contract 1.4302.

Currency options: Sterling £31,250 contracts (cents per £)

	Calls	*Puts*
Exercise price	*June*	*June*
$1.400/£	3.40	0.38
$1.425/£	1.20	0.68
$1.450/£	0.40	2.38

Required

(a) Explain whether the treasury department is justified in its belief that the US dollar is likely to strengthen against the pound. **(3 marks)**

(b) Explain the relative merits of forward currency contracts, currency futures contracts and currency options as instruments for hedging in the given situation. **(6 marks)**

(c) Assuming the franchise is won, illustrate the results of using forward, future and option currency hedges if the US$/£ spot exchange rate at the end of June is:

(i) 1.3500
(ii) 1.4500
(iii) 1.5500 **(16 marks)**

(Total = 25 marks)

22 Shawter 29 mins

Assume that it is now mid-December.

The finance director of Shawter plc, the parent company of the Shawter group, has recently reviewed the company's monthly cash budgets for the next year. As a result of buying new machinery in three months' time, his company is expected to require short-term financing of £30 million for a period of two months' until the proceeds from a factory disposal became available. The finance director is concerned that, as a result of increasing wage settlements, the Central Bank will increase interest rates in the near future.

LIBOR is currently 6% per annum and Shawter can borrow at LIBOR + 0.9%. Derivative contracts may be assumed to mature at the end of the relevant month.

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Three types of hedge are available:

- Three month sterling futures (£500,000 contract size)

  December 93.870

  March 93.790

  June 93.680

- Options on three-month sterling futures (£500,000 contract size, premium cost in annual %)

	Calls			*Puts*		
	December	*March*	*June*	*December*	*March*	*June*
93.750	0.120	0.195	0.270	0.020	0.085	0.180
94.000	0.015	0.075	0.155	0.165	0.255	0.335
94.250	0	0.085	0.085	0.400	0.480	0.555

- FRA prices (based on LIBOR):

  3 v 6 6.11–6.01

  3 v 5 6.18–6.10

  3 v 8 6.38–6.30

Required

Illustrate how the short-term interest rate risk might be hedged, and the possible results of the alternative hedges, if interest rates increase by 0.5%.

(Total = 15 marks)

23 Carrick plc 29 mins

(a) Explain the term risk management in respect of interest rates and discuss how interest risk might be managed. **(7 marks)**

(b) It is currently 1 January 20X7. Carrick plc receives interest of 6% per annum on short-term deposits on the London money markets amounting to £6 million. The company wishes to explore the use of a collar to protect, for a period of seven months, the interest yield it currently earns. The following prices are available, with the premium cost being quoted in annual percentage terms.

LIFFE interest rate options on three-month money market futures (contract size: £500,000).

	Calls		*Puts*	
Strike price	*June*	*Sept*	*June*	*Sept*
92.50	0.71	1.40	0.02	0.06
93.00	0.36	1.08	0.10	0.14
93.50	0.12	0.74	0.20	0.35
94.00	0.01	0.40	0.57	0.80
94.50	–	0.06	0.97	1.12

Required

Evaluate the use of a collar by Carrick plc for the purpose proposed above. Include calculations of the cost involved and indicate appropriate exercise price(s) for the collar. Ignore taxation, commission and margin requirements. **(8 marks)**

(Total = 15 marks)

24 Theta Inc 23 mins

(a) Theta Inc wants to borrow $10 million for five years with interest payable at six-monthly intervals. It can borrow from a bank at a floating rate of LIBOR plus 1% but wants to obtain a fixed rate for the full five-year period. A swap bank has indicated that it will be willing to receive a fixed rate of 8.5% in exchange for payments of six-month LIBOR.

Required

Calculate the fixed interest six-monthly payment with the swap in place. **(4 marks)**

(b) Show the interest payments by Theta if:

(i) LIBOR is 10% **(4 marks)**
(ii) LIBOR is 7.5% **(4 marks)**

(Total = 12 marks)

25 Brive Inc 49 mins

The latest statement of financial position for Brive Inc is summarised below.

	$'000	$'000	$'000
Non-current assets at net book value			5,700
Current assets			
Inventory and work in progress		3,500	
Receivables		1,800	
		5,300	
Less current liabilities			
Unsecured payables	4,000		
Bank overdraft (unsecured)	1,600		
		5,600	
Working capital			(300)
Total assets less current liabilities			5,400
Liabilities falling due after more than one year			
10% secured bonds			3,000
Net assets			2,400

	$'000
Capital and reserves	
Called up share capital	4,000
Reserves	(1,600)
	2,400

Brive Inc's called-up capital consists of 4,000,000 $1 ordinary shares issued and fully paid. The non-current assets comprise freehold property with a book value of $3,000,000 and plant and machinery with a book value of $2,700,000. The bonds are secured on the freehold property.

In recent years the company has suffered a series of trading losses which have brought it to the brink of insolvency. The directors estimate that in a forced sale the assets will realise the following amounts.

	$
Freehold premises	2,000,000
Plant and machinery	1,000,000
Inventory	1,700,000
Receivables	1,700,000

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The costs of insolvency proceedings are estimated at $770,000. However, trading conditions are now improving and the directors estimate that if new investment in plant and machinery costing $2,500,000 were undertaken the company should be able to generate annual profits before interest of $1,750,000. In order to take advantage of this they have put forward the following proposed reconstruction scheme.

(a) Freehold premises should be written down by $1,000,000, plant and machinery by $1,100,000, inventory and work in progress by $800,000 and receivables by $100,000.

(b) The ordinary shares should be written down by $3,000,000 and the debit balance on the statement of profit or loss written off.

(c) The secured bond holders would exchange their bonds for $1,500,000 ordinary shares and $1,300,000 14% unsecured loan notes repayable in 5 years' time.

(d) The bank overdraft should be written off and the bank should receive $1,200,000 of 14% unsecured loan notes repayable in 5 years' time in compensation.

(e) The unsecured payables should be written down by 25%.

(f) A rights issue of 1 for 1 at nominal value is to be made on the share capital after the above adjustments have been made.

(g) $2,500,000 will be invested in new plant and machinery.

Required

(a) Prepare the statement of financial position of the company after the completion of the reconstruction. **(6 marks)**

(b) Prepare a report, including appropriate calculations, discussing the advantages and disadvantages of the proposed reconstruction from the point of view of:

(i) The ordinary shareholders
(ii) The secured bond holders
(iii) The bank
(iv) The unsecured payables

Note. Ignore taxation. **(19 marks)**

(Total = 25 marks)

26 BBS Stores 49 mins

BBS Stores, a publicly quoted limited company, is considering unbundling a section of its property portfolio. The company believes that it should use the proceeds to reduce the company's medium-term borrowing and to reinvest the balance in the business (Option 1). However, the company's investors have argued strongly that a sale and rental scheme would release substantial cash to investors (Option 2). You are a financial consultant and have been given the task of assessing the likely impact of these alternative proposals on the company's financial performance, cost of capital and market value.

Attached is the summarised BBS Stores' statement of financial position. The company owns all its stores.

	As at year end 20X8 $m	*As at year end 20X7* $m
Assets		
Non-current assets		
Intangible assets	190	190
Property, plant and equipment	4,050	3,600
Other assets	500	530
	4,740	4,290
Current assets	840	1,160
Total assets	5,580	5,450
Equity		
Called-up share capital – equity	425	420
Retained earnings	1,535	980
Total equity	1,960	1,400
Liabilities		
Current liabilities	1,600	2,020
Non-current liabilities		
Medium-term loan notes	1,130	1,130
Other non-financial liabilities	890	900
Total liabilities	3,620	4,050
Total liabilities and equity	5,580	5,450

The company's profitability has improved significantly in recent years and earnings for 20X8 were $670 million (20X7: $540 million).

The company's property, plant and equipment within non-current assets for 20X8 are as follows:

	Land and buildings $m	*Fixtures, fittings and equipment* $m	*Assets under construction* $m	*Total* $m
Year end 20X8				
At revaluation	2,297	4,038	165	6,500
Accumulated depreciation		(2,450)		(2,450)
Net book value	2,297	1,588	165	4,050

The property portfolio was revalued at the year end 20X8. The assets under construction are valued at a market value of $165 million and relate to new building. In recent years commercial property values have risen in real terms by 4% per annum. Current inflation is 2.5% per annum. Property rentals currently earn an 8% return.

The proposal is that 50% of the property portfolio (land and buildings) and 50% of the assets under construction would be sold to a newly established property holding company called RPH that would issue bonds backed by the assured rental income stream from BBS Stores. BBS Stores would not hold any equity interest in the newly formed company nor would they take any part in its management.

BBS Stores is currently financed by equity in the form of 25c fully paid ordinary shares with a current market value of 400c per share. The capital debt for the company consists of medium-term loan notes of which $360 million are repayable at the end of two years and $770 million are repayable at the end of 6 years. Both issues of medium-term notes carry a floating rate of LIBOR plus 70 basis points. The interest liability on the 6-year notes has been swapped at a fixed rate of 5.5% in exchange for LIBOR which is also currently 5.5%. The reduction in the firm's gearing implied by Option 1 would

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improve the firm's credit rating and reduce its current credit spread by 30 basis points. The change in gearing resulting from the second option is not expected to have any impact upon the firm's credit rating. There has been no alteration in the rating of the company since the earliest debt was issued.

The BBS Stores equity beta is currently 1.824. A representative portfolio of commercial property companies has an equity beta of 1.25 and an average market gearing (adjusted for tax) of 50%. The risk-free rate of return is 5% and the equity risk premium is 3%. Using CAPM the current cost of equity is 10.47%. The current WACC is 9.55%. The company's current accounting rate of return on new investment is 13% before tax. You may assume that debt betas are zero throughout. The effective rate of company tax is 35%.

Required

On the assumption that the property unbundling proceeds, prepare a report for consideration by senior management which should include the following:

(a) A comparative statement showing the impact upon the statement of financial position and on the earnings per share on the assumption that the cash proceeds of the property sale are used:

  (i) To repay the debt, repayable in two years, in full and for reinvestment in non-current assets

  (ii) To repay the debt, repayable in two years, in full and to finance a share repurchase at the current share price with the balance of the proceeds **(13 marks)**

(b) An estimate of the weighted average cost of capital for the remaining business under both options on the assumption that the share price remains unchanged **(8 marks)**

(c) An evaluation of the potential impact of each alternative on the market value of the firm (you are not required to calculate a revised market value for the firm) **(4 marks)**

(Total = 25 marks)

27 Reorganisation 23 mins

(a) Discuss the potential problems with management buy-outs. **(5 marks)**

(b) Company X's hotel division is experiencing considerable financial difficulties. The management is prepared to undertake a buy-out, and Company X is willing to sell for $15 million. After an analysis of the division's performance, the management concluded that the division required a capital injection of $10 million.

Possible funding sources for the buy-out and the additional capital injection are as follows.

From management:	
Equity shares of 25c each	$12 million
From venture capitalist:	
Equity shares of 25c each	$5.5 million
Debt: 9.5% fixed rate loan	$7.5 million

The fixed rate loan principal is repayable in 10 years' time.

Forecasts of earnings before interest and tax for the next 5 years following the buy-out are as follows.

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
	$'000	$'000	$'000	$'000	$'000
EBIT	2,200	3,100	3,900	4,200	4,500

Corporation tax is charged at 30%. Dividends are expected to be no more than 12% of profits for the first 5 years.

Management has forecast that the value of equity capital is likely to increase by approximately 15% per annum for the next 5 years.

Required

On the basis of the above forecasts, determine whether management's estimate that the value of equity will increase by 15% per annum is a viable one. **(7 marks)**

(Total = 12 marks)

28 Transfer prices 20 mins

A multinational company based in Beeland has subsidiary companies in Ceeland and in the UK.

The UK subsidiary manufactures machinery parts which are sold to the Ceeland subsidiary for a unit price of B$420 (420 Beeland dollars), where the parts are assembled. The UK subsidiary shows a profit of B$80 per unit; 200,000 units are sold annually.

The Ceeland subsidiary incurs further costs of B$400 per unit and sells the finished goods on for an equivalent of B$1,050.

All the profits from the foreign subsidiaries are remitted to the parent company as dividends.

Double taxation treaties between Beeland, Ceeland and the UK allow companies to set foreign tax liabilities against their domestic tax liability.

The following rates of taxation apply.

	UK	*Beeland*	*Ceeland*
Tax on company profits	25%	35%	40%
Withholding tax on dividends	–	12%	10%

Required

(a) Show the tax effect of increasing the transfer price between the UK and Ceeland subsidiaries by 25%. **(6 marks)**

(b) Outline the various problems which might be encountered by a company which adjusts a transfer price substantially. **(4 marks)**

(Total = 10 marks)

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Further question practice solutions

1 Mezza

Top tips. Read the entire requirement before starting your answer – in part (a) it is easy to forget to consider how the issues could be mitigated. Part (b) specifically refers to the integrated reporting, so you need to know the relevant capitals to include in your answer.

Easy marks. There are numerous easy marks to be gained from the environmental and ethical issues surrounding the project, as such issues are extremely topical.

(a) **Overarching corporate aim**

The main aim of the directors is to maximise shareholder value and any decisions should be taken with this objective in mind. However, the company has other stakeholders and directors should be sensitive to potential negative implications from implementing the project.

Key issue (1) – will the project add value?

The first issue to consider is whether the project will add value to the company.

Positive factors

At first glance it would appear that the project would be adding value, as it is meeting an identifiable market need (tackling climate change). There are likely to be positive effects on the company's reputation and ultimately its share price as Mezza Co is demonstrating a desire and ability to tackle climate change. If Mezza Co champions the work being done by its subsidiary, there are likely to be future opportunities for the subsidiary to work on similar projects.

Other factors to consider

Before progressing with the project, further investigation into its likely value is required. Whilst there is no doubt that such a project should be well received, there are risks that must be considered, not just from the project itself but also from the behaviour of the directors. Share options form part of the directors' remuneration package and they may be tempted to take greater risks as a result, in order to try to boost the share price. This may be against the wishes of shareholders and other stakeholders who may have a more risk-averse attitude.

The project appears to use new technology and ideas which, by their very nature, will be risky. There will therefore be uncertainty surrounding the income stream from the project – the extent of the risk should be assessed prior to progressing with the project. Are the current revenue and cost estimates realistic? What is the likelihood of competitors entering the market and the potential effects on revenue and market share? A full investigation, using such means as sensitivity analysis and duration, is required to answer such questions.

When assessing the extent of the value added by the project, it is important that risk is factored into the process. By doing so, directors will be in a better position (if necessary) to show stakeholders that they are not taking unacceptable risks in proceeding with the project. Other factors that must be investigated include the length of time it will take to get the product to market, any additional infrastructure required and potential expertise needed.

Key issue (2) – plant location

Positive factors

Mezza Co has identified an 'ideal' location for the plant, namely Maienar in Asia. This is due to Mezza already having a significant presence in Maienar and thus a well-developed infrastructure exists. There are also strong ties with senior government officials in this country and the Government is keen to develop new industries. All of these factors are very positive for

the potential development of the project. The ties to senior government officials are likely to be particularly useful when trying to deal with legal and administrative issues, thus reducing the time between development and production actually starting.

Other factors to consider

Despite the positive factors mentioned above, there are ethical and environmental issues to consider prior to making a final decision regarding plant location. The likely effect on the fishermen's livelihood could produce adverse publicity, as could potential damaging effects on the environment and wildlife. Environmental impact tends to generate considerable debate and Mezza will want to avoid any negative effects on its reputation (particularly as the project is supposed to be 'environmentally friendly').

The fact that Mezza has close ties with senior political figures and the Government in general may create negative feeling if it is felt that Mezza could influence the Government into making decisions that are not in the best interests of the locality and the country as a whole. This is a relationship that will have to be managed very carefully.

Risk mitigation

Given that Mezza has an excellent corporate image, it is unlikely that it will want to ignore the plight of the fishermen. It could try to work with the fishermen and involve them in the process, pointing out the benefits of the project to the environment as a whole (without ignoring the effects on their livelihood). It could offer the fishermen priority on new jobs that are created and emphasise the additional wealth that the project is likely to create.

Mezza could also consider alternative locations for the plant, although this is likely to be expensive, given the need for certain infrastructure already present in Maienar. Alternatively the company could try to find an alternative process for growing and harvesting the plant that would not have adverse effects on wildlife and fish stocks. Again, this is an expensive option and any such costs would have to be set against expected revenues to determine value added.

As mentioned above, Mezza will have to manage its relationship with Maienar's Government very carefully as it does not want to appear to be influencing government decisions. Mezza needs to make it very clear that it is following proper legal and administrative procedures – and is working with the Government to protect and improve the country, rather than exploit it for its own gains.

Conclusion

It is important that Mezza considers all of the likely benefits and costs related to the project, not just to itself but also to the country and its inhabitants. While gaining prompt approval from the Government will allow the project to proceed and become profitable more quickly, it is important that Mezza focuses on the effects of the project and alternative ways to proceed, in order to avoid an overall negative impact on its reputation.

(b) **Integrated reporting**

Integrated reporting looks at the ability of an organisation to create value and considers important relationships, both internally and externally. It involves considering the impact of the proposed project and six capitals as follows.

Financial

The integrated report should explain how commercialising the product should generate revenues over time, be an important element in diversification and make a significant contribution to the growth of Mezza. The report should also disclose the financial strategy implications if additional funding was required and what finance cost commitments Mezza will assume.

Manufactured

The report would identify the new facility as an important addition to Mezza's productive capacity. It would also show how the infrastructure that Mezza already has in Maienar will be used to assist in growing and processing the new plant.

Intellectual

The report should show how Mezza intends to protect the plant and hence its future income by some sort of protection, such as the patent. It should also highlight how development of the plant fulfils the aims of the subsidiary, to develop products that have beneficial impacts on other capitals.

Human

Mezza should show how the employment opportunities provided by the new facility link to how Mezza has been using local labour in Maienar. It should highlight the ways in which the new facility allows local labour to develop their skills. However, the report also needs to show whether Mezza is doing anything to help the fishermen deal with their loss of livelihood, since the adverse impact on the fishermen would appear to go against Mezza's strategy of supporting local farming communities.

Social and relationship

The development of the plant and the new facility should be reported in the context of Mezza's strategy of being a good corporate citizen in Maienar. It should explain how the new plant will assist economic development there and in turn how this will enhance the value derived to Mezza from operating in that country.

Natural

The report needs to set the adverse impact on the area and the fishing stock in the context of the longer-term environmental benefits that development of the plant brings. It also needs to show the commitments that Mezza is making to mitigate environmental damage.

2 Stakeholders and ethics

Top tips. Part (a) is an introduction to issues that will often be relevant in questions on mergers as well as questions about change of company status. The answer concentrates on financial benefits, and even just concentrating on these indicates potential conflicts. These may be significant in a merger situation, as co-operation of senior managers and employees will often be essential for the merger to succeed.

The discussion in (b) tests your understanding of broader ethical issues. A variety of different points could also be made here.

(a) **A company seeking a stock market listing**

When an unlisted company converts into a listed company, some of the existing shareholder/managers will sell their shares to outside investors. In addition, new shares will probably be issued. The dilution of ownership might cause loss of control by the existing management.

The stakeholders involved in potential conflicts are as follows:

(i) **Existing shareholder/managers**

They will want to sell some of their shareholding at as high a price as possible. This may motivate them to overstate their company's prospects. Those shareholder/managers who wish to retire from the business may be in conflict with those who wish to stay in control – the latter may oppose the conversion into a listed company.

(ii) **New outside shareholders**

Most of these will hold minority stakes in the company and will receive their rewards as dividends only. This may put them in conflict with the existing shareholder/managers who receive rewards as salaries as well as dividends. On conversion to a listed company there should be clear policies on dividends and directors' remuneration.

(iii) **Employees, including managers who are not shareholders**

Part of the reason for the success of the company will be the efforts made by employees. They may feel that they should benefit when the company seeks a listing. One way of organising this is to create employee share options or other bonus schemes.

(b) Main functional areas of a firm could include:

(i) Human resources
(ii) Marketing
(iii) Market behaviour
(iv) Product development

Human resources

(i) Provision of minimum wage. In recent years, much has been made of 'cheap labour' and 'sweat shops'. The introduction of the minimum wage is designed to show that companies have an ethical approach to how they treat their employees and are prepared to pay them an acceptable amount for the work they do.

(ii) Discrimination – whether by age, gender, race or religion. It is no longer acceptable for employers to discriminate against employees for any reason – all employees are deemed to be equal and should not be prevented from progressing within the company for any discriminatory reason.

Marketing

(i) Marketing campaigns should be truthful and should not claim that products or services do something that they in fact cannot. This is why such campaigns have to be very carefully worded to avoid repercussions under Trade Descriptions Acts etc.

(ii) Campaigns should avoid creating artificial wants. This is particularly true with children's toys, as children are very receptive to aggressive advertising.

(iii) Do not target vulnerable groups (linked with above) or create a feeling of inferiority. Again, this is particularly true with children and teenagers, who are very easily led by what their peer groups have. The elderly are also vulnerable, particularly when it comes to such things as electricity and gas charges – making false promises regarding cheaper heating for example may cause the elderly to change companies when such action is not necessary and may in fact be detrimental.

Market behaviour

(i) Companies should not exploit their dominant market position by charging vastly inflated prices (this was particularly true when utilities were first privatised in the UK; also transport companies such as railway operators which have monopolies on certain routes).

(ii) Large companies should also avoid exploiting suppliers if these suppliers rely on large company business for survival. Unethical behaviour could include refusing to pay a fair price for the goods and forcing suppliers to provide goods and services at uneconomical prices. In the past this has been a particular problem for suppliers in developing countries providing goods and services for large companies in developed countries.

Product development

(i) Companies should strive to use ethical means to develop new products – for example, more and more cosmetics companies are not testing on animals, an idea pioneered by such companies as The Body Shop.

(ii) Companies should be sympathetic to the potential beliefs of shareholders – for example, there may be large blocks of shareholders who are strongly opposed to animal testing. Managers could of course argue that if potential investors were aware that the company tested their products on animals then they should not have purchased shares.

(iii) When developing products, be sympathetic to the public mood on certain issues – the use of real fur is now frowned upon in many countries; dolphin-friendly tuna is now commonplace.

(iv) Use of Fairtrade products and services – for example, Green and Blacks Fairtrade chocolate; Marks & Spencer using Fairtrade cotton in clothing and selling Fairtrade coffee.

3 Airline Business

Top tips. In part (a) 'advice' requires more than a numerical answer. However, the key is to realise that the investors' required return would be the coupon rate on a new issue to ensure that it is fully subscribed at its nominal value.

There is quite a bit of work involved in part (b) for eight marks, compared with what is required for the same number of marks in part (c). The question does not give you the current value of debt therefore you will have to calculate that first before you can calculate the effect on this value. One of the more complex calculations (not the calculation itself but recognising what you have to do) is working out the percentage effect on current value.

Remember to answer the actual requirement in part (b) – it is easy to forget to determine the **increase** in the effective cost of debt capital. The current gearing ratio and the market capitalisation of equity leads directly to an estimate of the current market value of debt and, given that the market yield is the current coupon, its nominal value. The alteration in the company's credit rating leads to a revised market value for this equity and at this point candidates had sufficient information to estimate the average cost of debt capital.

Part (c) is not particularly difficult; there is not much to be done for eight marks but make sure you relate your answer to the specific company in the scenario where you can.

(a) The appropriate coupon rate for the new debt issue should be the same as the yield for the four-year debt, which is calculated as follows:

Yield for four-year debt= risk-free rate + credit spread

= 5.1% + 0.9% (0.9% is the 90 base point spread) = 6%

The investment bankers have suggested that at a spread of 90 base points will guarantee that the offer will be taken up by the institutional investors. If the spread was set too high, the debt would be issued at a premium; if it was too low then it would have to be issued at a discount as there would not be a full take-up.

(b) **Impact of new issue on the company's cost of debt and market valuation**

When new debt is issued this will increase the risk of the company, resulting in a reduction in the company's credit rate and/or an increase in the company's cost of debt.

Current amount of debt in issue

Using the company's current gearing ratio of 25%, we can calculate the current amount of debt in issue:

$$\text{Gearing} = \frac{\text{MV of debt}}{\text{MV of debt} + \text{MV of equity}}$$

$$0.25 = \frac{\text{MV of debt}}{1.2\text{bn} + \text{MV of debt}}$$

0.25 (1.2bn + MV of debt) = MV of debt

0.25 × 1.2bn + 0.25MV of debt = MV of debt

0.3bn = 0.75MV of debt

MV of debt = 0.4bn

Thus the current market value of debt in issue is \$0.4bn. This is actually the nominal value as well, given that the coupon rate of 4% and the market yield (3.5% + 50 basis points) are the same.

Effect of new debt on market value of current debt

As mentioned in part (a) above, the yield on the new debt will be 6% (5.1% + 90 basis points). If we assume that this new debt is issued at nominal value at 6%, the market value of existing debt will be reduced by the reduction in credit rating and the increase in yield to 4.4% (that is, original yield of 3.5% + 90 basis points).

The interest on existing debt = 0.04 × \$0.4bn = \$0.016bn

Capital repaid = \$0.40bn

Revised value =

\$0.016/1.044 + \$0.016/(1.044^2) + \$0.416bn/(1.044^3) = \$0.3956bn or \$395.6m

This means that the new market value of current debt will be 98.9% (0.3956/0.4) of the current market value.

If the new debt of \$400 million is – as expected – taken up at the nominal value then total market value of debt in issue will be:

\$395.6 million + 400 million = \$795.6 million

Effect of new debt on cost of debt capital

Using the yields calculated above (6% for new debt; 4.4% for existing debt), the revised cost of debt capital can be calculated on a weighted average basis, adjusted for the effect of tax:

$$\text{Pre-tax cost of debt} = \left[\frac{400\text{m}}{(400\text{m} + 395.6\text{m}} \times 6\% + \frac{395.6\text{m}}{(400\text{m} + 395.6\text{m})} \times 4.4\%\right] \times (1 - 0.30)$$

$$= [3.02\% + 2.19\%] = 5.21\%$$

Current cost of debt = 4%

The effect of the new debt issue on cost of debt is to increase it by 1.21% pre-tax, which becomes 0.85% (1.21% × 0.7) post-tax.

What should be borne in mind is that part of this increase will be due to the longer term to maturity (four years rather than three years).

(c) **Advantages and disadvantages of debt as a method of financing**

Relative lower cost of debt compared with equity

One of the advantages of debt is that, due to the tax shield on interest payments, it is a relatively cheaper form of financing than equity (whose dividends are paid out of earnings

after tax). As such we would expect the higher level of gearing to lead to a fall in the weighted average cost of capital.

Appropriate to the industry and specific assets

The company is in the airline industry where debt tends to be a more appropriate method of finance, given that many of the assets can be sold when they are being replaced. In this case, the company is using debt to acquire new aircraft where a secondhand market does exist.

Signalling and agency effects

Companies tend to prefer debt to equity as a method of financing. This is mainly due to the tax shield offered by interest payments on debt. If the company increases its level of debt financing, the market could interpret this as meaning that management believe the company is undervalued. There is a significant agency effect arising from the legal obligation to make interest payments. Managers are less inclined to divert money towards financing their own incentives and perks if they know they have such legal obligations to meet.

Alteration of capital structure

One of the problems with debt financing is that it could be viewed as increasing the risk of the company to equity holders, given that there is a legal obligation to pay interest before dividends can be paid. As a result, investors may require a higher rate of return before they will be tempted to invest money in the company.

4 CD

Top tips. The net cash flows are in **real** terms so need to be converted into **nominal** cash flows.

(a) **Appraisal of Alternative 2**

Net present value (NPV)

Year	*0*	*1*	*2*	*3*
US$m real cash flows	(25.00)	2.60	3.80	4.10
US$m nominal cash flows (inflation 4% pa)	(25.00)	2.70	4.11	4.61
Exchange rate	1.600	1.616	1.631	1.647
US nominal cash flows in £m	(15.63)	1.67	2.52	2.80
£m real cash flows		3.70	4.20	4.60
£m nominal cash flows (inflation 3% pa)		3.81	4.46	5.03
Total nominal cash flows in £m	(15.63)	5.48	6.98	7.83
9% discount factors	1	0.917	0.842	0.772
Present value £m	(15.63)	5.03	5.88	6.04
NPV £m	1.32			

The NPV of the project is **£1.32 million** positive.

Payback

Year	*0*	*1*	*2*	*3*
Total nominal cash flows in £m	(15.63)	5.48	6.98	7.83
Cumulative cash flow £m	(15.63)	(10.15)	(3.17)	4.66

Payback = 2 + (3.17/7.83) = 2.40 years

Discounted payback

Year	*0*	*1*	*2*	*3*
Present value £m	(15.63)	5.03	5.88	6.04
Cumulative present value £m		(10.60)	(4.72)	1.32

Discounted payback = 2 + (4.72/6.04) = 2.78 years

Internal rate of return (IRR)

The IRR can be found by trial discount rates and interpolation. If the discount rate is 15%, the NPV is £(0.43) million.

Year	*0*	*1*	*2*	*3*
Total nominal cash flows in £m	(15.63)	5.48	6.98	7.83
15% factors	1	0.870	0.756	0.658
PV	(15.63)	4.77	5.28	5.15
NPV	(0.43)			

By interpolation the IRR is 9% + (15% – 9%) × 1.32/(1.32 + 0.43) = **13.5% pa**

Modified internal rate of return (MIRR)

We can find the MIRR using the formula given in the formula sheet.

$$MIRR = \left[\frac{PV_R}{PV_I}\right]^{\frac{1}{n}}(1+r_e)-1$$

Year	*0*	*1*	*2*	*3*
Total nominal cash flows in £m	(15.63)	5.48	6.98	7.83
9% factors	1	0.917	0.842	0.772
PV	(15.63)	5.03	5.88	6.04
NPV	1.32			

PV (return phase – Years 1–3) = £16.95m

PV (investment phase) = £(15.63)m

MIRR = $(16.95m/15.63m)^{1/3}$ × (1 + 0.09) – 1 = 12%

(b) **Project duration for Alternative 2**

Present value of cash inflows = NPV + initial investment = £1.32m + £15.63m = £16.95m

Year	*1*	*2*	*3*
PV of cash flow	5.03	5.88	6.04
% of total PV	30%	35%	36%
Year × %	1 × 30% = 0.3	2 × 35% = 0.7	3 × 36% = 1.08

Duration = 0.3 + 0.7 + 1.08 = 2.1 years

Alternative duration calculation:

Present value of cashin flows = NPV + initial investment = £1.32m + £15.63m = £16.95m

Year	*1*	*2*	*3*
PV of cash flow	5.03	5.88	6.04
Year × PV	1 × 5.03 = 5.03	2 × 5.88 = 11.76	3 × 6.04 = 18.12

Duration = (5.03 + 11.76 + 18.12)/16.95 = 2.1 years

Significance of results

On average Alternative 2 delivers value over 2.1 years. Compared with Alternative 1 this is a good result as Alternative 1 takes over one year longer to deliver value. The longer the duration, the more risky the project as there is greater uncertainty attached to future returns.

(c) **Evaluation of the two alternatives**

Summary of the appraisal results

Alternative	*1*	*2*
NPV at 9%	£1.45m	£1.32m
IRR	10.5%	13.5%
MIRR	13.2%	12.0%
Duration	3.2 years	2.1 years
Payback	2.6 years	2.40 years
Disc. payback	3.05 years	2.78 years

All other things being equal, the project to be accepted should be the one with the higher NPV, which is Alternative 1. NPV shows the absolute amount by which the project is forecast to **increase shareholders' wealth**, and is theoretically sounder than the IRR and MIRR methods.

In this case the MIRR method backs up the NPV, but the IRR gives the opposite indication. This 'conflict' arises because IRR makes the wrong **assumption** about reinvestment rates; reinvestment is assumed (in IRR) to be earning the same return as the project (as opposed to earning the average cost of capital which is the assumption made by MIRR).

The duration of the alternatives shows that Alternative 1 is more risky as it takes longer to recover half the present value. This is also backed up by the payback figures showing that Alternative 1 takes longer to recover the original outlay.

Before making a decision, however, there are a number of other important factors that must be taken into consideration.

Alternative 1

- Alternative 1 has a high risk of lowering the firm's reputation for quality and causing confusion among the customer base. The overall effect may be to **lose existing customers** but not to gain many new ones.
- It also removes the **focus** from the business. Marketing a wider range of products may be more difficult than is anticipated and may stretch resources.
- Duration is longer, which might put management off, particularly if they are averse to risk.

Alternative 2

- Alternative 2 represents a fundamental change in the nature of the business from a niche manufacturer to a **value added** distributor.
- The firm may be able to add successfully its **brand reputation for quality** to mass market products, but this will only be possible if the US 'flat packs' are of guaranteed quality and consistency, and the varnishing and assembly work are carried out to a high standard.
- The change in the nature of the firm's work may require **substantial new equipment**.
- This alternative may also result in a **loss of skilled workers**, with the risk of lower quality.
- However, the shorter duration of the project suggests lower financial risk to the firm, which may be a deciding factor if management are struggling to distinguish between the alternatives in other ways.

Given the similarity in the NPVs between the two projects, the decision will almost certainly depend on non-financial factors.

5 Bournelorth

Top tips. This question requires you to think outside the confines of one chapter, which is an important skill in AFM. You shold note that due credit is given to relevant and valid points discussed that may not be included in this model answer.

Make sure that in part (a) you make your points as specific to the scenario as you can.

In part (b(ii)) be careful to read the question carefully – it is asking about issues such as confidentiality and transparency that could determine the kind of information the company communicates; not what kind of information needs to be communicated.

(a) According to traditional finance theory, Bournelorth Co's directors will wish to strive for long-term shareholder wealth maximisation. The directors may not have been fully committed to long-term wealth maximisation, as they seemed to have focused on the development aspects which interested them most and left the original business mostly to others. However, now they are likely to come under pressure from the new external shareholders to maximise shareholder wealth and pay an acceptable level of dividend. To achieve this, it seems that Bournelorth Co will have to commit further large sums to investment in development of diagnostic applications (apps) in order to keep up with competitors.

Selling off the IT services business

At present the IT services business seems to be a reliable generator of significant profits. Selling it off would very likely produce a significant cash boost now, when needed. However, it would remove the safety net of reasonably certain income and mean that Bournelorth Co followed a much riskier business model. The IT services business also offers a possible gateway to reach customers who may be interested in the apps which Bournelorth Co develops.

Rights issue

If the executive directors wish to maintain their current percentage holdings, they would have to subscribe to 75% of the shares issued under the rights issue. Even though the shares would be issued at a discount, the directors might well not have the personal wealth available to subscribe fully. Previously they had to seek a listing to obtain enough funds for expansion, even though they were reluctant to bring in external investors, and this suggests their personal financial resources are limited.

However, the directors may need to take up the rights issue in order to ensure its success. If they do not, it may send out a message to external investors that the directors are unwilling to make a further commitment themselves because of the risks involved. There are also other factors which indicate that the rights issue may not be successful. The directors did not achieve the initial market price which they originally hoped for when Bournelorth Co was listed and shareholders may question the need for a rights issue soon after listing.

If the executive directors do not take up all of their rights, and the rights issue is still successful, this may have consequencesfor the operation of the business. The external shareholders would own a greater percentage of Bournelorth Co's equity share capital and may be in a position to reinforce the wishes of non-executive directors for improved governance and control systems and change of behaviour by the executive directors. Possibly they may also demand additional executive and non-executive directors, which would change the balance of power on the board.

The level of dividend demanded by shareholders may be less predictable than the interest on debt. One of the directors is also concerned whether the stock market is efficient or whether the share price may be subject to behavioural factors (discussed in (c) below).

Debt finance

Debt providers will demand Bournelorth Co commits to paying interest and ultimately repaying debt. This may worry the directors because of the significant uncertainties surrounding returns from new apps. Significant debt may have restrictive covenants built in, particularly if Bournelorth Co cannot provide much security. The directors may be faced with restrictions on dividends, for example, which may upset external shareholders.

Uncertainties surrounding funding may also influence directors' decisions. Loan finance may be difficult to obtain, but the amount and repayments would be fixed and could be budgeted, whereas the success of a rights issue is uncertain.

(b) (i) The main risks connected with development work are that time and resources are wasted on projects which do not generate sales or are not in line with corporate strategy. Directors may choose apps which interest them rather than apps which are best for the business. There is also the risk that projects do not deliver benefits, take too long or are too costly. Bournelorth Co's directors' heavy involvement in development activities may have made it easier to monitor them. However, the dangers with this are that the directors focus too much on their own individual projects, do not consider their projects objectively and do not step back to consider the overall picture.

The board must decide on a clear strategy for investment in development and needs to approve major initiatives before they are undertaken. There must be proper planning and budgeting of all initiatives and a structured approach to development. The board must regularly review projects, comparing planned and actual expenditure and resource usage. The board must be prepared to halt projects which are unlikely to deliver benefits. One director should be given responsibility for monitoring overall development activity without being directly involved in any of the work. Post-completion reviews should be carried out when development projects have been completed.

(ii) Communication with shareholders and other important stakeholders, such as potential customers, may be problematic. Bournelorth Co faces the general corporate governance requirement of transparency and has to comply with the specific disclosure requirements of its local stock market.

However, governance best practice also acknowledges that companies need to be allowed to preserve commercial confidentiality if appropriate, and clearly it will be relevant for Bournelorth Co. However, the less that it discloses, the less information finance providers will have on which to base their decisions.

Another issue with disclosure is that product failures may be more visible now that Bournelorth Co has obtained a listing and may have to include a business review in its accounts.

(c) (i) Sewell defines behavioural finance as the influence of psychology on the behaviour of financial practitioners and the subsequent effect on markets. Behavioural finance suggests that individual decision making is complex and will deviate from rational decision-making. Under rational decision-making, individual preferences will be clear and remain stable. Individuals will make choices with the aim of maximising utility, and adopt a rational approach for assessing outcomes.

Under behavioural finance, individuals may be more optimistic or conservative than appears to be warranted by rational analysis. They will try to simplify complex decisions and may make different decisions based on the same facts at different times.

(ii) Bournelorth Co's share price may be significantly influenced by the impact of behavioural factors, as it is a newly listed company operating in a sector where returns have traditionally been variable and unpredictable. The impact of behavioural factors may be complex, and they may exert both upward and downward pressures on Bournelorth Co's share price. Investors may, for example, compensate for not knowing much about Bournelorth Co by anchoring, which means using information which is irrelevant, but which they do have, to judge investment in Bournelorth Co.

The possibility of very high returns may add to the appeal of Bournelorth Co's shares. Some investors may want the opportunity of obtaining high returns even if it is not very likely that they will. The IT sector has also been subject to herd behaviour, notably in the dotcom boom. The herd effect is when a large number of investors have taken the same decision, for example to invest in a particular sector, and this influences others to conform and take the same decision.

However, even if Bournelorth Co produces high returns for some time, the fact that it is in a volatile sector may lead to investors selling shares before it appears to be warranted on the evidence, on the grounds that by the laws of chance Bournelorth Co will make a loss eventually (known as the gambler's fallacy).

Under behavioural finance, the possible volatility of Bournelorth Co's results may lead to downward pressure on its share price for various reasons. First some investors have regret aversion, a general bias against making a loss anyway. This, it is claimed, means that the level of returns on equity is rather higher than the returns on debt than is warranted by a rational view of the risk of equity.

Similarly under prospect theory, investors are more likely to choose a net outcome which consists entirely of small gains, rather than an identical net outcome which consists of a combination of larger gains and some losses. At present also, Bournelorth Co does not have much of a history of results for the market to analyse. Even when it has been listed for some time, however, another aspect of behavioural finance is investors placing excessive weight on the most recent results.

If the market reacts very well or badly to news about Bournelorth Co, the large rise or fall in the share price which results may also not be sustainable, but may revert back over time.

6 Four Seasons

(a) The value of the abandonment option can be estimated by determining the value of the put option using the Black–Scholes formula.

Call option = $P_a N(d_1) - P_e N(d_2)e^{-rt}$

Put option = $c - P_a + P_e e^{-rt}$

where:

Value of the underlying asset (P_a) = PV of cash flows from project at the point in time when the option is exercised. This is in five years' time so 15/20 of the projects' present value will remain: \$339m × 15/20 = \$254 million

Strike price (P_e) = Salvage value from abandonment = \$150 million

Variance in underlying asset's value = 0.09 (standard deviation (s) = $\sqrt{0.09}$ = 0.3)

Time to expiration = Life of the project = 5 years

Risk-free rate of interest (r) = 7%

Value of call option

$$d_1 = \frac{\ln\left(\frac{P_a}{P_e}\right) + \left(r + 0.5s^2\right)t}{s\sqrt{t}}$$

$$d_1 = \frac{\ln\left(\frac{254}{150}\right) + \left(0.07 + 0.50.3^2\right) \times 5}{0.3 \times \sqrt{5}}$$

$$= \frac{0.5267 + 0.115 \times 5}{0.6708}$$

$= 1.64$

$d_2 = d_1 - s\sqrt{t}$

$= 1.64 - 0.3 \times \sqrt{5}$

$= 0.97$

Using normal distribution tables:

$N(d_1) = 0.9495$

$N(d_2) = 0.8340$

Value of call option = 254 (0.9495) – 150 (0.8340) $e^{-0.07 \times 5}$

= 214.17 – 88.16

= 153.01

The value of the put option can be calculated as follows:

Put option = 153.01 – 254 + (150 $e^{-0.07 \times 5}$)

= 153.01 – 254 + 105.70

= \$4.71m

The value of this abandonment option is added to the project's NPV of \$89m, which gives a total NPV with abandonment option of \$93.71m.

(b) The main limitations of the Black–Scholes model are:

(i) The model is **only designed** for the valuation of **European options**.

(ii) The model assumes that there will be **no transaction costs**.

(iii) The model assumes knowledge of the **risk-free rate of interest,** and also assumes the risk-free rate will be constant throughout the option's life.

(iv) Likewise the model also assumes accurate knowledge of the **standard deviation of returns**, which is also assumed to be constant throughout the option's life.

7 Pandy

The value of the project (P_a) is \$20m at year 5. We therefore have to discount this back to Year 0 to obtain the PV.

P_a = \$20m × 0.567 = \$11.34m

The other variables are as follows.

P_e = \$20m t = 5 s = 0.25 r = 0.05 e^{-rt} = 0.779

d_1 = [ln(11.34/20) + (0.05 + 0.5 × 0.25^2) × 5]/(0.25 × √5)

= [–0.5674 + 0.40625]/0.5590

= –0.29

d_2 = –0.288 – 0.5590

= –0.85

$N(d_1)$ = 0.5 – 0.1141 = 0.3859

$N(d_2)$ = 0.5 – 0.3023 = 0.1977

Option to expand = ($11.34m × 0.3859) – ($20m × 0.1977 × 0.779)

= $4.376m – $3.080m

= $1.296m

NPV of the project is now $1.296m – $0.5m = $0.796m

We now can see the value of the real options approach. Here a project was originally showing a negative NPV (of $0.5m) and would therefore be rejected. However by valuing a real option associated with the project we can see that the project can be justified and now shows a positive NPV.

8 Novoroast

Top tips. Points to note in the calculations are:

- The treatment of working capital (the increase is included each year and the whole amount released at the end of the period)
- The use of purchasing power parity to calculate exchange rates
- The additional UK tax (calculated on taxable profits, not on cash flows)
- The use of the existing weighted average cost of capital (WACC) (as the company is still manufacturing the same products)

The discussion should include problems with the assumptions, and the limitations of only taking five years' worth of cash flows. You also need to consider the risks and long-term opportunities of investing in South America.

(a) To: Board of Directors of Novoroast plc
From: Strategic Financial Consultant
Date:

Proposed investment in South American manufacturing subsidiary

1 **Introduction**

The proposed investment has been triggered by the imposition of a very **high import tariff** (40%) in the South American country. The effect of this tariff is that all sales from the UK to this country will be lost (10% of total UK sales). This loss of UK sales will occur whether or not the proposed investment is made, and has therefore been omitted from the financial evaluation which follows.

2 **Financial evaluation**

A financial evaluation of the investment, based on discounting the sterling value of incremental cash flows at the company's WACC, shows a **negative NPV** of £610,000, indicating that the investment is not expected to show high enough returns over the 5-year time horizon to compensate for the risk involved. Calculations are followed by workings and assumptions.

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Year	*0*	*1*	*2*	*3*	*4*	*5*
Profit and cash flow – peso million						
Total contribution (W1)		5.80	44.20	92.82	97.04	100.92
Fixed costs (per year inflation increases)		(12.00)	(14.40)	(16.56)	(19.04)	(21.90)
Tax-allowable depreciation		(12.00)	(12.00)	(12.00)	(12.00)	(12.00)
Taxable profit		(18.20)	17.80	64.26	66.00	67.02
Tax: from Year 4 only at 25%					(16.50)	(16.76)
Add back depreciation		12.00	12.00	12.00	12.00	12.00
Net after-tax cash flow from operations		(6.20)	29.80	76.26	61.50	62.26
Investment cash flows						
Land and buildings (W3)	(50)					104.94
Plant and machinery (less 10% govt. grant)	(54)					
Working capital (W4)	(20)	(29.00)	(7.35)	(8.45)	(9.72)	74.52
Cash remittable from/to UK	(124)	(35.20)	22.45	67.81	51.78	241.72
Exchange rate P/£ (W2)	13.421	15.636	17.290	19.119	21.141	23.377
UK cash flows (£m)						
Cash remittable	(9.24)	(2.25)	1.30	3.55	2.45	10.34
Contribution from sale of chips (£3 per unit)		0.02	0.18	0.36	0.36	0.36
Tax on chips contribution at 30%		(0.01)	(0.05)	(0.11)	(0.11)	(0.11)
Additional UK tax at 5% on S. Am. profits					(0.16)	(0.14)
Net cash flow in £m	(9.24)	(2.24)	1.43	3.80	2.54	10.45
14% (W5) discount factors	1	0.877	0.769	0.675	0.592	0.519
Present value £m	(9.24)	(1.96)	1.10	2.57	1.50	5.42
NPV	(£610,000)					

Workings

1

Year	*0*	*1*	*2*	*3*	*4*	*5*
Contribution per unit						
Sales price (10% increases – pesos)		1,450.0	1,595.0	1,754.5	1,930.0	2,123.0
Variable cost per unit in pesos (previous year inflation increases)		600.0	720.0	828.0	952.2	1,095.0
Chip cost per unit (£8 converted to pesos – W2)		125.1	138.3	153.0	169.1	187.0
Contribution per unit (pesos)		724.9	736.7	773.5	808.7	841.0
Sales volume ('000 units)		8	60	120	120	120

2 *Prediction of future exchange rates*

Future exchange rates have been predicted from expected inflation rates, on the principle of purchasing power parity theory, eg Year 1 exchange rate = 13.421 × 1.20/1.03 = 15.636 etc.

	Inflation		
	UK	*S.Am.*	*Exchange rate*
Spot			13.421
Year 1	3%	20%	15.636 (13.421 × 1.2/1.03)
Year 2	4%	15%	17.290 (15.636 × 1.15/1.04)
Year 3	4%	15%	19.119 (17.290 × 1.15/1.04)
Year 4	4%	15%	21.141 (19.119 × 1.15/1.04)
Year 5	4%	15%	23.377 (21.141 × 1.15/1.04)

3 *Land and buildings*

Value after five years = P50m × 1.2 × 1.15^4 = P104.94m. It is assumed no tax is payable on the capital gain.

4 *Working capital*

Value of working capital increases in line with inflation each year. The relevant cash flow is the difference between the values from year to year. Working capital is assumed to be released at the end of Year 5.

End of year	*0*	*1*	*2*	*3*	*4*	*5*
Local inflation		20%	15%	15%	15%	
Value of Year 0 investment	20	24	27.60	31.74	36.50	0.00
Year 1 investment		25	28.75	33.06	38.02	0.00
Cumulative investment	20	49	56.35	64.80	74.52	0.00
Incremental cash flow	(20)	(29)	(7.35)	(8.45)	(9.72)	74.52

5 *Discount rate*

The company's WACC has been used as a discount rate, on the grounds that overall risk to investors is not expected to change as a result of this investment.

From the CAPM, k_e = 6% + (14% – 6%)1.25 = 16%.

k_d = 6% + (14% – 6%)0.225 = 7.8% pre-tax. After-tax rate = 7.8%(1 – 0.3) = 5.46%.

Market values: Equity: 200m × £4.10 = £820m. Debt: £180m × 800/1,000 = £144m.

Total = £964m.

WACC = 16% × 820/964 + 5.46% × 144/964 = 14.42%.

The discount rate will be **rounded** to 14% for the calculation.

6 *Limitations of the analysis*

The calculations are based on many assumptions and estimates concerning future cash flows. For example:

(i) **Purchasing power parity**, used to estimate exchange rates, is only a 'broad-brush' theory; many other factors are likely to affect exchange rates and could increase the risk of the project.

(ii) **Estimates** of inflation, used to estimate costs and exchange rates in the calculations, are subject to **high inaccuracies**.

(iii) **Assumptions** about future tax rates and the restrictions on price increases may be incorrect.

(iv) **Cash flows** beyond the five-year time horizon may be crucial in determining the viability or otherwise of the project; economic values of the operational assets at Year 5 may be a lot higher than the residual values included in the calculation.

The calculations show only the medium-term financial implications of the project. Non-financial factors and potentially important strategic issues have not been addressed.

7 *Other relevant information*

In order to get a more realistic view of the overall impact of the project, a strategic analysis needs to be carried out assessing the long-term plans for the company's products and markets. For example, the **long-term potential growth** of the South American market may be of greater significance than the medium-term problems of price controls and inflation. On the other hand, it may be of more importance to the

company to **increase its product range** to existing customers in Europe. There may also be further opportunities in other countries or regions.

Before deciding whether to invest in the South American country, the company should commission an evaluation of the **economic**, **political and ethical environment**. **Political risks** include the likelihood of imposition of exchange controls, prohibition of remittances, or confiscation of assets.

The value of this project may be higher than is immediately obvious if it opens up longer-term opportunities in South American markets. Option pricing theory can be used to value these opportunities.

As regards the existing financial estimates, the **uncertainties** surrounding the cash flows can be quantified and understood better by carrying out **sensitivity analysis**, which may be used to show how the final result varies with changes in the estimates used.

8 *Conclusion*

On the basis of the evaluation carried out so far, the project is not worthwhile. However, other opportunities not yet quantified may influence the final decision.

9 PMU

Top tips. The question is asking for benefits and disadvantages of entering into a joint venture rather than setting up independently. It is not asking you to discuss whether or not PMU should move into this market (Kantaka). If you enter into such discussions you will gain no credit.

Make sure your answer is balanced. You are given no indication in the question about the number of marks available for each element of the requirement – it is up to you to address the issues that arise in the scenario. Don't just provide a list of benefits and disadvantages – at this level you are expected to expand each issue and provide potential ways in which disadvantages can be dealt with.

Don't forget to suggest additional information that is required before a final decision can be made.

Easy marks. Even without detailed knowledge of joint ventures, the scenario is sufficiently detailed for you to pick out a number of points that will earn marks.

(a) **Benefits and disadvantages of PMU entering into a joint venture**

Benefits of joint venture

A joint venture with a local partner would give PMU relatively **low cost access** to an overseas market. The Kantaka Government is offering tax concessions to companies bringing FDI into the country and PMU would benefit further by having to borrow less money if it entered into a joint venture.

Given that PMU has no experience of overseas investment and doing business in foreign countries, having a joint venture partner would be beneficial. Such a partner could assist with such issues as **marketing, cultural and language issues and dealing with government restrictions and bureaucracy**.

A joint venture partner could also give easier access to **capital markets** which would reduce any **foreign currency risk** for PMU. If its investment is funded in Rosinante currency but fee income is in Kantaka currency, this will result in long-term foreign currency risk exposure. We have been told that the Kantaka currency has been depreciating against other currencies over the past two years. If this continues the fee income will be worth less when converted into Rosinante currency and could lead to a shortfall in funds available to cover the cost of the investment borrowings.

A joint venture would give PMU the chance to share costs with the local partner. Academic institutions already exist in Kantaka which would eliminate the need to source new premises and a whole new team to run the degree programmes.

Disadvantages of joint venture

The most significant problem with entering into a joint venture for PMU is the potential effects on **reputation**. PMU is a member of the prestigious Holly League and is world-renowned as being of the highest quality. The Kantaka Government has a history of being reluctant to approve degrees from overseas institutions that enter into joint ventures with local partners and those who do graduate with such degrees have been unable to seek employment in national or local government or nationalised organisations. In addition, degree programmes emerging from joint ventures are not held in high regard by Kantaka's population.

With this in mind, PMU could suffer from **negative publicity** if it chooses a poor academic institution with which to have a joint venture. It will have to carry out significant research into potential partners before making a decision. The academic institution chosen should ideally have a high reputation for quality teaching and qualifications to protect PMU's own reputation. It may also be worthwhile for PMU to meet with the Kantaka Government to try to obtain a commitment from the Government to back its degree programmes. All such efforts take time but it is important to do sufficient groundwork before making such a major commitment. PMU should also determine whether the Government will recognise its degrees if it sets up on its own rather than entering into a joint venture.

PMU should also be mindful of the potential impact on the **quality** of its degree programmes. We are told that the teaching and learning methods used in Kantaka's educational institutions are very different to the innovative methods used by PMU (which are instrumental in its academic success). In addition, students will have certain very **high expectations** of the quality of infrastructure, such as IT facilities, halls of residence and lecture halls. Any joint venture partner should be able to adapt to match such expectations. Existing staff will require **sufficient training** to ensure that teaching quality is not compromised. As far as possible, Kantaka students should have the same overall experience that PMU's home-based students in Rosinante enjoy. This may require a higher proportion of Rosinante staff being brought in initially until local staff acquire the necessary skills.

Cultural differences present major challenges to businesses setting up overseas. Steps should be taken to minimise such differences between local staff and expats from Rosinante. We have been told about the differences in teaching and learning methods – there are also differences in **attitudes** towards research, a major activity in Holly League universities. PMU will have to put strategies in place to deal with these and other cultural differences and ensure the availability of programmes to help expat staff settle into a new country. At all costs, a 'them and us' culture should be avoided as this will create resentment and alienation of local staff. One idea might be to encourage **staff exchange programmes** to expose both sets of staff to each other's cultures.

Joint ventures can restrict **managerial freedom of actions** as opinions of both sets of managers may differ. It is important that PMU listens to the opinions of the joint venture partner regardless of how different these may be to the underlying principles of its own managers. Clear guidelines should be developed regarding the aims and objectives of the joint venture and both sets of managers should be involved in the decision-making process.

It is important that PMU considers **government restrictions** on such factors as visas for key staff from Rosinante, proportion of total staff that has to be made up of local employees and repatriation of funds from Kantaka to Rosinante. A meeting with government officials is essential to clarify such issues.

Legal issues must be addressed properly and with due care and attention. Terms and conditions of the joint venture, roles and responsibilities of both parties, profit sharing

percentages and ownership percentages must all be discussed by legal representatives of both sides of the contract.

Other information required

- Will tax concessions be lost if PMU decides to 'go it alone' rather than enter into a joint venture? If so the impact on funding required will have to be determined.
- What government restrictions might be imposed on repatriation of funds and visas for key staff?
- Outcome of discussions with the Kantaka Government regarding whether it will recognise PMU degrees and thus allow graduates to gain employment in government and nationalised industries.
- Outcome of research into the availability of potential joint venture partners that will fulfil students' expectations regarding infrastructure, facilities and teaching methods.
- What is the likelihood of PMU's degrees being recognised by Kantaka's own people?
- Will PMU be able to raise funds locally to finance the venture, thus reducing exposure to foreign currency risk?
- Will local staff be willing to undergo training in PMU's teaching and learning methods and to what extent is this likely to breed resentment?
- Will PMU be able to source experts in Kantaka to help set up the venture if it decides to 'go it alone'?

(b) There are a number of ways PMU could deal with the issue of blocked funds:

(i) PMU could sell goods or services to the subsidiary and obtain payment. This could be for course materials or teaching staff supplied. The amount of this payment would depend on the volume of sales and also on the transfer price for the sales.

(ii) PMU could charge a royalty on the courses that the subsidiary runs. The size of the royalty could be adjusted to suit the wishes of PMU's management.

(iii) PMU could make a loan to a subsidiary at a high interest rate, which would improve PMU's company's profits at the expense of the subsidiary's profits.

(iv) Management charges may be levied by PMU for costs incurred in the management of international operations.

(v) The subsidiary could make a loan, equal to the required dividend remittance to PMU.

10 Tampem

Top tips. The key elements of the NPV calculation are the tax allowable depreciation and the capital asset pricing model (CAPM) based cost of capital. You would not have scored well on the APV calculation if you didn't calculate the ungeared cost of equity.

The tax shield on debt has been discounted at the cost of debt of 8% but the risk-free rate could have been used.

In part (b) a key point with NPV is that it assumes that risks will stay the same when investments are undertaken, although a key aim of major investments may be to change the risk profile of the company. APV takes into account the changes in financial risk.

(a) **Expected NPV**

The NPV is found by discounting at the weighted average cost of capital, calculated as follows:

Cost of equity

Using CAPM

$Ke = r_f + [E(r_m) - r_f]\beta$

$= 4 + (10 - 4)\ 1.5 = 13\%$

Cost of debt

After-tax cost of debt = $8(1 - 0.3)$

$= 5.6\%$

Weighted average cost of capital (WACC)

Gearing after the investment has been financed is expected to be E = 0.6, D = 0.4

$$WACC = Keg\frac{E}{E+D} + Kd(1-t)\frac{D}{E+D}$$

$= 13(0.6) + 5.6(0.4)$

$= 10.04\%$, say 10%

Tax allowable depreciation (TAD)

These are on the $4.4 million part of the investment that is non-current assets (not working capital or issue costs).

Year	*Value at start of year*	*TAD 25%*
	$'000	$'000
1	4,400	1,100
2	3,300	825
3	2,475	619
4	1,856	464

Year	*0*	*1*	*2*	*3*	*4*
	$'000	$'000	$'000	$'000	$'000
Pre-tax operating cash flows		1,250	1,400	1,600	1,800
TAD		(1,100)	825	619	464
Taxable profit		150	575	981	1,336
Tax @ 30%		(45)	(172)	(294)	(401)
Add back TAD		1,100	825	619	464
Investment cost	(5,000)				
Issue costs	(400)				
After-tax realisable value					1,500
Net cash flows	(5,400)	1,205	1,228	1,306	2,899
Discount factor 10%	1.000	0.909	0.826	0.751	0.683
Present values (PV)	(5,400)	1,095	1,014	981	1,980

The expected NPV is **$(330,000)**

BPP LEARNING MEDIA

MIRR (using the formula provided on the formula sheet)

$$MIRR = \left[\frac{PV_r}{PV_i}\right]^{1/n} \times \left(1+r_e\right) - 1$$

Where PV_r = PV of return phase and PV_i = PV of investment phase

PV_i = \$5,400,000

The project NPV is (\$330,000) so *PVr* = \$5,400,000 – \$330,000 = \$5,070,000.

Using the formula, $MIRR = \left[\frac{5,070,000}{5,400,000}\right]^{1/4} \times (1+0.1) - 1 = 0.083$ or **8.3%**

Expected APV

To calculate the base case NPV, the investment cash flows are discounted at the **ungeared cost of equity**, assuming the corporate debt is risk free (and has a beta of zero):

$$\beta_a = \beta_e \frac{E}{E+D(1-t)}$$

$$= 1.5 \times \frac{1}{1+1(1-0.3)} = 0.882$$

The ungeared cost of equity can now be estimated using the CAPM:

$Ke_u = r_f + [E(r_m) - r_f]\beta$

$= 4 + (10 - 4) \times 0.882$

= 9.29% (say, approximately 9%)

Year	*0*	*1*	*2*	*3*	*4*
	\$'000	\$'000	\$'000	\$'000	\$'000
Net cash flows	(5,000)	1,205	1,228	1,306	2,899
Discount factor 9%	1.000	0.917	0.842	0.772	0.708
Present values	(5,000)	1,105	1,034	1,008	2,052

The expected base case NPV is **\$199,000**.

Financing side effects

Issue costs

\$400,000; because they are treated as a side effect they are not included in this NPV calculation.

Present value of tax shield

Debt capacity of project = \$5.4m × 50% = \$2.7m

Annual tax savings on debt interest = \$2.7m × 8% × 30% = \$64,800

PV of tax savings for four years, discounted at the required return on debt of 8%, is 64,800 × 3.312 = \$214,618.

	\$'000
APV	
Base case NPV	199
Tax relief on debt interest	215
Issue costs	(400)
	14

The APV is **$14,000**.

(b) **Validity of the views of the two managers**

Manager A

Manager A believes that the **NPV** method should be used, on the basis that the NPV of a project will be reflected in an **equivalent increase in the company's share price**. However, even if the market is efficient, this is only likely to be true if:

- The financing used **does not create a significant change** in gearing
- The project is **small relative to the size of the company**
- The project **risk is the same** as the company's average operating risk

The manager is correct that the NPV method is quicker than the MIRR (although this is only marginal) and APV methods. The main advantage of NPV over MIRR is that it gives an absolute measure of the increase in shareholder wealth.

Manager B

Manager B prefers the **APV method**, in which the cash flows are discounted at the ungeared cost of equity for the project, and the resulting NPV is then adjusted for financing side effects such as issue costs and the tax shield on debt interest. The main problem with the APV method is the **estimation** of the various **financing side effects** and the **discount rates** used to appraise them. For example in the calculation the risk-free rate could have been used to discount the tax effect which would have produced a different result.

Problems with both viewpoints

Both NPV and APV methods rely on the restrictive assumptions about capital markets which are made in the CAPM and in the theories of capital structure. The **figures used** in the CAPM (risk-free rate, market rate and betas) can be difficult to determine. **Business risks** are assumed to be **constant**.

None of the methods considered attempt to value the possible **real options** for abandonment or further investment which may be associated with the project and could generate additional shareholder wealth. It is important to factor in these options to the initial evaluation of the project to ensure the correct decision is made.

11 Levante

Top tips. The 'financial implications' really means whether the company will be better or worse off using each of the available alternatives. There are two main payments that companies make with bonds – annual interest and redemption. You should therefore focus on these payments when considering the financial implications.

(a) **Spot yield rates based on A credit rating**

Year	
1	3.2% + 0.65% = 3.85%
2	3.7% + 0.76% = 4.46%
3	4.2% + 0.87% = 5.07%
4	4.8% + 1% = 5.8%
5	5.0% + 1.12% = 6.12%

Bond value (A rating) – to be redeemed in three years' time

Year		
1	$\$4 \times 1.0385^{-1}$	= 3.852
2	$\$4 \times 1.0446^{-2}$	= 3.666
3	$\$104 \times 1.0507^{-3}$	= 89.660
		97.178 per $100

Current price (AA rating) = $98.71 per $100

Fall in price due to drop in rating = (98.71 – 97.178)/98.71 × 100 = 1.55%

(b) **Financial implications of each of the two options**

(i) *Value of 5% bond*

Spot rates applicable to Levante Co are those calculated above:

Year	
1	3.85%
2	4.46%
3	5.07%
4	5.80%
5	6.12%

Value of 5% fixed coupon bond

Year		
1	5×1.0385^{-1}	4.815
2	5×1.0446^{-2}	4.582
3	5×1.0507^{-3}	4.311
4	5×1.0580^{-4}	3.991
5	105×1.0612^{-5}	78.019
	Total value	95.718

This means that the bond would have to be issued at a discount if a 5% coupon was offered.

(ii) *New coupon rate for bond valued at $100 by the market*

As a 5% coupon means that the bond would have to be issued at a discount, a higher coupon must be offered. The coupon rate can be calculated by finding the yield to maturity of the 5% bond discounted at the yield curve given above. This will then be the coupon of the new bond to ensure the face value is $100.

$\$5 \times (1 + YTM)^{-1} + \$5 \times (1 + YTM)^{-2} + \$5 \times (1 + YTM)^{-3} + \$5 \times (1 + YTM)^{-4} + \$105 \times (1 + YTM)^{-5}$

= $95.718

We solve this equation by trial and error – it doesn't have to work out exactly but we are looking for a coupon rate that will be close to $95.718.

If we try 6%, we obtain a result of \$95.78 which is close enough to the target of \$95.718.

This means that if the coupon payment is \$6 per \$100 (6%) the market value of the bond will be equal to the face value of \$100.

$\$6 \times 1.06^{-1} + \$6 \times 1.06^{-2} + \$6 \times 1.06^{-3} + \$6 \times 1.06^{-4} + \$106 \times 1.06^{-5} = \$100$

Advice to directors

If a coupon of 5% was chosen then the bond would be issued at a discount of approximately 4.28%. To raise \$150 million the company would have to issue (\$150 million/95.718) \$156,710,337 of bonds in terms of their nominal value. When the bonds come to be redeemed in 5 years' time, Levante will have to pay an additional \$6,710,337 to redeem these bonds.

However, a lower coupon rate will mean that interest payments each year will fall. Issuing \$150 million at 6% would mean that annual interest payments would be \$9 million (6% of \$150 million). In comparison, issuing \$156,710,337 of bonds at 5% is an annual interest payment of \$7,835,517 which lower by \$1,164,483.

The choice depends on whether the directors feel that that project's profit will be sufficient to cover the additional redemption charges in five years' time. If they are reasonably confident that profits will be sufficient then they should choose the lower coupon rate bond. If they wish to spread the cost rather than paying it in one lump sum then the higher coupon rate should be chosen.

12 Mercury Training

Top tips. In part (a), the asset beta of Mercury is calculated using the revenue weightings from Jupiter and the financial services sector. This is quite a tough section for eight marks and it is important to show all your workings to ensure you gain as many marks as possible.

Part (b) requires the use of the dividend valuation model to calculate share price at the higher end of the range of possible prices. There are three possible growth rates that could be used. You should recognise that the historic earnings growth rate actually exceeds the cost of equity capital and therefore cannot be sustained in the long run.

Part (c) requires knowledge of the advantages and disadvantages of public listings and private equity finance. Remember to make it relevant to the scenario where possible.

(a) **Step 1**

Ungear beta of Jupiter and financial services sector

$$\beta_a = \beta_g \frac{V_e}{V_e + V_d(1-T)}$$

Jupiter $= 1.5 \times \frac{88}{88 + (12 \times 0.6)} = 1.3865$

FS sector $= 0.9 \times \frac{75}{75 + (25 \times 0.6)} = 0.75$

Step 2

Calculate average asset beta for Mercury

$\beta_a = (0.67 \times 1.3865) + (0.33 \times 0.75) = 1.175$

Step 3

Regear Mercury's beta

$$\beta_a = \beta_e \times \frac{V_e}{V_e + V_d(1-T)}$$

$$1.175 = \beta_e \times \frac{70}{70 + 30(1-0.4)}$$

$$1.175 = \beta_e \times 0.795$$

$$\beta_e = 1.48$$

Step 4

Calculate cost of equity capital and WACC

Using CAPM:

Cost of equity capital $= R_f + \beta_i(E(r_m) - R_f) = 4.5 + 1.48 \times 3.5 = 9.68\%$

$$\textbf{WACC} = \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d (1 - T)$$

$$= (0.7 \times 0.0968) + (0.3 \times [0.045 + 0.025]) \times 0.6$$

$$= 8.04\%$$

Where k_d = risk-free rate (4.5%) + premium on risk-free rate (2.5%)

When to use cost of equity and WACC

Cost of equity is the rate of return required by the company's ordinary shareholders. The return includes **a risk-free rate** (to reflect that investors are rational) and a **risk premium** (to reflect that investors are risk averse). Cost of equity is used to value income streams to the **shareholders** (that is, dividends or free cash flow to equity).

WACC is the average cost of capital of the business and is based on the company's **level of gearing**. WACC is used to value income streams to the **business as a whole** ie free cash flow (for example, it is used as the **discount rate** to appraise potential investments).

(b) **Range of likely issue prices**

Lower range of issue price will be the net assets at fair value divided by the number of shares

= \$65 million/10 million shares

= \$6.50 per share

Upper range – use **dividend valuation model**

Three possible earnings rates:

(i) **Historical earnings growth rate** of 12% is greater than the cost of equity capital, therefore cannot be sustained in the long run

(ii) The **weighted anticipated growth rate** of the two business sectors in which Mercury operates (0.67 × 6% + 0.33 × 4% = 5.34%)

(iii) **The rate implied from the firm's reinvestment** (9.68% – see part (a) Step 4 above)

$$g = br_e = \frac{(100 - 25)}{100} \times 0.0968 = 7.26\%$$

Either growth rate can be used, but here the higher of the two feasible rates – that is, 7.26% – is used to calculate the higher issue price

$$P_0 = \frac{d_0(1+g)}{(k_e - g)}$$

$$P_0 = \frac{25(1+0.0726)}{(0.0968 - 0.0726)} = \$11.08 \text{ per share}$$

If the company was floated, the higher price above (which is based on a minority shareholding earning a dividend from the shares) could be achieved. This implies that a portion of the equity and **effective control** is retained. **Private equity investors** are likely to be willing to pay a premium for the benefits of control (**control premium**) – often as much as 30%–50% of the share price. In this case negotiations may start at a share price of \$16.62 (\$11.08 × 1.5).

(c) To: Directors of Mercury Training
From: Treasury department
Subject: Public listing versus private equity finance

As you are currently considering either a flotation or an outright sale of Mercury Training, I would like to outline the relative advantages and disadvantages of a public listing versus private equity finance.

Public listing

This is the traditional method of raising finance by firms which have reached a certain size. Where a public listing is sought, owners will be looking to **release their equity stake** in the firm (either partially or in total). A public listing gives the company access to **a wider pool of finance** and makes it easier to grow by acquisition. As owners, you will be able to release your holding and use the money to fund other projects.

However, public listings lead to the company being subject to **increased scrutiny, accountability and regulation**. There are greater **legal requirements** and the company will also be required to adhere to the **rules of the stock exchange**.

Obtaining a public listing is **expensive** – for example brokerage commission and underwriting fees.

New investors may have **more exacting requirements** and different ideas of how the business should progress. This may put additional strain on the directors responsible for the company's overall strategy.

Private equity

Private equity finance is raised via **venture capital companies** or private equity businesses. There are **fewer regulatory restrictions** attached to private equity finance than there are to public listings. The cost of accessing private equity finance is lower and in certain jurisdictions there are **favourable tax advantages** to private equity investors.

Directors of a company seeking private equity finance must realise however that the financial institution will require an **equity stake** in the company. The directors responsible for the overall company strategy will still be subject to **considerable scrutiny** as the finance providers may want to have a **representative** appointed to the company's board to look after their interests. They may even require the appointment of an **independent director**.

Private equity providers will need to be convinced that the company can **continue its business operations successfully**, otherwise there will be no incentive to invest.

I hope this information is useful but please contact me if you wish to discuss further.

13 Kodiak Company

Top tips. In part (a), layout is very important, not just to make things clear for the marker, but also for you to ensure that no figures are missed. There are numerous workings involved in this part of the question therefore you need to be able to keep track of where figures are coming from. Remember that cash flow statements never include depreciation so ensure you account for this when calculating the free cash flow to equity. Make sure you answer the question – you are asked for the free cash flow to equity so you will have to deduct any new investment in non-current assets.

Part (b) is straightforward if you can remember the formula but remember to show your workings.

Part (c) is testing your understanding of how estimates can affect the valuation figure. Two of the more important figures are growth rates and required rate of return so make sure you comment on those. There are several other factors you can comment on but remember this part is only worth six marks so don't get carried away!

Easy marks. The calculations in part (a) should be quite straightforward and you should be expecting to gain all, or almost all, of the available marks. As mentioned above, part (b) is also quite straightforward if you remember the formula for calculating terminal value.

(a)

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Revenue (9% growth per annum)	5,450	5,941	6,476
Cost of sales (9% growth per annum)	(3,270)	(3,564)	(3,885)
Gross profit	2,180	2,377	2,591
Other operating costs (W1)	(2,013)	(2,160)	(2,318)
Operating profit	167	217	273
Add depreciation (W2)	135	144	155
Less incremental working capital (W3)	(20)	(22)	(24)
Less interest	(74)	(74)	(74)
Less taxation (W4)	(15)	(28)	(43)
	193	237	287
Less new additions to non-current assets (W2)	(79)	(95)	(114)
Free cash flow to equity	114	142	173

Workings

1 *Operating costs*

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Variable costs (9% growth per annum)	818	892	972
Fixed costs (6% growth per annum)	1,060	1,124	1,191
Depreciation (10%) (Working 2)	135	144	155
Total operating costs	2,013	2,160	2,318

2 *Depreciation and non-current assets*

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Non-current assets at start of year	1,266	1,345	1,440
Additions (20% growth)	79	95	114
Non-current assets at end of year	1,345	1,440	1,554
Depreciation (10%)	135	144	155

3 *Working capital*

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Working capital requirements (9% growth pa)	240	262	286
Incremental working capital	(240 – 220)	(262 – 240)	(286 – 262)
	= 20	= 22	= 24

Note that the working capital figure excludes cash, therefore the current (Year 0) working capital figure is $270,000 – $50,000 = $220,000.

4 *Taxation*

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Charged on previous year's profit after interest			
Given in question	15		
Previous year's operating profit (from projected statement of profit or loss)		167	217
Interest		(74)	(74)
Profit before tax		93	143
Tax at 30%		28	43

(b) **Value of business using free cash flow to equity and terminal value**

	Year 1	*Year 2*	*Year 3*
	$'000	$'000	$'000
Free cash flow to equity (from (a))	114	142	173
Terminal value (Working)			2,546
Total			2,719
Discount factor (10%)	0.909	0.826	0.751
Present value	104	117	2,042

Value of the business = $2,263,000

Working: Terminal value

$$\text{Terminal value} = \frac{FCF_N(1+g)}{k-g}$$

where g = growth rate

k = required rate of return

$$\text{Terminal value} = \frac{173(1+0.03)}{0.10-0.03} = \$2{,}546$$

(c) **Assumptions and uncertainties within the valuation**

Whilst the valuation of the business is a useful estimate, it should be treated with caution as it is subject to certain assumptions.

Rate of return

The rate of return of 10% is assumed to fairly reflect the required **market rate of return** for a business of this type, which compensates you for the business risk to which you are exposed. Whilst the required return for an investment held in a widely diversified portfolio should only compensate you for **market risk**, if you hold the same investment individually you may expect a higher return due to your increased exposure to risk.

Growth rates

The growth rate applied to terminal value is assumed to be **certain** into the indefinite future. In the case of a three-year projection this is unlikely to be the case, due to unexpected economic conditions and the type of business. In order to reduce the effects of such uncertainties, different growth rates could be applied to the calculations to determine business valuation in a variety of scenarios.

Interest rates and tax rates

Similar to the growth rate, it has been assumed that interest rates and tax rates will remain **unchanged** during the three-year period. If economic conditions suggest that changes may take place revised calculations could reflect different possible rates to update the estimate of business valuation.

Costs, revenues and non-current assets

It has been assumed that the figures used for these factors are certain and that the business is a going concern. It may be worth investigating the **potential variability** of these factors and the range of values that may result for such variability. Changes in estimates will obviously affect operating profit and projected cash flows, which in turn will affect the estimated value of the business.

14 Saturn Systems

Top tips. This is a relatively straightforward question if you can identify the issues involved.

Requirement (b) is divided neatly into three types of issues so deal with each type under a separate heading to make it easy for the marker to identify your points.

The solution given relates to the UK City Code but you can refer to your own country's codes instead and still gain the available marks.

Make sure you relate your answer to the specific scenario and do not just write everything you know about takeover and acquisition regulations.

Easy marks. Part (a) is a fairly straightforward discussion. Also it should have been easy to identify that the financial risk of Saturn could change if more debt was introduced into the capital structure to fund the acquisition of Pluto.

(a) **Advantages of growth by acquisition**

Acquiring an **existing company** is a speedier method of entering a new business than setting up a project using internal resources, because an acquired business will already have **customers** and, hopefully, **goodwill**. An acquisition may also effectively **eliminate a competitor** and may **allow higher profitability**. Other advantages may come from the **combination of complementary resources** of the acquiring and acquired companies.

Also, because Pluto is a **major supplier** of Saturn, the acquisition will help to secure Saturn's supply chain and could help reduce costs, which can be important in a competitive industry such as telecommunications. The acquisition could also mean that competitors are forced to seek alternative and perhaps lower quality suppliers.

Problems of growth by acquisition

Frequently, a **significant premium** must be **paid** in order to **encourage existing shareholders** to sell, or to outbid, a rival. This may make it difficult to show a **respectable retur**n on the cost of the acquisition.

The acquired company may **not produce the exact product or service** that the acquirer needs, or may need **significant investment** before it conforms to quality requirements.

Management problems are also quite common, particularly when the acquiring and acquired companies have different organisational cultures. **Disputes** may cause the loss of key staff members, resulting in reduced quality or even in the establishment of competing businesses.

(b) **There are several regulatory, financial and ethical issues that must be considered if Saturn Systems wants to make a bid for Pluto Ltd**.

Regulatory issues

As a large listed company we have an obligation to ensure that any remarks made in the public domain will not mislead investors. The **City Code** in the UK requires the maintenance of **absolute secrecy** prior to an announcement being made. This requirement falls on the person or persons who hold **confidential information** (particularly information that might affect share price) and every effort should be made to prevent **accidental disclosure** of such information.

The City Code specifically states that a **false market must not be created** in the shares of the 'target' company. The remarks made last night no doubt contributed to the 15% rise in Pluto's share price. In accordance with the City Code, Saturn Systems will be expected to make a **statement of intention** in the light of the effect of the remarks at the dinner.

If it is stated that Saturn Systems are not interested in making a bid, it will not be able to make another bid **for six months**, unless Pluto's board **recommends** a bid that might be made by Saturn Systems. Another way in which this restriction could be waived is if another offer is made by a **third party**.

Financial issues

Saturn Systems are in a strong **financial position** at the moment which may be one of the reasons the market interpreted the remarks as being significant. The 15% increase in Pluto's share price indicates that the market now sees Pluto as being a **target for takeover** and that Saturn may be interested in buying the company.

One problem is that Saturn Systems is only in the early stages of investigating Pluto and has not yet conducted a **due diligence** study. It does not know what the company is worth as a valuation has not yet taken place. As the remarks apparently contributed to a 15% increase in share price, Saturn Systems will now have to pay more for Pluto if it decides to make a bid. This could affect the financial position as it may be unable to raise the extra finance required to cover the additional cost.

As well as the issues above, there is the likelihood of the extra debt affecting the **financial risk profile**. The acquisition of Pluto could also affect the **business risk exposure**. As a result, Saturn Systems cannot value Pluto without revaluing the existing business. If Pluto's value exceeds the increase in Saturn's value if the acquisition took place, it should not proceed with the purchase.

Ethical issues

There is now a dilemma of how to proceed. Saturn Systems has made no secret of the fact that it wants to growth by acquisition rather than organically therefore it would not be ethical to deny any interest in Pluto. It was one of four potential targets discussed at the last board meeting and investigations have been conducted into the company as well as reviewing the steps necessary to raise the finance for acquisition. In order to maintain its commitment to transparency of information, it is recommended that Saturn Systems clarifies its intentions.

(c) **Proposed course of action**

Saturn Systems should release a statement to **clarify the position** regarding Pluto. It should confirm that it is looking into the possibility of an acquisition of Pluto but make it clear that the board has decided not to make a bid at this time. However, it should be made clear that Saturn Systems **reserves the right** to make a bid or take any action that would otherwise be prohibited under the **six-month rule** should Pluto's board agree to an acquisition or if any other company announced its intention to make an offer. This means Saturn Systems still has the chance to complete its investigations and develop a bid proposal before entering into negotiations with Pluto's board.

15 Gasco

Top tips. This case study is a welcome change to most 'general questions' on mergers and takeovers, as it provides a lot of detail for use as illustrations of synergy, stakeholder expectations and post-merger problems. You should state the general principles involved and illustrate them with examples drawn from the question.

(a) There is frequently a mix of good and bad reasons behind a takeover bid. Among the good reasons, the most significant is the possibility of creating **synergy**, which means that the value of cash flows from the combined business is higher than the value of cash flows from the two individual businesses. Although CarCare and Gasco are in different market sectors, there are a number of areas which may generate synergy.

(i) **Elimination of duplicated resources**. The most obvious areas are the marketing systems, the call centre systems and local offices and training facilities for mobile repair/emergency staff. Head office overheads may also be reduced.

(ii) **Cross-selling**. Opportunities exist to cross-sell products to customers on the other company's database.

(iii) **Building a critical mass** for non-core business. This might apply to the financial services areas of both businesses. The credit card and insurance businesses may gain from a combined brand name.

(iv) **Reduction in the risk of the company's cash flow profile**. CarCare receives membership subscriptions in advance, whereas Gasco's customers will pay mainly in arrears. The combined cash flows will be perceived as less risky by shareholders and lenders.

(v) The takeover of CarCare will **abolish its mutual status** and will allow equity funds for expansion to be raised more easily, by share issues made by the parent company, reducing the cost of capital.

Among the many possible bad reasons for takeover are:

(i) The directors of Gasco **seeking the prestige** of a larger company

(ii) Diversification with **no real strategic objective**

(iii) Gasco using up surplus cash, **again with no strategic objective**

(b) **Stakeholders**

The major stakeholders of CarCare are its members, who are both owners and customers, its directors and employees, and its creditors. Competitors will also be highly interested in the takeover.

Members

The members will have **mixed reactions**. The replacement of mutual status with marketable equity shares or cash will give them an immediate **'windfall' gain**, which many will welcome. However, the cost of this is **lost influence** on the future direction of CarCare. As customers, many may fear a reduction in the quality of service, particularly in the light of increased competition in the market and the fact that Gasco has to demonstrate that it is making a **return on its investment**. Others may disagree, on the basis that Gasco will be able to raise money for expansion, modernisation and improvements more easily than CarCare could as a mutual organisation.

CarCare's directors have a duty to ensure that they act in the **best interest** of **members**. However, they will also be concerned about their own positions after the takeover and will wish to seek suitable positions in the new company's management structure. Some may fear loss of their jobs.

Employees

Employees will have **mixed reactions** depending on whether they are likely to be presented with additional opportunities or loss of status or redundancy. There is likely to be some **rationalisation** of the workforce except for those with highly specific skills, and for those who remain there may also be the threat of relocation. Employees will be seeking answers to these questions before the takeover happens, but are unlikely to receive comprehensive answers.

Payables

Payables, including bankers, will probably be happy with the merger provided that Gasco has no financial problems.

Competitors

Some competitors will fear that they will **lose market share** if the takeover enables new finance for expansion, improvement and marketing of CarCare. Others will be more optimistic, believing that CarCare will become less sensitive to the needs of customers.

(c) Gasco may face a number of problems after the takeover has been achieved.

(i) Former members of Gasco who did not agree with the takeover, and who may have been actively resisting it, may decide to **change their service provider** to another organisation. The parent company will have to be proactive in giving confidence to all its CarCare customers.

(ii) The two organisations probably had **different management styles**, Gasco being a stock exchange quoted company with a clear need for financial results and CarCare being more orientated to serving its customers and acting as a pressure group to represent their needs. Conflicts may arise between directors, managers and employees of CarCare after the takeover as a result of an enforced change in management style from Gasco.

(iii) Actual and feared redundancies, relocations, changes in work practice, training methods and other problems may **demotivate CarCare employees**, causing resistance and a drop in productivity. In this respect, delays in information provision and decision making can make the situation worse.

(iv) **Competitors may take advantage** of reorganisation problems at CarCare in order to gain market share.

16 Pursuit

Top tips. Your entire answer should be in report format so don't just produce a set of calculations with some explanations – you are expected to produce a professional-looking report with all the necessary details. It is up to you how you structure your report – for example, calculations could be in appendices – but make sure all the required elements are addressed.

Report to: **Board of directors of Pursuit Co**
From: Strategic Financial Consultant
Date: June 20X1
Re: Potential acquisition of Fodder Co

Introduction

This report focuses on various issues related to the proposed acquisition of Fodder Co. It evaluates whether the acquisition would be beneficial to Pursuit Co's shareholders and estimates how much finance is likely to be needed to fund the acquisition. As the capital structure may change as a result of the finance required, the report highlights the potential implications of such a change and possible ways in which any issues could be resolved.

The Chief Financial Officer has recommended reducing Pursuit Co's cash reserves as a defence against a potential takeover by SGF Co. This report assesses the suitability of such a defence and whether it would be a viable option.

Valuation of Fodder Co

Tutorial note. This forms the answer to part (a). Remember to ignore interest as it is already included in the discount rate.

Year	*1*	*2*	*3*	*4*
	$'000	$'000	$'000	$'000
Sales revenue (W1) – growth rate 6%	17,115	18,142	19,231	20,385
Operating profit (6% growth rate)	5,479	5,808	6,156	6,525
Tax at 28%	(1,534)	(1,626)	(1,724)	(1,827)
Less additional investment (W2)	(213)	(226)	(240)	(254)
Free cash flow	3,732	3,956	4,192	4,444
Discount factor 13% (W3)	0.885	0.783	0.693	0.613
Discounted cash flow	3,303	3,098	2,905	2,724

	$'000
Total discounted cash flows (Years 1–4)	12,030
Terminal value (W4)	28,059
Total value of Fodder Co	40,089

Workings

1 *Sales revenue growth*

Growth rate = $(16{,}146/13{,}559)^{1/3} - 1 = 0.0599$ or 5.99% (say 6%)

Alternatively:
Growth rate (20X8–20X9) = (14,491 – 13,559)/13,559 = 6.87%
Growth rate (20X9–20Y0) = (15,229 – 14,491)/14,491 = 5.09%
Growth rate (20Y0–20Y1) = (16,146 – 15,229)/15,229 = 6.02%
Average growth rate = (6.87 + 5.09 + 6.02)/3 = 5.99% (say 6%)

2 *Additional investment*

Year	*Sales revenue increase* ($'000)	*22% of increase*
1	(17,115 – 16,146) = 969	213
2	(18,142 – 17,115) = 1,027	226
3	(19,231 – 18,142) = 1,089	240
4	(20,385 – 19,231) = 1,154	254

3 *Cost of capital – Fodder Co*

Using capital asset pricing model

Cost of equity (k_e) = 4.5% + 6 × 1.53 = 13.68%

WACC = (13.68% × 0.9) + [9% × (1 – 0.28) × 0.1] = 12.96% (say 13%)

4 *Terminal value*

Growth rate is halved to 3% p.a.

Present value (PV) of cash flows in perpetuity = 4,444 × [1.03/(0.13 – 0.03)] = $45,773

Discounted back to Year 0 = $45,773 × 0.613 = $28,059

Value of combined company

Year	*1*	*2*	*3*	*4*
	$'000	$'000	$'000	$'000
Sales revenue – growth rate 5.8%	51,952	54,965	58,153	61,526
Operating profit (30% of sales)	15,586	16,490	17,446	18,458
Tax at 28%	(4,364)	(4,617)	(4,885)	(5,168)
Less additional investment (W5)	(513)	(542)	(574)	(607)
Free cash flow	10,709	11,331	11,987	12,683
Discount factor 9% (W6)	0.917	0.842	0.772	0.708
Discounted cash flow	9,820	9,541	9,254	8,980

	$'000
Total discounted cash flows (Years 1–4)	37,595
Terminal value (W7)	151,475
Total value of combined company	189,070

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Synergy benefits ($'000)= Total value of combined company – total value of individual companies

= $189,070 – ($140,000 + $40,089)

= $8,981

Premium required to purchase Fodder Co = 25% of equity

Equity = 90% of $40,089 = $36,080

Premium = $9,020 (in 000s).

Net benefits to Pursuit's shareholders = $8,981 – 9,020 = –$39,000 approx

5 *Additional investment*

Year	*Sales revenue increase* ($'000)	*18% of increase*
1	See note below	
2	54,965 – 51,952 = 3,013	542
3	58,153 – 54,965 = 3,188	574
4	61,526 – 58,153 = 3,373	607

Note. The additional investment for Year 1 is given in the question.

6 *Combined company cost of capital*

Asset beta is calculated using the formula:

$$b_a = \left[\frac{V_e}{(V_e + V_d(1-T))} b_e\right] + \left[\frac{V_d(1-T)}{(V_e + V_d(1-T))} b_d\right]$$

Asset beta (Pursuit) = 1.18 × (0.5/[0.5 + 0.5 × (1 – 0.28)]) = 0.686 (assume debt beta = 0)

Asset beta (Fodder) = 1.53 × (0.9/[0.9 + 0.1 × (1 – 0.28)]) = 1.417 (assume debt beta = 0)

Asset beta (combined company)

= [(0.686 × $140m) + (1.417 × $40.1m)]/(140m + 40.1m) = 0.849

Equity beta (combined company) = 0.849 × [0.5 + (0.5 × 0.72)]/0.5 = 1.46

Cost of equity (k_e) = 4.5% + 1.46 × 6% = 13.26%

WACC = [13.26% × 0.5] + [6.4% × (0.5 × 0.72)] = 8.93% (say 9%)

7 *Terminal value*

Growth rate is halved to 2.9% pa

PV of cash flows in perpetuity = 12,683 × [1.029/(0.09 – 0.029)] = $213,948

Discounted back to Year 0 = $213,948 × 0.708 = $151,475

Comments

The extent of the benefits to Pursuit's shareholders depends on the additional synergy from the acquisition of Fodder Co. The calculations above show the synergy to be about $9 million. However, once Fodder's debts have been cleared (as per the acquisition agreement) and equity shareholders paid there is a negative net present value (NPV) of approximately $39,000. It is therefore unlikely that Pursuit's shareholders will see this acquisition as beneficial.

Limitations of the estimated valuations of Fodder and the combined company

Tutorial note. This forms the answer to part (a)(ii) of the question.

Whilst the valuation techniques used above are useful for providing estimates of company value, it is important to treat the results with caution. The valuation techniques use numerous limiting assumptions, such as constant growth rates both in the early years and for the remainder of the project – there is no way of guaranteeing that these growth rates will be sustainable. Other assumptions include those relating to debt beta (assumed to be zero), discount rates, profit margins and fixed tax rates. As the negative NPV from the acquisition is minimal, changes in any of these variables could potentially change the investment decision.

In addition, no information has been given about **post-acquisition integration costs** or pre-acquisition expenses such as legal fees. These should be taken into consideration when trying to determine the net benefits to shareholders as such costs can be quite substantial.

Pursuit's ability to estimate such variables as sales revenue growth, additional investment required and operating profit growth for Fodder may be **limited** due to lack of detailed information. This means that the value of Fodder may be significantly **inaccurate** and thus synergy benefits will be more difficult to predict.

In view of the issues above, it would appear to be **unwise to rely on a single value**. It would be better to have a range of values based on different assumptions and the likelihood of their occurrence.

Amount of debt finance needed and likelihood of maintaining current capital structure

Tutorial note. This forms the answer to part (a)(iii) of the question.

Pursuit is currently valued at $140 million – with a 50/50 split between debt and equity this means $70 million debt and $70 million equity. If this capital structure was to be maintained, the combined company (with an approximate value before payments to Fodder's shareholders of $189 million) would have debt of $94.5 million and equity of the same amount. Debt capacity would thus have to increase by about $24.5 million.

Amount payable for Fodder

	$'000
Debt obligations (10% of $40,089)	4,009
Shareholders ($36,080 × 1.25)	45,100
	49,109

Part of the price for Fodder could be paid using the extra debt capacity of $24.5 million and also the $20 million cash reserves that Pursuit currently has. However, there would still be a shortfall of $4.6 million. It is therefore impossible to maintain the current capital structure if Pursuit only uses cash reserves and debt finance to fund the acquisition.

Implications of changes in capital structure

Tutorial note. This forms the answer to part (a)(iv) of the question.

The use of either of the two proposals for funding the acquisition of Fodder (a combination of debt finance and cash reserves or the Chief Financial Officer's suggestion of debt finance only) will mean a change in capital structure.

Such a fundamental change will have significant implications for the combined company. The cost of capital will have to be recalculated, which will have an effect on the valuation of the combined company. As the valuation of the company changes, so will the market value of debt and market value of equity. This will have a subsequent effect on cost of capital and the cycle will continue.

This is the type of scenario that is consistent with an acquisition where both financial and business risk change.

The issue can be resolved by using an **iterative process** (which may be performed on an Excel spreadsheet). This process involves recalculating beta and cost of capital and then applying these to determine a revised company valuation. The process is then repeated until the assumed capital structure is close to the one that has been recalculated.

Another alternative would be to use **adjusted present value** which first calculates a value assuming an all-equity financial structure and then makes adjustments for the effects of the method of financing used.

Suggested defence against a potential bid by SGF Co

Tutorial note. This forms the answer to part (a)(v) of the question.

The Chief Financial Officer has suggested a distribution of the $20 million cash reserves to shareholders in the form of a special dividend in order to defend against the potential bid by SGF Co. This type of defence is known as the **'crown jewels'** approach, whereby a company dispenses with its most valuable assets (which may have been the main reason for the takeover bid).

Returning the cash to the shareholders may have a positive effect on the currently depressed share price. It may be that the shareholders do not agree with the board's policy to retain large cash reserves and a reduction in these reserves may push up the share price and reduce the likelihood of a takeover bid.

A formal bid has not been made to date and it would be wise for Pursuit's board to determine whether the large cash reserves are the attraction or if SGF has another reason for wishing to acquire Pursuit. In addition, before the cash is returned to the shareholders, it should be determined whether this is actually what the shareholders want. There would be no point returning the money to them if they would prefer it to be reinvested in the company.

If the cash reserves are returned to the shareholders this will have implications for funding the acquisition of Fodder. Even with the $20 million reserves to partially finance the purchase, the capital structure would have to change. If this money was not available then there would be a much more significant change in capital structure as an additional $20 million in debt finance would have to be found (if possible). This will have an effect on cost of capital and also on the value of the combined firm (see discussion above).

It may be the case that the amount of debt required is not feasible due to the considerable increase in gearing it would mean. The board of Pursuit should consider whether the acquisition is worth pursuing due to its minimal benefit to shareholders.

Conclusion

This report has focused on the potential acquisition of Fodder Co and a possible defence against a takeover bid by SGF Co. There are numerous issues that must be resolved prior to making a final decision regarding going ahead with the acquisition, but it is clear that (if the valuations are correct) the capital structure cannot remain unchanged. The implications of this must be considered prior to a final decision being made. The board should also consider whether the acquisition should go ahead at all, given the minimal benefit to shareholders.

Should you require any further information please do not hesitate to contact me.

17 Olivine

Top tips. Our answer to part (a)(ii) assumes that the administrative savings have been achieved. Otherwise the answer to (a)(ii) is $(25 + 9.6)m/60m = 57.7 cents per share, and subsequent answers also change.

(a) (i) **The total value of the share offer**

Earnings per share = $25m/40m = $0.625

P/E ratio = 20

Share price = 20 × $0.625 = $12.50 per share

Share offer = 5 shares × (16m shares/4) = 20m shares issued

Value of share offer = $12.50 × 20m = $250m

(ii) **Olivine earnings per share post-acquisition**

Earnings = $25m + $9.6m + $2.4m = $37.0m

Number of shares = 40m + 20m = 60m

Earnings per share = $37.0m/60m = 61.7c per share

(iii) **Share price of Olivine post-acquisition**

Earnings per share (part ii) = 61.7c per share

Price/earnings ratio = 20 × (100 – 5)% = 19

Share price = 19 × $0.617 = $11.72 per share

(b) **Effect on wealth of shareholders**

Olivine shareholders

Original holding = 40m shares @ $12.50 per share = $500m
New share price = $11.72
New share value = 40m shares @ $11.72 = $468.8m
Loss in shareholder wealth = $500m – $468.8m = $31.2m or 6.24%

Halite shareholders

Original earnings per share = $9.6m/16m shares = $0.60
Price/earnings ratio = 15
Share price = 15 × $0.60 = $9.00 per share
Original holding = 16m shares @ $9.00 = $144m
New holding = 20m shares @ $11.72 = $234.4m
Gain in shareholder wealth = $234.4m – $144m = $90.4m or 62.78%

(c) The market capitalisation of the separate businesses is (40m × $12.50) + (16m × $9.00) = $644m. When combined, the market capitalisation will be 60m × $11.72 = $703.2m so there are benefits to be gained in overall terms.

Effect on share price

The **total share value** of Halite prior to the acquisition is $144 million. However, the intended share issue by Olivine of 20 million shares has a value at Olivine's current share price of $250 million. The issue of so many shares to achieve this premium means that there is a small reduction in the size of the earnings per share of Olivine even when the earnings of Halite and the benefits of the acquisition are taken into account. This reduction in earnings per share together with a 5% reduction in the price/earnings ratio of Olivine after the acquisition would lead to a reduction in Olivine's share price from $12.50 per share before the

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acquisition to $11.72 per share after the acquisition. The estimate of the revised P/E ratio is possibly too high and needs further scrutiny.

This reduction in share value for Olivine shareholders would **result in a loss in shareholder value** from the acquisition of $31.2 million (6.24%). In contrast, the generous premium being considered for the shares of Halite would lead to an increase in the value of the shares held by former Halite shareholders of $90.4 million (62.78%).

Beneficiaries of offer

If the proposed offer is made, all the benefit of the acquisition will accrue to the Halite plc shareholders and the Olivine shareholders will suffer a loss in share value. However, the dividend per share for Halite shareholders is likely to be lower in the future than it is at present.

The directors of Olivine might wish to consider a less generous offer than the current premium of $106 million ($250m – $144m) on the purchase of Halite. For example, a share for share exchange would value the offer at $200 million (16 million shares @ $12.50 per share) thereby still providing a substantial premium for the Halite shareholders but with no loss to the Olivine shareholders.

18 Treasury management

Top tips. A few easy marks may be available for discussing the role of the treasury function. Part (b) looks at the role from another angle.

(a) **Management of cash**

A central treasury department will normally have the responsibility for the **management of the group's cash flows** and borrowings. Subsidiaries with surplus cash will be required to submit the cash to the treasury department, and subsidiaries needing cash will borrow it from the treasury department, not from an external bank.

Borrowing

A central treasury will also be given the **responsibility for borrowing** on behalf of the group. If a subsidiary needs capital to invest, the treasury department will borrow the money required, and lend it on to the subsidiary. The subsidiary will be responsible for **paying interest** and **repaying the capital** to the treasury department, which will in turn be responsible for the interest and capital payments to the original lenders.

Risk management

Another function of the treasury department will be to **manage the financial risk** of the group, such as currency risk and interest rate risk. Within broad guidelines, the treasurer might have authority to decide on the balance between fixed rate and floating rate borrowing, and to use swaps to adjust the balance. The department would also be responsible for arranging forward exchange contracts and other hedging transactions.

Taxation

The central treasury department could also be responsible for the **tax affairs** of the group, and an objective would be to minimise the overall tax bill. To accomplish this effectively, the treasury must have **authority to manage transfer prices** between subsidiaries in the group, as a means of transferring profits from high-tax countries to lower-tax countries.

(b) The treasury function needs information from within and outside the organisation to carry out its tasks.

(i) From each subsidiary within the group, it will need **figures for future cash receipts and payments**, making a distinction between definite amounts and estimates of future amounts. This information about cash flows will be used to **forecast the cash flows of the group**, and identify any future borrowing needs, particularly short-term and medium-term requirements. Figures should be provided regularly, possibly on a daily basis.

(ii) Information will also be required about **capital expenditure requirements**, so that long-term capital can be made available to fund it.

(iii) Subsidiary finance managers should be encouraged to **submit information** to the **treasury department** about local market and business conditions, such as prospects for a change in the value of the local currency and a change in interest rates.

(iv) From outside the group, the treasury will need a **range of information** about current market prices, such as exchange rates and interest rates, and about which banks are offering those prices. Large treasury departments will have a link to one or more information systems such as Reuters and Bloomberg.

(v) The treasury department should be alert to any **favourable market opportunities** for raising new debt capital. The treasurer should maintain regular contact with several banks, and expect to be kept informed of opportunities as they arise.

(vi) Where the treasury is responsible for the group's tax affairs, information will also be needed about **tax regulations** in each country where the group operates, and changes in those regulations.

19 For4Fore

Top tips. If you can work your way through the formula and are able to use the normal distribution table, this question is actually not that bad. In (b), an evaluation implies the need to value a put option and then to think about whether it is suitable.

(a)

P_a = 444 P_e =385 t = 4/12 s = 0.25 r = 0.0417 e^{-rt} = 0.9862

d_1 = [ln(444/385) + (0.0417+ 0.5 × 0.25^2) × 4/12]/(0.25 × √(4/12))

= [0.1426 + 0.0243]/0.1443

= 1.16

d_2 = 1.16 – 0.25 × √.333 = 1.02

$N(d_1)$ = 0.5 + 0.3770 = 0.8770

$N(d_2)$ = 0.5 + 0.3461 = 0.8461

Call value = (444 × 0.8770) – (385 × 0.9862 × 0.8461) = 68p

(b) Put value = call value – Pa + Pe e^{-rT}

Put = 68 – 444 + 385 × 0.9862 = 68 – 444 + 380 = 4p

This is less valuable than a call option but in any event a put would not be appropriate as it would reward managers for driving down the share price.

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20 Fidden plc

(a) Techniques for protecting against the risk of adverse foreign exchange movements include the following:

(i) A company could trade only in its own currency, thus transferring all risks to suppliers and customers.

(ii) A company could ensure that its assets and liabilities in any one currency are as nearly equal as possible, so that losses on assets (or liabilities) are matched by gains on liabilities (or assets).

(iii) A company could enter into forward contracts, under which an agreed amount of a currency will be bought or sold at an agreed rate at some fixed future date or, under a forward option contract, at some date in a fixed future period.

(iv) A company could buy foreign currency options, under which the buyer acquires the right to buy (call options) or sell (put options) a certain amount of a currency at a fixed rate at some future date. If rates move in such a way that the option rate is unfavourable, the option is simply allowed to lapse.

(v) A company could buy foreign currency futures on a financial futures exchange. Futures are effectively forward contracts, in standard sizes and with fixed maturity dates. Their prices move in response to exchange rate movements, and they are usually sold before maturity, the profit or loss on sale corresponding approximately to the exchange loss or profit on the currency transaction they were intended to hedge.

(vi) A company could enter into a money market hedge. One currency is borrowed and converted into another, which is then invested until the funds are required or funds are received to repay the original loan. The early conversion protects against adverse exchange rate movements, but at a cost equal to the difference between the cost of borrowing in one currency and the return available on investment in the other currency.

(b) (i) (1) Forward exchange market

The rates are:

	$/£
Spot	1.7106–1.7140
Three months forward	1.7024–1.7063
Six months forward	1.6967–1.7006

The net payment three months hence is $£116{,}000 - \frac{\$197{,}000}{1.7063} = £546.$

The net payment six months hence is $\frac{\$(447{,}000 - 154{,}000)}{1.6967} = £172{,}688.$

Note that the dollar receipts can be used in part settlement of the dollar payments, so only the net payment is hedged.

(2) Money market

$197,000 will be received three months hence, so:

$$\frac{\$197{,}000}{(1+0.09\times {}^{3}/_{12})} = \$192{,}665$$

may be borrowed now and converted into sterling, the dollar loan to be repaid from the receipts.

The net sterling payment three months hence is:

$$£116,000 - \frac{\$197,000}{1+(0.09 \times {}^{3}/_{12})} \times \frac{1}{1.7140} \times (1+(0.095 \times {}^{3}/_{12})) = £924$$

The equation for the $197,000 receipt in three months is to calculate the amount of dollars to borrow now (divide by the dollar borrowing rate) and then to find out how much that will give now in sterling (divide by the exchange rate). The final amount of sterling after three months is given by multiplying by the sterling lending rate.

$293,000 (net) must be paid six months hence. We can borrow sterling now and convert it into dollars, such that the fund in six months will equal $293,000. The sterling payment in six months' time will be the principal and the interest thereon. A similar logic applies as for the equation above except that the situation is one of making a final payment rather than a receipt.

The sterling payment six months hence is therefore

$$\frac{293,000}{1+0.06 \times {}^{6}/_{12}} \times \frac{1}{1.7106} \times (1+0.125 \times {}^{6}/_{12}) = £176,690$$

(ii) Available put options (put, because sterling is to be sold) are at $1.70 (cost 3.45 cents per £) and at $1.80 (cost 9.32 cents per £).

Using options at $1.70 gives the following results.

$$\frac{\$293,000}{1.70\$/£} = £172,353$$

$$\text{Contracts required} = \frac{£172,353}{£12,500} = 14 \text{ (to the next whole number)}$$

Cost of options = 14 × 12,500 × 3.45c = $6,038

(translated at today's spot rate = £3,530)

14 contracts will provide, for £12,500 × 14 = £175,000, $(175,000 × 1.70) = $297,500.

$$\text{The overall cost is } £175,000 + \frac{\$293,000+\$6,038-\$297,500}{1.6967} = £175,906$$

As this figure exceeds the cost of hedging through the forward exchange market (£172,688), use of $1.70 options would have been disadvantageous.

Using options at $1.80:

$$\frac{\$293,000}{1.80\$/£} = £162,778$$

$$\text{Contracts required} = \frac{£162,778}{£12,500} = 14 \text{ (to next whole number)}$$

Cost of options = 14 × 12,500 × 9.32c = $16,310 (÷ 1.7106 = £9,535)

14 contracts will provide, for £12,500 × 14 = £175,000, 175,000 × 1.80 = $315,000.

$$\text{The overall cost is } £175,000 + \frac{\$293,000+\$16,310-\$315,000}{1.7006} = £171,654$$

This figure is less than the cost of hedging through the forward exchange market, so use of $1.80 options would have been preferable.

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(iii) Foreign currency options have the advantage that, while offering protection against adverse currency movements, they need not be exercised if movements are favourable. Thus the maximum cost is the option price, while there is no comparable limit on the potential gains.

21 Curropt plc

(a) The department's view that the US dollar will strengthen is in **agreement** with the **indications** of the forward market and the futures market. Forward and futures rates show a **stronger dollar** than the spot rate. The forward rate is often taken as an **unbiased** predictor of what the spot rate will be in future. However, future events could cause large currency movements in **either direction**.

(b) The **company needs to buy dollars in June.**

Forward contract

A forward currency contract will fix the exchange rate for the date required near the end of June. If the exact date is not known, a range of dates can be specified, using an **option forward contract**. This will remove currency risk **provided that the franchise is won**. If the **franchise is not won** and the group has no use for US dollars, it will still have to buy the dollars at the forward rate. It will then have to sell them back for pounds at the spot rate which might result in an exchange loss.

Futures contract

A currency hedge using futures contracts will attempt to create a **compensating gain** on the futures market which will **offset** the **increase** in the **sterling cost** if the dollar strengthens. The hedge works by **selling sterling futures** contracts now and closing out by **buying sterling futures** in **June** at a lower dollar price if the dollar has strengthened. Like a forward contract, the exchange rate in June is effectively fixed because, if the dollar weakens, the futures hedge will produce a loss which counterbalances the cheaper sterling cost. However, because of inefficiencies in future market hedges, the exchange rate is not fixed to the same level of accuracy as a forward hedge.

A futures market hedge has the same weakness as a forward currency contract in the franchise situation. If the franchise is not won, an **exchange loss** may result.

Currency option

A currency option is an ideal hedge in the franchise situation. It gives the company the **right but not the obligation** to sell pounds for dollars in June. It is only exercised if it is to the company's advantage; that is, if the dollar has strengthened. If the **dollar strengthens** and the franchise is won, the exchange rate has been **protected**. If the dollar strengthens and the **franchise is not won**, a **windfall gain** will result by **selling pounds** at the exercise price and buying them more cheaply at spot with a stronger dollar.

(c) **Results of using currency hedges if the franchise is won**

Forward market

Using the forward market, the rate for **buying dollars** at the end of June is 1.4310 US$/£. The cost in sterling is 15m/1.4310 = £10,482,180.

Futures

Date of contract

June future

Type of contract

Sell sterling futures

Number of contracts

$$\frac{15,000,000}{1.4302 \times 62,500} = 167.8 \approx 168 \text{ contracts}$$

Tick size

0.0001 × 62,500 = $6.25

Closing futures price

This can be estimated by assuming that the difference between the futures rate and the spot rate (ie basis) decreases constantly over time. On 30 June there will be 0 months left of this June contract so the basis should have fallen to zero.

	1 March	*30 June*
Futures price	1.4302	
Spot rate now	1.4461	
Basis (future – spot)	–0.0159	0

Three possible spot price scenarios

1.3500
1.4500
1.5500

Assuming basis = 0 then the futures price will be the same as the spot price.

Hedge outcome

	1.3500	*1.4500*	*1.5500*
	$	$	$
Opening futures price	1.4302	1.4302	1.4302
Closing futures price	1.3500	1.4500	1.5500
Movement in ticks	802	(198)	(1,198)
Futures profits/(losses)	842,100	(207,900)	(1,257,900)
168 × tick movement × 6.25	842,100	(207,900)	(1,257,900)

Net outcome

	$	$	$
Spot market payment	(15,000,000)	(15,000,000)	(15,000,000)
Futures market (profits)/losses	842,100	(207,900)	(1,257,900)
	(14,157,900)	(15,207,900)	(16,257,900)
Translated at closing rate	£10,487,333	£10,488,207	£10,488,698

This gives an effective rate of $15m/£10.488m (approx.) = 1.4303

A **shortcut** that will deliver **approximately** the same answer is:

Opening futures price – closing basis = effective futures rate

Here this gives:
1.4302 – 0 = 1.4302

Applying this rate gives an outcome in £s of $15m/1.4302 = £10,488,044

This is the answer for all three scenarios, and is the preferred approach for tackling futures questions because it is so much quicker.

The slight difference arises because this shortcut does not account for the fact that the futures hedge is for 168 contracts, not 167.8.

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Options

Date of contract

June

Option type

Buy put

Exercise price

Exercise price	*Premium*	*Net*
1.4000	0.0038	1.3962
1.4250	0.0068	1.4182
1.4500	0.0238	1.4262

Choose 1.4500

Number of contracts

$$\frac{15{,}000{,}000 \div 1.4500}{31{,}250} = 331.03 \approx 331 \text{ contracts}$$

Tick size

31,250 × 0.0001 = $3.125

Premium

0.0238 × 31,250 × 331= $246,181 at 1.4461
= £170,238

Outcome

	1.3500	*1.4500*	*1.5500*
	$	$	$
Option market			
Strike price	1.4500	1.4500	1.4500
Closing price	1.3500	1.4500	1.5500
Exercise?	Yes	No	No
Outcome of option 331 × £31,250 × 1.45 = Shortfall in $s vs $15m needed	$14,998,438 $1,563	–	–
At spot rate of 1.35 (alternatively forward rate could be used)	£1,157		

Net outcome

	1.3500	*1.4500*	*1.5500*
	$	$	$
Spot market payment		(15,000,000)	(15,000,000)
Options			
		(15,000,000)	(15,000,000)
	£	£	£
Translated at closing spot rate		(10,344,828)	(9,677,419)
Option exercised (331 × £31,250)	(10,343,750)		
Shortfall	(1,157)		
Premium	(170,238)	(170,238)	(170,238)
	(10,515,145)	(10,515,066)	(9,847,657)

Note. There are a number of possible approaches to evaluating options.

Summary

The company will either choose to purchase a **forward** or an **option**. Although forwards are slightly more advantageous at lower exchange rates, the net benefits of using an option are significant if the exchange rate moves in Curropt's favour eg to $1.55. Also, given that the transaction is not certain to be required an option will be more suitable because it can be sold on if it is not needed. On this basis an option is recommended.

22 Shawter

Shawter needs a £30m loan for two months, starting in mid-March.

FRAs 3v5 at 6.18%

Loan	LIBOR + 0.9%	6.50% + 0.9% = 7.40%
FRA	Compensation	6.50 – 6.18 = 0.32%
		Net = 7.08%

In £s this is £30m × 0.0708 × 2/12 = £354,000

Futures Set-up in Dec — March at 6.21%, 40 contracts (30m/0.5m × 2/3)

Evaluate	Spot +0.9	7.40%
	Future Dec*	6.21%
	Future Mar*	6.53%
	Gain	0.32%
	Net	**7.08%**

(Using the quick method: opening future 6.21 – closing basis 0.03 = 6.18. Then adding 0.9 to reflect Shawter's borrowing costs, this becomes 7.08%).

*Basis

	Mid-Dec	**Mid-March**
Mar future	6.21%	6.53%
Spot	6.00%	6.50%
Basis	0.21%	0.03%
	3.5 months	**0.5 month left**

In £s this is £30m × 0.0708 × 2/12 = £354,000

Options Set-up — March put at 6.00% (closest to spot), 40 contracts to sell, cost = 0.255%

Evaluate	Spot + 0.9%	7.40%
	Option	6.00%
	Future Mar*	6.53%
	Gain	0.53%
	NET	**7.125%**

In £s this is £30m × 0.07125 × 2/12 = £356,250

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Working

7.4 – 0.53 + 0.255 = 7.125%

Summary

FRA	7.08%
Futures	7.08%
Options	7.125%

The FRA is the simpleset of the agreements but carries a set term. Given the uncertainty over the timing of the cash flow needs a future is recommended here.

23 Carrick plc

Top tips. The first part of this question should be fairly straightforward. However, it is easy to write more than is strictly necessary on these areas, and leave yourself insufficient time for the rest of the question. The key thing to bring out is how each instrument limits interest rate risk by limiting or eliminating the effects of interest rate changes on the company.

In Part (b) remember that Carrick is **receiving** interest so it must buy a call option to limit its exposure to falls in interest rates. As a collar is being constructed, Carrick must sell a put option to counterbalance buying the call option.

The answer works through the key stages:

- Choice of options
- No. of contracts
- Premium payable
- Effects of collar
- Results of collar

You need to show in the answer:

- Technical expertise (choosing 9400 for the initial option, evaluating the other possible prices but ignoring 9450 as it's not relevant)
- Numerical abilities (getting the premium, number of contracts and gain calculation right)
- Depth of discussion (the question asks you to evaluate and that implies detailed analysis, explaining what will happen at the various rates, and also explaining that the choice is not clear-cut – 9250 has the largest potential benefits but also the largest definite costs)

(a) **Interest rate exposure**

Interest rate exposure arises when a company's borrowing is such that a change in interest rates might expose it to interest charges that are unacceptably high. For example, if a company has a large tranche of debt at a fixed rate of interest that is due for repayment in the near future, and the loan is to be replaced or renegotiated, the company would be vulnerable to a sudden increase in market interest rates.

Risk management

Risk management in this context involves using **hedging techniques** to reduce or 'cover' an exposure. However, hedging has a cost, which will either take the form of a **fee** to a financial institution or a **reduction in profit**, and this must be weighed against the reduction in financial risks that the hedge achieves. The extent to which the exposure is covered is known as the **'hedge efficiency'**. A perfect hedge has an efficiency of 100%.

Methods of managing interest rate risk include the following.

Forward interest rate agreements (FRAs)

An FRA is an agreement, usually between a company and a bank, about the **interest rate** on a future loan or deposit. The agreement will **fix the rate of interest** for borrowing for a certain time in the future. If the actual rate of interest at that time is above that agreed, the bank pays the company the difference, and *vice versa*. Thus the company benefits from effectively fixing the rate of interest on a loan for a given period, but it may miss the opportunity to benefit from any favourable movements in rates during that time. An FRA is simply an agreement about rates – it does not involve the movement of the principal sum – the actual borrowing must be arranged separately.

Futures

A financial future is an agreement on the **future price** of a **financial variable**. Interest rate futures are similar in all respects to FRAs, except that the terms, sums involved and periods are **standardised**. They are traded on the London International Futures and Options Exchange (LIFFE). Their standardised nature makes them less attractive to corporate borrowers because it is not always possible to match them exactly to specific rate exposures. Each contract will require the payment of a small initial deposit.

Interest rate options

An interest rate guarantee (or option) provides the **right to borrow** a **specified amount** at a guaranteed rate of interest. The option guarantees that the **interest rate will not rise** above a specified level during a specified period. On the date of expiry of the option the buyer must decide whether or not to exercise their right to borrow. They will only exercise the option if actual **interest rates** have **risen above the option rate**. The advantage of options is that the buyer cannot lose on the interest rate and can take advantage of any favourable rate movements. However, a **premium** must be paid regardless of whether or not the option is exercised. Options can be negotiated directly with the bank or traded in a standardised form on the LIFFE.

Caps and collars

These can be used to set a **floor** and a **ceiling** to the range of interest rates that might be incurred. A **premium** must be paid for this service. These agreements do not provide a perfect hedge, but they do limit the range of possibilities and thus reduce the level of exposure.

(b) Collars make use of **interest rate options** to limit exposure to the risk of movement in rates. The company would arrange both a ceiling (an upper limit) and a floor (a lower limit) on its interest yield. The use of the ceiling means that the cost is lower than for a floor alone.

Choice of options

Since Carrick requires protection for the next seven months, it can use **September options** in order to cover the full period. It is assumed that the floor will be fixed at the current yield of 6%. This implies that it will buy call options at 94.00. At the same time, Carrick will limit its ability to benefit from rises in rates by selling a put option at a higher rate, for example 7% (or 93.00).

The level of **premiums payable** will **depend** on the different **sizes of collar**. The number of three-month contracts required for seven months' cover will be:

$$\frac{£6m}{£0.5m} \times \frac{7}{3} = 28 \text{ contracts (£14m)}$$

The premiums payable at different sizes of collar (in annual percentage terms) will be:

Call	*Premium*	*Put*	*Premium*	*Net premium*	*£ cost**
94.00	0.40	93.50	0.35	0.05	1,750
94.00	0.40	93.00	0.14	0.26	9,100
94.00	0.40	92.50	0.06	0.34	11,900

(* eg £14m × 0.05% × ¼ = £1,750)

If Carrick does take out the options as described above, the effect will be as follows.

(i) If interest rates fall below 6%, Carrick will **exercise the call option** and effectively fix its interest rate at 6%. The loss on the interest rate will be borne by the seller of the call option.

(ii) If interest rates remain between the 6% floor and the 7% ceiling, Carrick will **do nothing** but will benefit from the effect of any increase in rates above 6% within this band.

(iii) If interest rates rise above 7% the buyer of the put option will **exercise** their **option**, provided that the futures price falls below 93.00. Carrick will effectively achieve an interest rate of 7%, but the benefit of any premium on rates above 7% will accrue to the buyer of the put option.

In practice, costs will be higher due to the transaction costs that will be incurred.

The potential gross interest rate gain, and the net gain taking premiums into account if rates do rise to the various exercise prices, are as follows. The interest rate gain is calculated on £6 million for seven months.

	Interest rate % rise	*Interest gain* £	*Premium £ cost (above)*	*Net gain* £
93.50	0.50	17,500	1,750	15,750
93.00	1.00	35,000	9,100	25,900
92.50	1.50	52,500	11,900	40,600

This suggests that Carrick could make the greatest potential gain by **selling put options** at 92.50. However, this gain will only be realised if actual rates rise to 7.5%. If they stay at around 6% then Carrick will still incur costs without realising benefits. The actual put price chosen will depend on the view of the directors on the likely movements in rates over the period in question but, if it seems likely that rates will increase by up to 1%, then a put price of 9300 would be the most appropriate.

24 Theta Inc

(a) Theta borrows $10 million with interest at six-month LIBOR plus 1%. In the swap, it receives six-month LIBOR and pays fixed interest at 8.5%. The net effect is to acquire a fixed rate obligation at 9.5% for the full term of the swap.

	%
Borrow at LIBOR plus 1%	–(LIBOR + 1%)
Swap: receive (floating rate)	+LIBOR
pay (fixed rate)	–8.5%
Net payment (fixed rate)	–9.5%

Theta will therefore fix its payments at $475,000 (10 million × 9.5% × 6/12) every six months for the five-year term of the swap.

At each six-monthly fixing date for the swap, the payment due from Theta to the swaps bank or from the bank to Theta will depend on the market rate for six-month LIBOR at that date.

(b) (i) **LIBOR 10%**

Suppose that on the first fixing date for the swap, at the end of month six in the first year, six-month LIBOR is 10%. The payments due by each party to the swap will be as follows.

	$
Theta pays fixed rate of 8.5%	
($10m × 8.5% × 6/12)	425,000
Swaps bank pays LIBOR rate of 10%	
($10m × 10% × 6/12)	500,000
Net payment from bank to Theta	75,000

This payment will be made six months later at the end of the notional interest rate period. Theta will pay interest on its loan at LIBOR + 1% which for this six-month period is 11% (10% + 1%). Taken with the payment received under the swap agreement, the net cost to Theta is equivalent to interest payable at 9.5%.

	$
Loan payment at 11%	
($10m × 11% × 6/12)	550,000
Payment received from the swap bank	(75,000)
Net payment (equivalent to 9.5% interest)	475,000

(ii) **LIBOR 7.5%**

Suppose that at the next six-monthly fixing date, six-month LIBOR is 7.5%. The swap payments will be as follows.

	$
Theta to swap bank (fixed at 8.5%)	425,000
Swap bank to Theta (at 7.5%)	375,000
Net payment by Theta to swaps bank	50,000

Under its loan arrangement, Theta will pay 8.5% (LIBOR + 1%) for the six-month period. Adding the net swap payment gives a total cost for the six-month period of $475,000, equivalent to an interest rate of 9.5% for the period.

	$
Loan payment at 8.5%	
($10m × 8.5% × 6/12)	425,000
Swap payment	50,000
Total payment (equivalent to 9.5% interest)	475,000

25 Brive Inc

Top tips. In this question you are given details of the proposed reconstruction whereas in the exam you may have some input into its design.

There are no real traps in answer to (a), and if you adopted a methodical layout you should have scored full marks. The principal advantage of the layout we've used is that it highlights the adjustments.

In Part (b) with each of the parties you first assess what the position would be if insolvency did occur, and then the consequences (certain and uncertain) of reconstruction. Knowledge of the order of priority in insolvency proceedings is vital. You need to show that the shareholders' and bond holders' position is not clear-cut. If insolvency proceeds, they will certainly lose money; however, if the reconstruction proceeds, they will have to pay out more money in return for uncertain future returns **and** other possibly undesirable consequences (change in control, lack of security).

The conclusion sums up the benefits to everyone but also emphasises the uncertainties.

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(a) and (b)

REPORT

To: Board of Directors
From: M Accountant
Date: 17 September 20X1
Subject: Proposed capital reconstruction

Introduction

The purpose of this report is to evaluate the implications of the proposed capital reconstruction of Brive Inc for the various affected parties, including the shareholders, bond holders, unsecured payables and the bank. Calculations showing the effect of the reconstruction on the statement of financial position are included as an appendix to this report.

Ordinary shareholders

In the event of Brive becoming insolvent, the ordinary shareholders would be most unlikely to receive anything for their shares, since the net proceeds would be as follows.

	$
Property	2,000,000
Plant	1,000,000
Inventory	1,700,000
Receivables	1,700,000
Insolvency proceeding costs	(770,000)
	5,630,000

The total amount due to the payables, bank and bond holders is $8,600,000, leaving nothing available for the shareholders.

If the reconstruction is undertaken, the existing shareholders will have to provide an additional $1m of capital in subscribing to the rights issue. However, if the projections are correct the effect of this should be to bring Brive back into profit, with earnings after interest amounting to $1.4m ($1.75m – $0.35m) per annum. This amounts to earnings per share of 28c which should permit Brive to start paying a dividend and providing some return to the shareholders again. The fact that the company is returning to profit should also make it possible to sell the shares if required which is presumably difficult at the present time. However, there would be a substantial shift in the balance of control, with the existing shareholders being left with only 40% of the equity, the balance being in the hands of the present bond holders.

Secured bond holders

Under the existing arrangements, the amount owing to the bond holders is $3 million. Although the bonds are secured on the property which has a book value of $3 million, in the event of a forced sale this would only be likely to realise $2 million, giving a shortfall of $1 million. The bond holders would rank alongside the bank and the other payables for repayment of this balance. As has been calculated above, the amount that would be realised after insolvency proceedings and available to the unsecured payables would be $3.63 million (net of property proceeds). The total amount owed is:

	$m
Bond holders	1.0
Bank (overdraft)	1.6
Payables	4.0
	6.6

The bond holders would therefore only receive 55 cents in the dollar on the balance owing, giving a total payout of 85 cents in the dollar (($2m + $0.55m)/$3.0m).

Under the proposed scheme, the bond holders would receive $2.8 million of new capital in return for the old bonds ie 93.33 cents in the dollar in the form of capital rather than cash. Of this, $1.3 million would be in the form of 14% unsecured loan notes and the remainder in the form of equity. They would also have to subscribe an additional $1.5 million to take up the rights issue. Their total investment in the reconstruction would therefore be:

	$m
Cash forgone from insolvency	2.55
Additional cash investment	1.50
	4.05

Returns would be:

	$
Interest ($1.3m × 14%)	182,000
Return on equity ($3m × 0.28)	840,000
	1,022,000

This represents a return of 25.23% which is likely to be above that which could be earned elsewhere thus making the scheme attractive to the bond holders. However, in addition they would have to forgo their security on the property and rank partly with the unsecured payables and partly with the equity. They should therefore be confident of the ability of the management to deliver the projected returns before consenting to the scheme.

The bank

Since the overdraft is unsecured, the bank would rank for repayment alongside the unsecured payables. As calculated above, the amount to be repaid would be 55 cents in the dollar, and the bank would thus recover $880,000 in the event of insolvency proceedings. In the reconstruction, the bank would have to write off $400,000 ($1,600,000 debt – $1,200,000 loan notes), but would receive interest of 14% per annum leading to repayment of the balance in five years' time.

The investment that the bank would be making would therefore be the cash forgone from insolvency proceedings of $880,000. The annual returns would be $168,000 (14% × $1.2 million) which represents a return on the incremental investment of 19.1%. Provided that the bank is confident of the financial projections of the management, it stands to receive $1.2 million in five years' time. The effective return of 19.1% in the meantime should be in **excess of current overdraft rates**, and the level of security is improved since there would no longer be secured bond holders ranking ahead of the bank for repayment. The scheme is therefore likely to be attractive to the bank.

Unsecured payables

If Brive becomes insolvent the unsecured payables will receive 55 cents in the dollar ie $2.2 million. Under the proposed scheme they would stand to receive 75 cents (25% written down) in the dollar with apparently no significant delay in payment. If Brive continues to operate they will be able to continue to trade with the company and generate further profits from the business. The proposed scheme therefore seems **attractive** from their point of view.

Conclusions

The proposed scheme appears to hold benefits for all the parties involved. It is also in the interests of Brive's customers and workforce for the company to continue to trade. However, these benefits will only be realised if the directors are correct in their forecast of trading conditions and if the new investment can achieve the projected returns. All parties should satisfy themselves as to these points before considering proceeding further with the reconstruction.

	Before	*Adjustment*					*After*
		a	*b*	*c*	*d*	*e–g*	
	$'000						$'000
Non-current assets	5,700	(2,100)				2,500	6,100
Current assets							
Inventory	3,500	(800)					2,700
Receivables	1,800	(100)					1,700
	5,300						4,400
Payables	(4,000)					1,000	(3,000)
Overdraft	(1,600)				1,600		0
Working capital	(300)						1,400
Total assets less current liabilities	5,400						7,500
10% bonds	(3,000)			3,000			0
14% loan notes				(1,300)	(1,200)		(2,500)
Net assets	2,400						5,000
Capital and reserves							
Share capital	4,000		(3,000)	1,500		2,500	5,000
Reserves	(1,600)		1,600				0
	2,400						5,000

26 BBS Stores

Top tips. There is a lot of information in this question and it is easy to become overwhelmed. Before delving into the detail, read the requirements. This will give you an idea about the detail you are trying to extract from the question and will focus your attention. You are required to carry out numerous calculations so label these clearly. It is very easy to get lost otherwise.

In part (a), don't forget that adjustments to the earnings for the EPS calculations will be net of tax. Part (b) involves a lot of calculations but remember to consider each option and don't forget what you are actually trying to achieve. You may find it easier to start from what you are required to find and work backwards. However you decide to do this part of the question, it is imperative that your workings are clear. Make use of the formulae in the formula sheet where you can.

Easy marks. This is a very involved question but you should be able to pick up some relatively straightforward marks in part (a) when constructing the comparative statements. You should also be able to gain at least a few easy marks in part (b) when calculating equity cost of capital (using CAPM) and WACC.

(a) The proposal would involve the following:

	$m
Sell 50% of land and buildings	1,148.50
Sell 50% of assets under construction	82.50
	1,231.00

Impact on statement of financial position

Option 1 is the proposal to use the proceeds ($1,231m) to reduce medium-term borrowing and reinvest the balance in the business (non-current assets). The effect would be as follows:

	Borrowings and other financial liabilities $m	*Property, plant and equipment* $m	*Sales proceeds received (used)* $m
Balance at end 20X8 (before adjustment)	1,130	4,050	
Sales proceeds		(1,231)	1,231
Repayment of medium-term notes	(360)		(360)
Reinvestment in company		871	(871)
Balance after adjustment	770	3,690	Nil

Option 2 is the sale and rental scheme proposed by the company's investors on the assumption that this scheme would release substantial cash to them. The proposal would involve the repayment of the medium-term notes and the balance ($871m) used to execute a share buyback. This would involve ($871m/$4) **217.75m shares** with a nominal value of **$54.44m**.

	Borrowings and other financial requirements $m	*Property, plant and equipment* $m	*Called-up share capital – equity* $m	*Retained earnings* $m
Balance at end 20X8 (before adjustment)	1,130	4,050	425.00	1,535
Sales proceeds		(1,231)		
Repayment of medium-term notes	(360)			
Share buyback			(54.44)	(817)
Balance at end 20X8 (after adjustment)	770	2,819	370.56	718

Comparative statements of financial position

	20X8 (original) $m	*Sales proceeds* $m	*Option 1* $m	$m	*Option 2* $m	$m
Non-current assets						
Intangible	190			190		190
Property etc	4,050	(1,231)	871	3,690	(1,231)	2,819
Other	500			500		500
	4,740			4,380		3,509
Current assets	840	1,231	(1,231)	840		840
Total assets	5,580			5,220		4,349

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	20X8 (original) $m	*Sales proceeds* $m	*Option 1* $m	$m	*Option 2* $m	$m
Equity						
Called-up equity capital	425			425	(54)	371
Retained earnings	1,535			1,535	(817)	718
Total equity	1,960			1,960		1,089
Liabilities						
Current liabilities	1,600			1,600		1,600
Non-current liabilities						
Borrowings etc	1,130		(360)	770	(360)	770
Other	890			890		890
Total liabilities	3,620			3,260		3,260
Total liabilities and equity	5,580			5,220		4,349

Gearing is affected as follows:

	20X8 (Option 1)	*20X8 (Option 2)*	*20X8 (before adjustment)*
Long-term debt (borrowings and other financial liabilities)	770	770	1,130
Total capital employed (total assets – current liabilities)	3,620	2,749	3,980
Gearing ratio	21.27%	28.01%	28.39%

Gearing has been reduced substantially with Option 1. Whilst gearing is also reduced slightly under Option 2, it is considerably higher than the gearing ratio that would result from paying off the medium-term notes and reinvesting the balance in the company.

Impact on earnings per share (EPS)

Both options will result in a reduction in interest payable due to paying off the medium-term notes. In addition, credit spread on the 6-year debt would be reduced by 30 basis points with Option 1. The sale of the property would reduce property rent with both options. Under Option 1, the funds reinvested in the company would earn a return of 13%.

The total effect would be as follows:

	Current position $m	*Option 1* $m	*Option 2* $m
Earnings for 20X8	670.00	670.00	670.00
Add interest saved on medium-term notes (net of tax): $360m × 6.2% × 65% (interest is charged at LIBOR 5.5% + 70 basis points)		14.51	14.51
Add return on reinvested funds ($871m × 13% × 65%)		73.60	
Add reduction in credit spread on 6-year debt (0.3% × $770m × 65%)		1.50	
Less property rent forgone ($1,231m × 8% × 65%)		(64.01)	(64.01)
Adjusted earnings	670.00	695.60	620.50
Number of shares	1,700.00m	1,700.00m	1,482.00m
Adjusted EPS in cents per share	39.41	40.92	41.87

(b) **Impact of unbundling on the company's WACC**

Our starting point for this part of the report is to estimate the asset beta for the retail part of the business.

Current k_e = 10.47% and the current WACC = 9.55%

There are 1,700m shares ($425/0.25) so V_e = 1,700 × 4 = $6,800m

V_d = $1,130m

We now ungear the current company beta using the formula:

$$\beta_a = \beta_e \times \frac{V_e}{V_e + V_d(1-T)} = 1.824 \times (6{,}800/(6{,}800 + 1{,}130(1 - 0.35))$$

β_a = 1.646

The retail asset beta is the weighted average of the individual asset betas:

$$\beta_a = \left[\frac{V_R}{V_T} \times b_R\right] + \left[\frac{V_P}{V_T} \times b_P\right]$$

where V_R = value of retail section, and β_R = asset beta of retail section;

V_T = total value of business

β_P = asset beta of property section (this is calculated from the equity beta of other portfolio companies 1.25 × market gearing adjusted for tax of 0.5 = 0.625).

V_P = value of property

$$1.646 = \frac{4{,}338}{6{,}800} \times \beta_R + \frac{2{,}462}{6{,}800} \times 0.625$$

V_T = $4 × no. of shares = $4 × (425m ÷ 0.25) = $6,800m

V_P = 2,297 + 165 = $2,462m

$V_R = V_T - V_P$ = 6,800 – 2,462 = $4,338m

Rearranging the equation we find:

β_R = 2.225

The asset beta of the company will be a combination of the retail beta (2.225) and the property beta (0.625). We can now calculate the cost of equity under each option.

Value of equity	Option 1	Option 2
	= 425m × 4 × 4 = $6,800m	[(425m × 4) – 217.75m] × 4 = $5,929m

The value of **property** (half of which is sold) is now $2,462m × 0.5 = $1,231m

The remaining value of the equity (as above) is the value of the retail section (eg for **Option 1** 6,800 – 1,231 = 5,569, and for **Option 2** 5,929 – 1,231 = 4,698).

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The average asset beta can now be calculated as a weighted average of the asset betas for property and retail as follows.

Average asset beta	Option 1	Option 2
	$\frac{5,569}{6,800} \times 2.225 + \frac{1,231}{6,800} \times 0.625$ = 1.935	$\frac{4,698}{5,929} \times 2.225 + \frac{1,231}{5,929} \times 0.625$ = 1.893

Now using $\beta_a = \beta_e \times \frac{V_e}{V_e + V_d(1-T)}$ we can find the equity beta for either option.

Equity beta (adjusted for gearing)	Option 1	Option 2
	$\beta_a = \beta_e \times \frac{6,800}{(6,800 + (770 \times 0.65))}$ $1.935 = \beta_e \times 0.931$ β_e = 1.935/0.931 = 2.078	$\beta_a = \beta_e \times \frac{5,929}{(5,929 + (770 \times 0.65))}$ $1.893 = \beta_e \times 0.922$ β_e = 1.893/0.922 = 2.053

Now the cost of equity can be calculated, as follows.

Cost of equity	Option 1	Option 2
	5% + (2.078 × 3%) = 11.23%	5% + (2.053 × 3%) = 11.16%

Option (1) WACC

$$= \left[\frac{6,800}{(6,800 + 770)} \times 11.23\%\right] + \left[\frac{770}{(6,800 + 770)} \times 5.9\% \times 0.65\right] = 10.48\%$$

(where 5.9% = LIBOR + 70bp – 30bp)

Option (2) WACC

$$= \left[\frac{5,929}{(5,929 + 770)} \times 11.16\%\right] + \left[\frac{770}{(5,929 + 770)} \times 6.2\% \times 0.65\right] = 10.34\%$$

Note that both options will increase the current WACC of 9.55% by a considerable margin.

(c) **Potential impact of each alternative on the market value of the firm**

It is difficult to assess the impact of unbundling on the value of BBS Stores. Although the equity beta will increase with the removal of part of the existing property portfolio, this will be countered by a reduction in gearing. We have assumed that the balance of $871 million in Option 1 could be reinvested at the current rate of return of 13%. If we fail to do so then shareholders' value will be significantly reduced. To reduce this risk, shareholders appear to favour Option 2 where they are guaranteed a cash return through a share buyback.

Whether the property is owned or leased should have no effect on the company's value if we can assume that the current use of the assets and the resultant value gained remain unchanged. If a separate property company can be set up we may be able to remove ownership from the statement of financial position. However, we must bear in mind that the ease with which this can be done will depend on accounting regulations in the country concerned.

A final observation is the assumption of a constant and known share price (400 cents). Share prices are not constant nor are they certain. In order to assess the potential impact of any movements in this variable, we should set up a simulation model and run the model for various share prices and equity betas.

27 Reorganisation

(a) Potential problems with management buyouts:

(i) Deciding on a fair price – management will obviously want to pay the lowest price possible, while the vendor will want to secure the highest possible price.

(ii) Any geographical relocation may result in the loss of key workers.

(iii) Maintaining a good relationship with suppliers and customers, particularly if key contacts that suppliers and customers were used to dealing with decide to leave as a result of the buyout.

(iv) Availability of sufficient cash flow to maintain and replace non-current assets. This is one of the main problems with buyouts – cash is often very tight at the beginning of the venture.

(v) Changes in work practices may not suit all employees.

(vi) Maintaining financial arrangements with previous employees may be difficult – for example, pension rights.

(vii) Many suppliers of funds will insist on representation at board level in order to maintain some control over how the funds are being used.

(b) In order to estimate the change in the value of equity, we can use forecast retained earnings figures, assuming dividends to be at the maximum 12% level.

(All figures are in $'000)

	0	*1*	*2*	*3*	*4*	*5*
EBIT	–	2,200	3,100	3,900	4,200	4,500
9.5% interest	–	713	713	713	713	713
Earnings before tax	–	1,487	2,387	3,187	3,487	3,787
Tax	–	446	716	956	1,046	1,136
Earnings after tax	–	1,041	1,671	2,231	2,441	2,651
Dividend (12%)	–	125	201	268	293	318
Retained earnings	–	916	1,470	1,963	2,148	2,333
Equity	17,500	18,416	19,886	21,849	23,997	26,330

Compound growth interest rate = $\left[\sqrt[5]{\frac{26,330}{17,500}}\right] - 1 = 8.5\%$

The 8.5% growth rate is considerably less than the 15% rise predicted by management, therefore it can be concluded that the management's estimate does not appear to be viable.

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28 Transfer prices

Top tips. You can go wrong quite easily in part (a) if you don't think carefully about the layout of your computation. For each of the options you need to split the calculation between what happens in the countries where the subsidiaries are located, and what happens in the country where the holding company is located. Remember also to assess the effect of the withholding tax separately from the other local taxes.

Part (b) demonstrates how strategic issues can be brought into the discussion part of an answer. It is not sufficient just to discuss government action. Local issues are important, as well as trying to ensure goal congruence throughout the group.

(a) The current position is as follows.

	UK company B$'000	*Ceeland company* B$'000	*Total* B$'000
Revenue and taxes in the local country			
Sales	84,000	210,000	294,000
Production expenses	(68,000)	(164,000)	(232,000)
Taxable profit	16,000	46,000	62,000
Tax (1)	(4,000)	(18,400)	(22,400)
Dividends to Beeland	12,000	27,600	39,600
Withholding tax (2)	0	2,760	2,760
Revenue and taxes in Beeland			
Dividend	12,000	27,600	39,600
Add back foreign tax paid	4,000	18,400	22,400
Taxable income	16,000	46,000	62,000
Beeland tax due	5,600	16,100	21,700
Foreign tax credit	(4,000)	(16,100)	(20,100)
Tax paid in Beeland (3)	1,600	–	1,600
Total tax (1) + (2) + (3)	5,600	21,160	26,760

An increase of 25% in the transfer price would have the following effect.

	UK company B$'000	*Ceeland company* B$'000	*Total* B$'000
Revenues and taxes in the local country			
Sales	105,000	210,000	315,000
Production expenses	(68,000)	(185,000)	(253,000)
Taxable profit	37,000	25,000	62,000
Tax (1)	(9,250)	(10,000)	(19,250)
Dividends to Beeland	27,750	15,000	42,750
Withholding tax (2)	0	1,500	1,500

	UK company	*Ceeland company*	*Total*
	B$'000	B$'000	B$'000
Revenues and taxes in Beeland			
Dividend	27,750	15,000	42,750
Add back foreign tax paid	9,250	10,000	19,250
Taxable income	37,000	25,000	62,000
Beeland tax due	12,950	8,750	21,700
Foreign tax credit	(9,250)	(8,750)	(18,000)
Tax paid in Beeland (3)	3,700	–	3,700
Total tax (1) + (2) + (3)	12,950	11,500	24,450

The total tax payable by the company is therefore reduced by B$2,310,000 to B$24,450,000.

(b) **Government action**

In practice, governments usually seek to prevent multinationals reducing their tax liability through the manipulation of transfer prices. For tax purposes governments will normally demand that an **'arm's length' price** is used in the computation of the taxable profit and not an artificial transfer price. If no such 'arm's length' price is available then there may be some scope for tax minimisation through the choice of transfer price.

Other factors

If it is possible to manipulate the transfer price in this way, there are further factors that the company must take into consideration before making a final decision.

(i) The level of transfer prices will affect the **movement of funds** within the group. If inter-company sales involve the use of different currencies the level of the transfer price will also affect the group's **foreign exchange exposure**. These factors must be taken into account as well as the tax situation.

(ii) The level of profit reported by the subsidiary could affect its **local credit rating** and this could be important if the company wishes to raise funds locally. It could also affect the ease with which credit can be obtained from suppliers.

(iii) The reported profit is likely to have an **effect** on the **motivation** of managers and staff in the subsidiary. If reported profits are high then they may become complacent and cost control may become weak. If, on the other hand, profits are continually low they may become demotivated.

(iv) Transfer prices that **do not reflect market levels** may lead to subsidiaries making 'make or buy' decisions that do not optimise the performance of the group as a whole.

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Glossary

Chapter 1: Financial strategy: formulation

Dividend capacity: the cash generated in any given year that is **available** to pay to ordinary shareholders (it is also called free cash flow to equity).

Chapter 2: Financial strategy: evaluation

Beta factor: a measure of the sensitivity of a share to movements in the overall market. A beta factor measures market risk.

Financial risk: the volatility of earnings due to the financial policies of a business.

Systematic (or market) risk: the portion of risk that will still remain even if a diversified portfolio has been created, because it is determined by general market factors.

Unsystematic (or specific) risk: the component of risk that is associated with investing in that particular company. This can be reduced by diversification.

Chapter 3: DCF techniques

Internal rate of return (IRR) of any investment: the discount rate at which the NPV is equal to zero. Alternatively, the IRR can be thought of as the return that is delivered by a project.

Net present value (NPV): of a project is the sum of the discounted cash flows less the initial investment.

Nominal or money: Adjusted for inflation

Project duration: measure of the average time over which a project delivers its value.

Real terms: At current prices

Chapter 5: International investment and financing decisions

Economic risk: the risk that the present value of a company's future cash flows might be reduced by adverse exchange rate movements.

Eurobond (or international bond): a bond sold outside the jurisdiction of the country in whose currency the bond is denominated.

Chapter 6: Cost of capital and changing risk

Asset beta: an ungeared beta measuring only business risk.

Equity beta: a measure of the market risk of a security, including its business and financial risk.

Chapter 8: Valuation for acquisitions and mergers

Free cash flow (FCF): the cash available for payment to investors (shareholders and debt holders), also called free cash flow to firm.

Free cash flow to equity (FCFE): the cash available for payment to shareholders, also called dividend capacity.

Chapter 9: Acquisitions: strategic issues and regulation

Reverse takeover: a situation where a smaller quoted company (S Co) takes over a larger **unquoted** company (L Co) by a share-for-share exchange.

Synergies: extra benefits resulting from an acquisition either from higher cash inflows and/or lower risk.

Chapter 11: The role of the treasury function

Delta hedge: defines the number of options required. For example the number of share options required = number of shares ÷ delta

Rho: measures the sensitivity of option prices to interest rate changes.

Theta: the change in an option's price (specifically its time premium) over time.

Treasury management: primarily involves the management of liquidity and risk, and also helps a company to develop its long term financial strategy.

Vega: measures the sensitivity of an option's price to a change in the implied volatility of the underlying asset.

Chapter 12: Managing currency risk

Currency options: contracts giving the holder the right, but not the obligation, to buy (call) or sell (put) a fixed amount of currency at a fixed rate in return for an upfront fee or premium.

Tick: the smallest movement in the exchange rate, which is normally quoted on the futures market to four decimal places

Chapter 13: Managing interest rate risk

Call option: an option to receive interest at a pre-determined rate on a standard notional amount over a fixed period in the future.

Companies that will have a cash flow surplus require **contracts to buy**.

Companies which will borrow require **contracts to sell**.

Exchange-traded interest rate option: an agreement with an exchange to pay or receive interest at a pre-determined rate on a **standard** notional amount over a fixed standard period (usually **three months**) in the future.

FOREX swap: a short-term swap made up of a spot transaction and a forward transaction which allows a company to obtain foreign currency for a short time period (usually within a week) and then to swap back into the domestic currency a short-time later at a known (forward) rate.

Forward rate agreement: a contract with a bank to receive or pay interest at a pre-determined interest rate on a notional amount over a fixed period in the future.

Interest rate future: an agreement with an exchange to pay or receive interest at a pre-determined rate on a **standard** notional amount over a fixed standard period (usually **three months**) in the future.

Put option: an option to **pay interest** at a pre-determined rate on a standard notional amount over a fixed period in the future.

Chapter 15: Business reorganisation

Mezzanine finance: finance that had some of the characteristics of both debt and equity.

Unbundling: involves restructuring a business by reorganising it into a number of separate parts.

Chapter 16: Planning and trading issues for multinationals

Arm's length standard: this means that intra-firm trade of multinationals should be priced as if they took place between unrelated parties acting at arm's length in competitive markets.

Barriers to entry: factors which make it difficult for suppliers to enter a market.

Money laundering: constitutes any financial transactions whose purpose is to conceal the identity of the parties to the transaction.

Multinational enterprise: one which owns or controls production facilities or subsidiaries or service facilities outside the country in which it is based.

Securitisation: the process of converting illiquid assets into marketable securities.

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Mathematical tables and formulae

Formulae

Modigliani and Miller Proposition 2 (with tax)

$$k_e = k_e^i + (1-T)(k_e^i - k_d)\frac{V_d}{V_e}$$

The Capital Asset Pricing Model

$$E(r_i) = R_f + \beta_i\,(E(r_m) - R_f)$$

The asset beta formula

$$\beta_a = \left[\frac{V_e}{(V_e + V_d(1-T))}\beta_e\right] + \left[\frac{V_d(1-T)}{(V_e + V_d(1-T))}\beta_d\right]$$

The Growth Model

$$P_o = \frac{D_o(1+g)}{(r_e - g)}$$

Gordon's growth approximation

$$g = br_e$$

The weighted average cost of capital

$$WACC = \left[\frac{V_e}{V_e + V_d}\right]k_e + \left[\frac{V_d}{V_e + V_d}\right]k_d(1-T)$$

The Fisher formula

$$(1+i) = (1+r)(1+h)$$

Purchasing power parity and interest rate parity

$$S_1 = S_0 \times \frac{(1+h_c)}{(1+h_b)} \qquad F_0 = S_0 \times \frac{(1+i_c)}{(1+i_b)}$$

Modified Internal Rate of Return

$$MIRR = \left[\frac{PV_R}{PV_I}\right]^{\frac{1}{n}}(1+r_e) - 1$$

The Black–Scholes option pricing model

$$c = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

Where:

$$d_1 = \frac{\ln(P_a / P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

$$d_2 = d_1 - s\sqrt{t}$$

The Put Call Parity relationship

$$p = c - P_a + P_e e^{-rt}$$

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Present value table

Present value of 1, ie $(1 + r)^{-n}$

Where r = discount rate

n = number of periods

Discount rates (r)

Periods

(n)	**1%**	**2%**	**3%**	**4%**	**5%**	**6%**	**7%**	**8%**	**9%**	**10%**
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239

(n)	**11%**	**12%**	**13%**	**14%**	**15%**	**16%**	**17%**	**18%**	**19%**	**20%**
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065

Annuity table

Present value of an annuity ie $\frac{1-(1+r)^{-n}}{r}$

Where r = discount rate

n = number of periods

Interest rates (r)

Periods

(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606

(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675

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Standard normal distribution table

$Z = \frac{(x-\mu)}{\sigma}$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

This table can be used to calculate $N(d_1)$, the cumulative normal distribution functions needed for the Black–Scholes model of option pricing. If $d_1 > 0$, add 0.5 to the relevant number above. If $d_1 < 0$, subtract the relevant number above from 0.5.

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