

ACCA

Financial Management

Paper F9

Course Notes

ACF9CN07(N)

F9 *Financial Management* Study Programme

	Page
Introduction to the paper and the course.....	(ii)
1 Financial management and financial objectives	1.1
2 Economic environment for business.....	2.1
3 Financial markets and institutions	3.1
4 Working capital	4.1
5 Managing working capital	5.1
6 Working capital finance	6.1
End of Day 1 – refer to Course Companion for	
Home Study	<input type="checkbox"/>
Progress test 1	<input type="checkbox"/>
7 Investment decision.....	7.1
8 Investment appraisal using DCF methods.....	8.1
9 Allowing for tax and inflation.....	9.1
10 Project appraisal and risk	10.1
11 Specific investment decisions.....	11.1
End of Day 2 – refer to Course Companion for	
Home Study	<input type="checkbox"/>
Progress test 2	<input type="checkbox"/>
12 Sources of finance.....	12.1
13 Dividend policy	13.1
14 Gearing and capital structure	14.1
15 Cost of capital.....	15.1
16 Capital structure	16.1
End of Day 3 – refer to Course Companion for	
Home Study	<input type="checkbox"/>
Progress test 3	<input type="checkbox"/>
17 Business valuations.....	17.1
18 Market efficiency	18.1
19 Foreign currency risk.....	19.1
20 Interest rate risk.....	20.1
End of Day 4 – refer to Course Companion for	
Home Study	<input type="checkbox"/>
Progress test 4	<input type="checkbox"/>
21 Answers to Lecture Examples.....	21.1
22 Question and Answer bank	22.1
23 Formulae and ratios to learn.....	23.1
24 Appendix A: Pilot Paper questions	24.1
25 Appendix B: Mathematical tables	25.1

Don't forget to plan your revision phase!

- Revision of syllabus
- Testing of knowledge
- Question practice
- Exam technique practice

BPP provides revision courses, question days, mock days and specific material to assist you in this important phase of your studies.

Introduction to Paper F9 *Financial Management*

Overall aim of the syllabus

To develop the knowledge and skills expected of a financial manager, relating to issues affecting investments, financing, and dividend policy decisions.

The syllabus

The broad syllabus headings are:

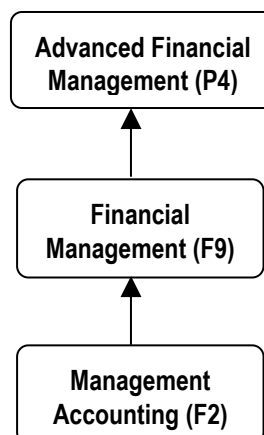
A	Financial management function
B	Financial management environment
C	Working capital management
D	Investment appraisal techniques
E	Sources of business finance
F	Cost of capital
G	Business valuations
H	Risk management

Main capabilities

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

- Discuss the role and purpose of the financial management function
- Assess and discuss the impact of the economic environment on financial management
- Discuss and apply working capital management techniques
- Carry out effective investment appraisal
- Identify and evaluate alternative sources of business finance
- Explain and calculate the cost of capital and the factors which affect it
- Discuss and apply principles of business and asset valuations
- Explain and apply risk management techniques in business

Links with other papers



This diagram shows where links exist between this paper and other papers that may precede or follow it. This paper prepares you for the advanced (optional) paper on financial management (P4).

Assessment methods and format of the exam

Examiner: Anthony Head

The examination is a three-hour paper and all questions are compulsory. Each question is worth 25 marks and has both computational and discursive elements. The balance between computational and discursive elements will continue in line with the pilot paper (50:50).

Candidates are provided with a formulae sheet and tables of discount factors and annuity factors (given in Appendix B).

Format of the Exam	Marks
Question 1	25
Question 2	25
Question 3	25
Question 4	25
	100

Course Aims

Achieving ACCA's Study Guide Outcomes

A Financial management function

A1	The nature and purpose of financial management	Chapter 1
A2	Financial objectives and the relationship with corporate strategy	Chapter 1
A3	Stakeholders and impact on corporate objectives	Chapter 1
A4	Financial and other objectives in not-for-profit organisations	Chapter 1

B Financial management environment

B1	The economic environment for business	Chapter 2
B2	The nature and role of financial markets and institutions	Chapter 3

C Working capital management

C1	The nature, elements and importance of working capital	Chapter 4
C2	Management of inventories, accounts receivable, accounts payable and cash	Chapter 5
C3	Determining working capital needs and funding strategies	Chapter 6

D Investment appraisal

D1	The nature of investment decisions and the appraisal process	Chapter 7
D2	Non-discounted cash flow techniques	Chapter 7
D3	Discounted cash flow techniques	Chapter 8
D4	Allowing for inflation and taxation in DCF	Chapter 9
D5	Adjusting for risk and uncertainty	Chapter 10
D4	Specific investment decisions	Chapter 11

E Business finance

E1	Sources of, and raising, short-term finance	Chapter 12
E2	Sources of, and raising, long-term finance	Chapter 12
E3	Internal sources of finance and dividend policy	Chapter 13
E4	Gearing and capital structure considerations	Chapter 14
E5	Finance for small and medium-sized enterprises	Chapter 14

F Cost of capital

F1	Sources of finance and their relative costs	Chapter 15
F2	Estimating the cost of equity	Chapter 15
F3	Estimating the cost of debt and other capital instruments	Chapter 15
F4	Estimating the overall cost of capital	Chapter 15
F5	Capital structure theories and practical considerations	Chapter 16
F6	Impact of cost of capital on investments	Chapter 16

G Business valuations

G1	Nature and purpose of the valuation of business and financial assets	Chapter 17
G2	Models for the valuation of shares	Chapter 17
G3	The valuation of debt and other financial assets	Chapter 17
G4	Efficient market hypothesis and practical considerations in the valuation of shares	Chapter 18

H Risk management

H1	The nature and types of risk and approaches to risk management	Chapter 19
H2	Causes of exchange rate fluctuations and interest rate fluctuations	Chapters 19/20
H3	Hedging techniques for foreign currency risk	Chapter 19
H4	Hedging techniques for interest rate risk	Chapter 20

Classroom tuition and Home study

Your studies for BPP consist of two elements, classroom tuition and home study.

Classroom tuition

In class we aim to cover the key areas of the syllabus. To ensure examination success you will spend private study time reinforcing your classroom course with question practice and reviewing areas of the Course Notes and Study Text.

Home study

To support you with your private study BPP provides you with a Course Companion which helps you to work at home and aims to ensure your private study time is effectively used. The Course Companion includes a Home Study section which breaks down your home study by days, one to be covered at the end of each day of the course. You will find clear guidance as to the time to spend on various activities and their importance.

You are also provided with progress tests and two course exams which should be submitted for marking as they become due.

These may include questions on topics covered in class and home study.

BPP Learn Online

Come and visit the BPP Learn Online free at www.bpp.com/acca/learnonline for exam tips, FAQs and syllabus health check.

ACCA Forum

We have thriving ACCA bulletin boards at www.bpp.com/accaforum. Register and discuss your studies with tutors and students.

Helpline

If you have any queries during your private study simply contact your class tutor on the telephone number or e-mail address that they will supply. Alternatively, call +44 (0)20 8740 2222 (or your local training centre if outside the London area) and ask for a tutor for this paper to speak to you or to call you back within 24 hours.

Feedback

The success of BPP's courses has been built on what **you**, the students tell us. At the end of the course for each subject, you will be given a feedback form to complete and return.

If you have any issues or ideas before you are given the form to complete, please raise them with the course tutor or relevant head of centre.

If this is not possible, please email ACCACoursesFeedback@bpp.com.

Financial management & Financial objectives

1

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Explain the nature & purpose of financial management, and its relationship to financial and management accounting.
- Discuss the relationship between financial objectives (eg shareholder wealth maximisation, profit maximisation, earnings per share growth), corporate objectives and corporate strategy.
- Identify the range of stakeholders, their objectives and possible conflict between stakeholder objectives.
- Discuss the role of management in meeting stakeholder objectives including the use of agency theory.
- Describe and apply ways of measuring achievement of corporate objectives.
- Explain ways to encourage the achievement of stakeholder objectives, including managerial reward schemes and regulatory requirements.
- Discuss the impact of not-for-profit status on financial and other objectives.
- Discuss the nature and importance of Value for Money as an objective and how to measure the achievement of objectives in not-for-profit organisations.

Exam Context

This is an important chapter and could be tested as a whole question, but is more likely to feature as part of a question (eg 8 marks for ratio analysis in the pilot paper).

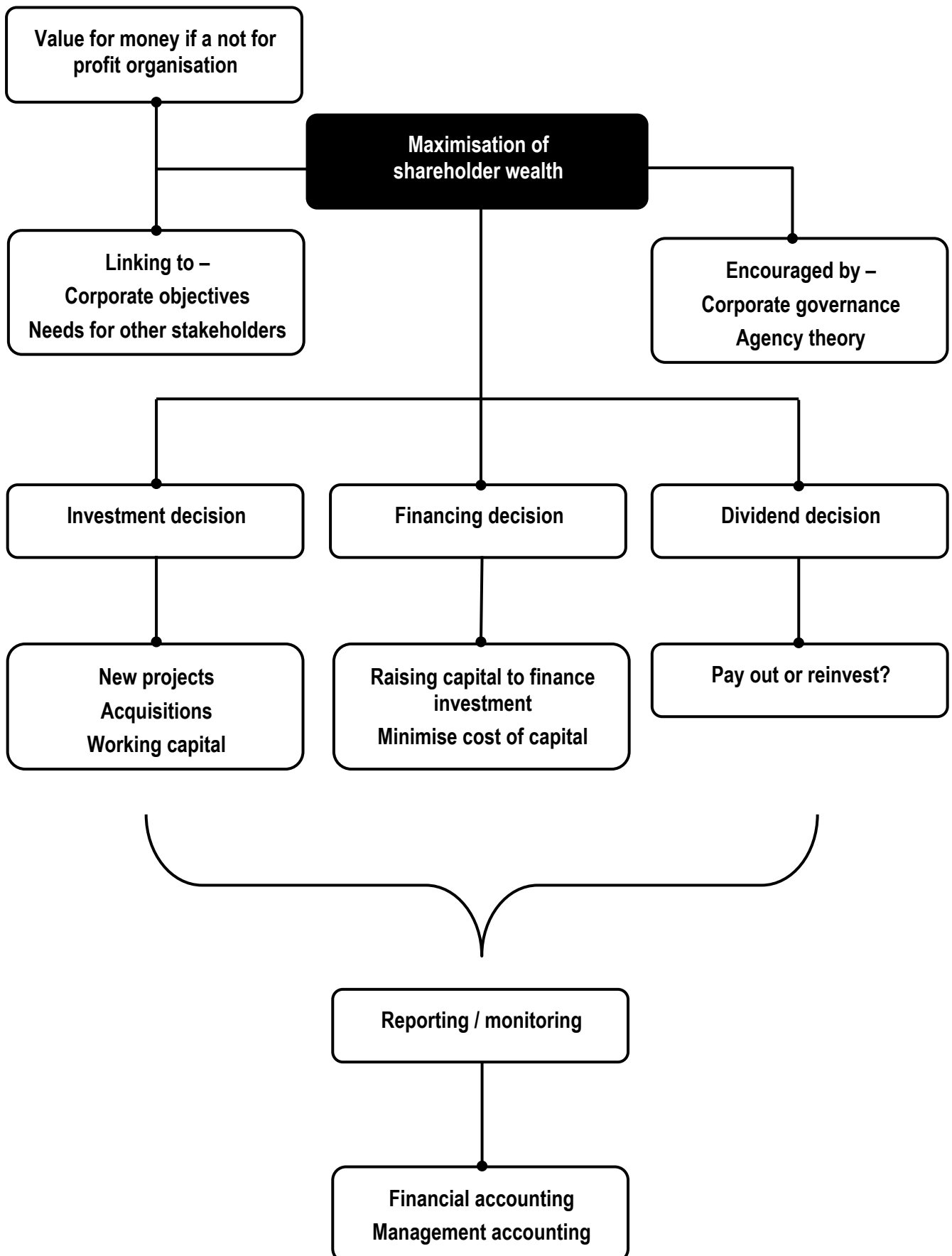
Qualification Context

The areas covered in this chapter will be developed in the professional level Advanced Financial Management paper (P4) which develops strategies to resolve stakeholder conflict, discusses international corporate governance systems, and ethical and environmental issues.

Business Context

In recent years there have been widespread concerns over the failure of senior management to manage their businesses in the best interest of their shareholders. In the UK this has led to the development of the Higgs Report and the Smith Report, which provide comprehensive **corporate governance** guidelines.

Overview



1 Financial objectives

- 1.1 Profit maximisation is often assumed to be the main objective of a business. However, shareholders sometimes express disappointment in a company's performance even when profits are rising; this suggests that profit is not sufficient as a business objective.

Lecture example 1

Exam standard for 8 marks

At the end of 2004 Ryanair made an announcement, as part of a stock market briefing, that their quarter 4 profits had risen by 30%. Immediately after the announcement the share price fell.

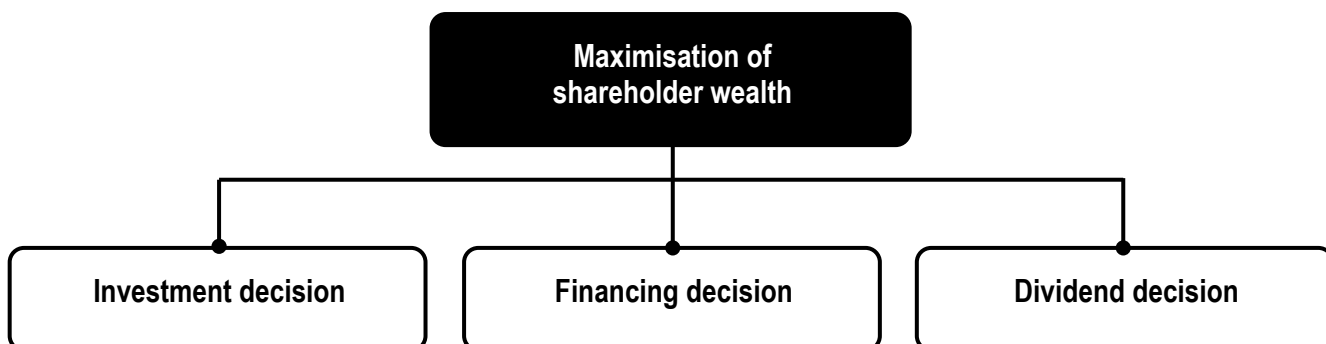
Required

- (a) Discuss why shareholders might be dissatisfied, despite higher profits? **(6 marks)**
- (b) What other measure could be used to assess Ryanair's performance? **(2 marks)**

Solution

-
- 1.2 For a profit making company, maximisation of shareholder wealth is assumed to be the financial objective. This is measured by the share price for a listed company, since the share price measure the value of all the dividends that investors expect to receive in the future.

2 A framework for maximising shareholder wealth



Investment decisions

2.1 **Investment decisions** (in projects, takeovers or working capital) need to be analysed to ensure that they are beneficial to the investor; this is covered in later chapters.



2.2 Investments can help a firm to achieve key **corporate objectives** such as market share, quality etc; these will be monitored by the management accounting department. Investments also help a firm to achieve key **financial objectives** such as improving **earnings per share**.

Sections 1.5, 2.1 – 2.2

Lecture example 2

Exam standard for 8 marks

Magneto plc has objectives to improve **earnings per share** and **dividends per share** by 10% pa.

£m	Last year	Current year
Profits before interest and tax	22,300	23,726
Interest	3,000	3,000
Tax	<u>5,790</u>	<u>6,218</u>
Profits after interest and tax	13,510	14,508
Preference dividends	200	200
Dividends	7,986	8,585
Retained earnings	5,324	5,723
No ordinary shares issued	100,000	100,000

Required

Evaluate whether Magneto has achieved its earnings & dividend per share objectives (6 marks)

Solution

Financing decision

- 2.3 **Financing decisions** mainly focus on how much debt a firm should use, and aim to minimise the **cost of capital**. This is covered in later chapters.

Dividend decision

- 2.4 The **dividend decision** is determined by how much a firm has decided to spend on investments and how much of the finance needed for this it has decided to raise externally, and is a good example of the **interrelationship** between these 3 decisions. The dividend decision is covered in chapter 13.



Case 1

3 Encouraging shareholder wealth maximisation

Agency theory

- 3.1 Why do managers (and other agents of the shareholders, such as employees) sometimes have different objectives?

Unless they are also owners of the business, managers may prefer to:

- (a) **Maximise short-term profits** – to trigger bonuses
 - (b) **Minimise dividends** – to free up funds to use within the business
 - (c) **Reduce risk by diversifying** – but shareholders can do this themselves
 - (d) **Boost their own pay & perks**
 - (e) **Avoid debt finance** – to avoid the need for careful cash management
- 3.2 The danger that managers may not act in the best interest of shareholders is referred to as the **agency problem**; it can be dealt with by **monitoring the actions of management** performance or by the **use of incentive schemes**, these are discussed below.

Corporate governance

- 3.3 In the UK **corporate governance** regulations have been designed to **monitor the actions of management**. Here are some of the main requirements:

Board of directors	Key committees
Separate MD & chairman Minimum 50% non executive directors Chairman independent Max 1 year notice period NEDs should be independent (3 year contract, no share options)	<u>Remuneration committee</u> <ul style="list-style-type: none"> • Pay & incentives of executive directors <u>Audit committee</u> <ul style="list-style-type: none"> • Risk management • NEDs only <u>Nomination committee</u> <ul style="list-style-type: none"> • Choice of new directors

Lecture example 3

Exam standard for 10 marks

ERTIN PLC

The following information relates to Ertin plc, a fictitious company incorporated in England.

Board of directors		<i>Basic salary</i> (£)	<i>Outstanding share options</i>
Chairman and Chief executive:	H A Mefford	210,000	500,000
Finance director:	Mrs F M Barnfield FCCA	120,000	100,000
Production director:	M L T Hojy	85,000	100,000
Other executive directors:	S Lompertas	75,000	50,000
	P T Figler	80,000	50,000
	Lord Gwumba	100,000	100,000
Non-executive directors:	Dr P Dorecton	20,000	60,000
	Mrs B D Mefford	25,000	100,000

The agenda of a board meeting of Ertin plc is as follows.

- Minutes of the last meeting
- Proposed investment in France
- Consideration of the remuneration of board members
- Proposal for the formation of an audit committee, with Mrs F M Barnfield, P T Figler and Dr P Dorecton as nominated committee members

Required

Identify weaknesses in the corporate governance of Ertin plc and describe what actions are required to comply with best practice.

Solution

3.4 There are two main types of **incentive schemes** that you need to be aware of:

- Performance related pay** – either against profit or a strategic performance measure
- Share options** – options to buy shares in say 3 years time at today's share price

4 Needs of other stakeholders



Section 3

- 4.1 Stakeholders are defined as 'any groups affected by the activities of the firm', they can be classified as:
- (a) **Internal** – staff, managers
 - (b) **Connected** – finance providers (shareholders, banks), customers, suppliers
 - (c) **External** – government, trade unions, pressure groups
- 4.2 Shareholders are normally the most important stakeholder group, but the interests of other stakeholders are often important too. To ensure that the interests of these other stakeholder groups are not neglected, **non financial objectives** can be used; here are some examples:
- (a) **Staff** – staff turnover
 - (b) **Bank** – gearing, interest cover
 - (c) **Customers** – liquidity ratios, complaints, market share
 - (d) **Suppliers** – payables (creditor) days
- 4.3 Note that there is often a **conflict between stakeholder objectives** eg profit to shareholders and pay rises to staff. This will require the development of **acceptable compromises** eg pay rises linked to productivity gains.

5 Measuring the achievement of stakeholder objectives

- 5.1 As indicated above, ratio analysis is often used by stakeholders to assess the performance of a company. Ratios are normally split into 4 categories :
- (a) **Profitability** – important to assess managerial performance
 - (b) **Debt** – important to banks
 - (c) **Liquidity** – important to suppliers and customers
 - (d) **Shareholder investor ratios** – important to shareholders
- 5.2 Profitability ratios include:

$$\text{ROCE} = \frac{\text{Profit from operations}}{\text{Capital employed}} \%$$

$$\text{ROCE} = \frac{\text{Profit from operations}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Capital employed}}$$

$$\text{Profit margin} \times \text{Asset turnover}$$

Note. 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 or asset turnover. If both profit margin and asset turnover are getting worse then the company has a profitability problem. Profit from operations = before interest and tax.

1: FINANCIAL MANAGEMENT & FINANCIAL OBJECTIVES

5.3 Debt ratios include:

$$\text{Gearing} = \frac{\text{Book value of debt}}{\text{Book value of equity}}$$

$$\text{Interest cover} = \frac{\text{Profit from operations}}{\text{Interest}}$$

5.4 Liquidity ratios include:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Acid Test ratio} = \frac{\text{Current assets (less inventory)}}{\text{Current liabilities}}$$

5.5 Shareholder investor ratios include:

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100$$

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

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

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 will be its share price and its P/E ratio.

Lecture example 4

Technique demonstration

Summary financial information for Robertson plc is given below, covering the last two years.

	<i>Previous year</i>	<i>Current year</i>
Turnover	43,800	48,000
Cost of sales	16,600	18,200
Salaries and Wages	12,600	12,900
Other costs	5,900	7,400
Profit before interest and tax	8,700	9,500
Interest	1,200	1,000
Tax	2,400	2,800
Profit after interest and tax	5,100	5,700
Dividends payable	2,000	2,200
Shareholders' funds	22,600	25,700
Long term debt	11,300	9,000
Number of shares in issue ('000)	9,000	9,000
P/E ratio (average for year)		
Robertson plc	17.0	18.0
Industry	18.0	18.2

Required

Review Robertson's performance using profit, debt, and shareholder investor ratios.

Solution

6 Not for profit organisations

Value for money



Section 6

6.1 Many organisations are not for profit, in this case a more appropriate objective is to make sure that the organisation is getting good **value for money**; economy, efficiency, effectiveness.

- (a) **Economy** – purchase of inputs of appropriate quality at minimum cost
- (b) **Efficiency** – use of these inputs to maximise output
- (c) **Effectiveness** – use of these inputs to achieves it goals (quality, speed of response)

7 Summary of Chapter 1

- 7.1 The prime financial objective of a profit making company is to **maximise shareholder wealth**, this can be measure by **total shareholder return** (dividend + share price increase).
- 7.2 To maximise shareholder wealth an organisation must take **sensible investment, financing and dividend decisions**.
- 7.3 To assess the impact of these decisions on shareholders and other stakeholders, it is important to monitor **profit, debt, liquidity and shareholder ratios**.
- 7.4 **Corporate governance** regulations and **incentive schemes** are used to check that shareholder wealth maximisation is taken seriously.

END OF CHAPTER

Economic environment for business

2

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify & explain the main macroeconomic targets.
- Define & discuss the role of fiscal, monetary, interest rate and exchange rate policies in achieving macroeconomic policy targets.
- Explain how government economic policy interacts with planning and decision making in business.
- Explain the need for and the interaction with planning and decision-making in business of:
 - (i) competition policy
 - (ii) government assistance for business
 - (iii) green policies
 - (iv) corporate governance regulation.

Exam Context

This chapter aims to build your knowledge of the financial environment, and is unlikely to feature as a major part of an exam question.

Qualification Context

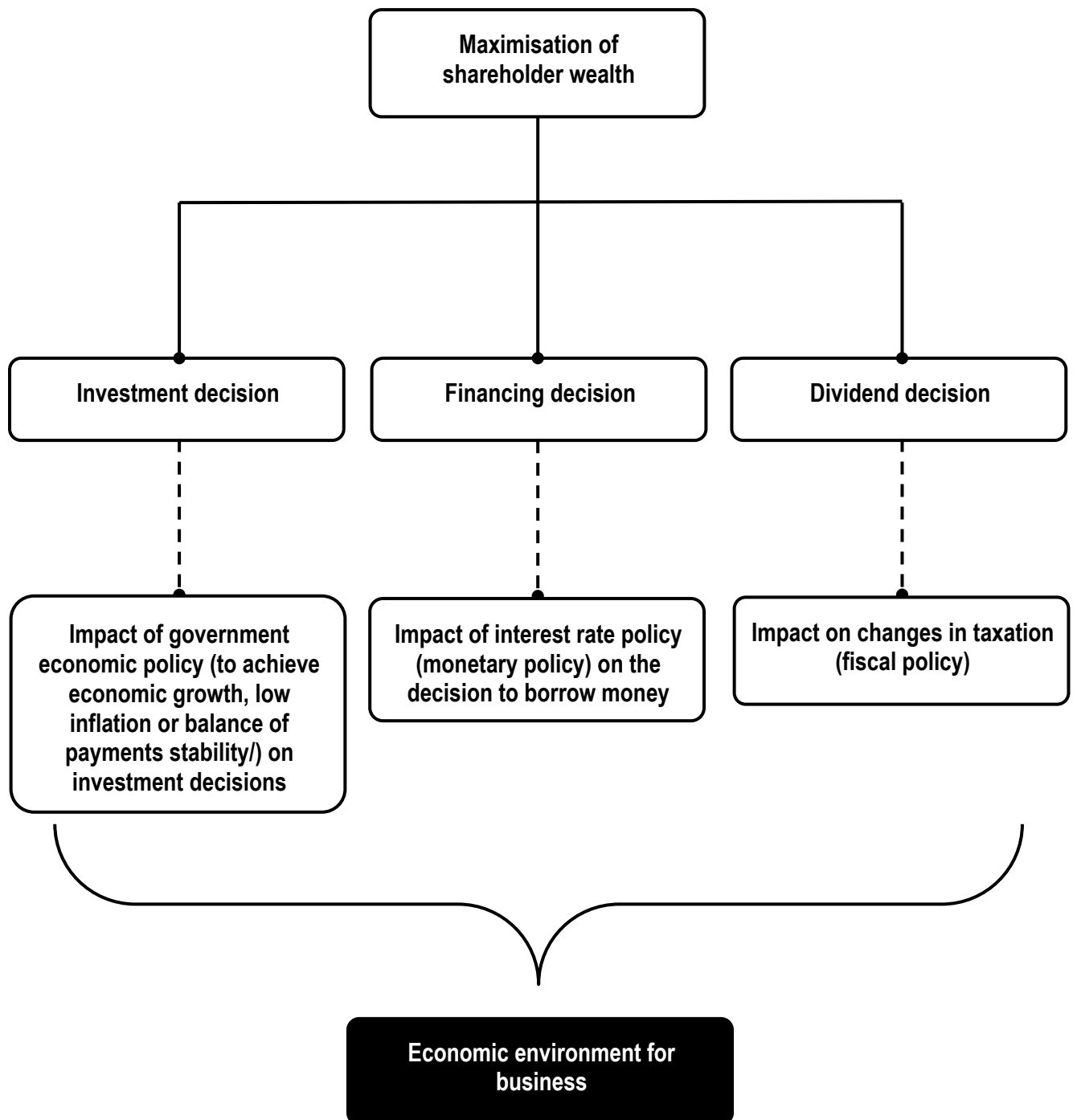
A general awareness of this topic will also be expected in P4 Advanced Financial Management.

Business Context

In 2007 the HM treasury website outlined 4 key UK economic objectives:

- 1 Improve the trend rate of growth over the economic cycle
- 2 Keep inflation at 2%
- 3 Keep public sector debt below 40% of GDP
- 4 Demonstrate progress on improving the employment rate

Overview



1 Introduction

- 1.1 This is not an exam that will test economic theories. You only need to be aware of what a government's general economic objectives are, and how this can **impact on a business**.
- 1.2 Government objectives for the economy are referred to as **macroeconomic objectives or targets**. The three main targets are usually:
- Economic growth & high employment
 - Low inflation
 - Balance of payments stability

2 Policies for achieving macroeconomic targets

Policy type	Definition
Fiscal policy	How much the government decides to spend, and to raise as tax revenue
Monetary policy	Control over the money supply and of interest rates
Exchange rate policy	If the value of the £ is forced down in value it makes imports more expensive and exports cheaper
Competition policy	Policies to encourage competition e.g. blocking takeovers
Green policy	Policies to encourage protection of the environment

3 Target 1 : achieving economic growth /high employment

Lecture example 1

Idea generation

Required

Identify the impact on a business of the policy changes outlined in the table below.

Policy	Impact on a business's planning & decision making
Fiscal policy – boosting spending – cutting taxes	
Monetary policy – increasing money supply – lower interest rates	
Exchange rate policy – lower exchange rates	

4 Target 2 : achieving low inflation

Lecture example 2

Idea generation

Required

Identify the impact on a business of the policy changes outlined in the table below.

Policy	Impact on a business's planning & decision making
Fiscal policy – cutting spending – raising taxes	
Monetary policy – higher interest rates	
Exchange rate policy – higher exchange rates	

5 Target 3 : achieving balance of payments stability

- 5.1 It is very difficult for a country to spend more on imports than it earns from exports for a sustained period of time. Where imports exceed exports this is often called a balance of payments deficit, and governments will often take action to correct this situation using the policies described below.

Lecture example 3

Idea generation

Required

Identify the impact on a business of the policy changes outlined in the table below.

Policy	Impact on a business's planning & decision making
Fiscal policy – cutting spending – raising taxes	
Monetary policy – higher interest rates	
Exchange rate policy – lower exchange rates	



Section 5

6 Other policies

6.1 Other policies include:

- (a) **Competition policy** – eg the Competition Commission prevents takeovers that are against the public interest
- (b) **Government assistance for business** – grants may be available to attract firms to invest in depressed areas
- (c) **Green policies** – may either threaten a business (eg tax on petrol) or create opportunities (eg subsidies for loft insulation)
- (d) **Corporate governance regulation** – see chapter 1

7 Summary of Chapter 2

7.1 Governments use **fiscal policy, monetary policy, and exchange rate policy** to achieve their main policy objectives of:

- (a) Economic growth & high employment
- (b) Low inflation
- (c) Balance of payment stability

7.2 Each of these policies will have an **impact** on a firm's **investment, financing and dividend policy decisions**.

2: ECONOMIC ENVIRONMENT FOR BUSINESS

END OF CHAPTER

Financial markets and institutions

3

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify the nature and role of money and capital markets, both national and international, in the UK financial system.
- Explain the role of financial intermediaries.
- Explain the functions of a stock market and a corporate bond market.
- Explain the nature and features of different securities in relation to the risk/return trade-off

Exam Context

Like chapter 2 this chapter aims to build your knowledge of the financial environment and is unlikely to feature as a major part of an exam question.

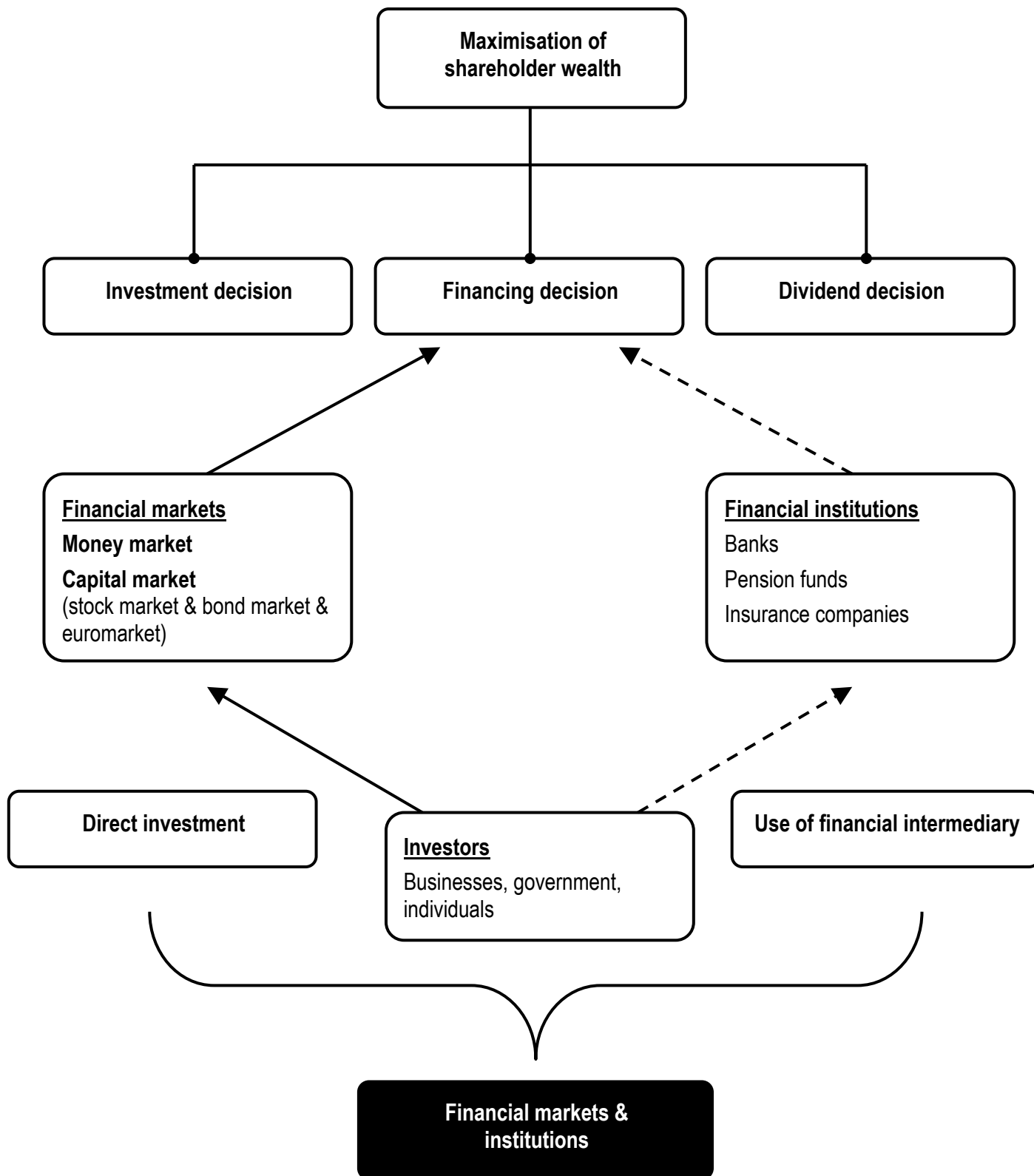
Qualification Context

The areas covered in this chapter will be developed in the professional level Advanced Financial Management paper (P4) which focuses on recent developments in money markets and capital markets.

Business Context

In 2005 Shell issued \$500m of three-year Eurobonds at a coupon rate of 4.75%, the deal was organised by Credit Suisse First Boston.

Overview



1 Introduction

- 1.1 When a firm is making its **financing decision** it has the choice of obtaining finance **directly** from investors through the **financial markets** or **indirectly** through **financial institutions** that they have deposited their money with; these financial institutions act as **financial intermediaries**.

2 Financial institutions

Types	Functions
Merchant banks	Provide large corporate loans, often syndicated. Manage investment portfolios for corporate clients.
Pension funds	Invest to meet future pension liabilities.
Insurance companies	Invest to meet future liabilities.

- 2.1 These financial institutions dominate share ownership, and also the provision of debt finance; because they are investing their clients money they are referred to as **financial intermediaries**.

3 Financial intermediaries

- 3.1 Financial intermediaries provide the following functions: (remember as **MAP**)

Functions	Description
Maturity transformation	A bank can make a 10-year loan (long-term) while still allowing its depositors to take money out whenever they want; so short-term deposits become long-term investments.
Aggregation of funds	A bank can aggregate lots of small amounts of money into a large loan.
Pooling losses	Any losses sustained from a bad debt will not impact directly on an individual depositor.

4 Financial markets

- 4.1 A financial market brings a firm into **direct** contact with its investors. The trend to borrowing directly from investors is sometimes called **disintermediation**.
- 4.2 Financial markets are split into those that provide short-term finance (**money markets**) and those that provide long-term finance (**capital markets**).

5 Money markets

5.1 If a company or a government needs to raise funds for the short-term, they can access the money markets and issue:

- Increasing risk to the investor ↓
- (a) Treasury bills (issued by governments)
 - (b) Certificates of deposit (issued by companies)
 - (c) Commercial paper (issued by companies with a high credit rating)
 - (d) Bills of exchange (company IOU signed by customer, may be 'accepted')

5.2 Higher risk investments require a higher return to be paid. **Commercial paper and bills of exchange are discussed in more detail later in the course.**

6 Capital markets

6.1 If a company needs to raise funds for the long-term, it can access the capital markets; this is a market on which the following are traded:

- Increasing risk to the investor ↓
- (a) Junk bonds (unsecured)
 - (b) Debentures / loan notes (secured on an asset or by covenants)
 - (c) Shares traded on the main Stock Market
 - (d) Shares in Alternative Investment Market

6.2 Higher risk investments require a higher return to be paid, so shares will give a higher return (and therefore cost more) than debentures. **Debentures & shares are covered in more detail later in the course.**

Lecture example 1

Idea generation

Required

What advantages are there to a firm of:

- (a) a listing on the main Stock Market
- (b) a listing on the Alternative Investment Market
- (c) issuing debentures

Solution

(a)

(b)

(c)

7 Euromarkets

7.1 In recent years a strong market has built up which allows large companies with excellent credit ratings to raise finance in a foreign currency. This market is organised by international commercial banks. The key features of Eurobonds are summarised below. This market is much bigger than the market for domestic bonds / debentures.

Advantages	Explanation
Cheap debt finance	Can be sold by investors, and a wide pool of investors share the risk
Unsecured, no covenants	Only issued by large companies with an excellent credit rating
Long-term debt in a foreign currency	Typically 5-15 years, normally in euros or dollars but possible in any currency

8 Summary of Chapter 3

- 8.1 When a firm is making its **financing decision** it has the choice of borrowing directly from investors through the **financial markets** (capital markets or money markets) or borrowing from them indirectly through **financial institutions** (merchant banks, pension funds)
- 8.2 Recent trends have seen the emergence of the **Euromarkets**, which allow companies with an excellent credit rating the ability to borrow in a variety of different currencies.
- 8.3 In any market, any **risks faced by investors mean that they will require a higher return**; this means that the cost of using equity is higher than the cost of using debentures. Cost of capital is discussed later in this course.

3: FINANCIAL MARKETS AND INSTITUTIONS

END OF CHAPTER

4

Working capital

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe the nature of working capital and identify its elements.
- Identify the objectives of working capital management in terms of liquidity and profitability, and discuss the conflict between them.
- Discuss the central role of working capital management in financial management.
- Explain the cash operating cycle and the role of accounts payable & accounts receivable
- Explain and apply relevant accounting ratios including current ratio, quick ratio, inventory turnover ratio, average collection period, average payables period, sales/net working capital ratio.

Exam Context

This short chapter is very important and could easily feature as a significant part of a compulsory 25-mark question.

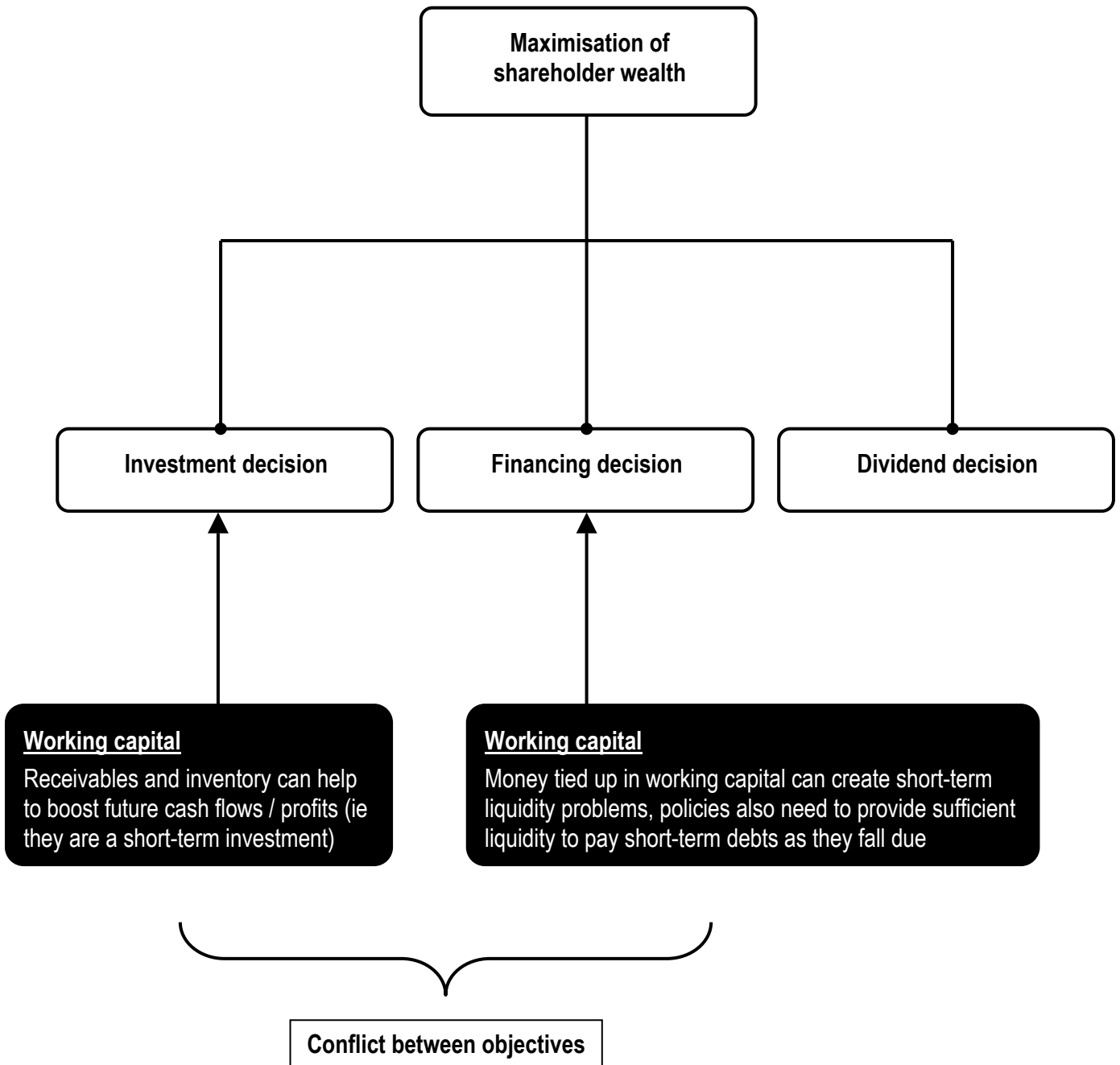
Qualification Context

You will have seen some of the ratios covered in this chapter if you have completed paper F7 Financial Reporting.

Business Context

Jarvis plc, a major construction company worth £827m in 2004, expanded its public sector business too quickly, often winning contracts that it had little expertise in and could not afford. By 2007 the company was worth £26m and was owned by its creditor banks. Jarvis had been overtrading.

Overview



1 Working capital

1.1 Working capital is the value of current assets less the value of current liabilities.

Key terms	Definition
Current assets	Cash, inventory, receivables.
Current liabilities	Payables, loans falling due within 1 year, overdraft.

2 Objectives of working capital management

2.1 The two main objectives of working capital management are:

- (a) To increase the **profits** of a business
- (b) To provide sufficient **liquidity** to meet short term obligations as they fall due

Lecture example 1

Idea generation

Required

How can investment in higher levels of inventory or receivables affect

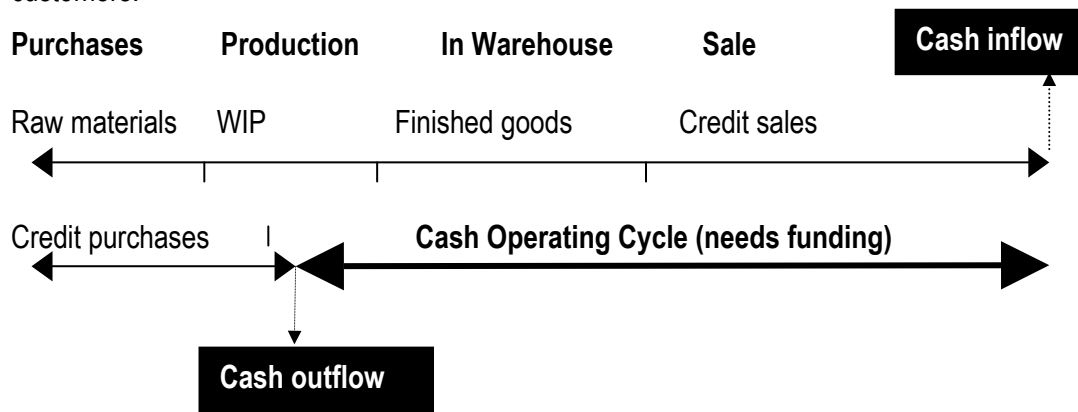
- (a) profits ?
- (b) liquidity ?

Solution

2.2 There is often a **conflict** between the two main objectives of working capital management; ie management need to carefully consider the level of investment in working capital and to consider the **impact** that this is having on a company's liquidity position; an overview of this is given by the **cash operating cycle**.

3 Overview – cash operating cycle

3.1 The cash operating cycle (also known as the working capital cycle) is the period of time between the **outflow** of cash to pay for raw materials and the **inflow** of cash from customers.



Section 3

3.2 The optimal length of the cycle depends on the industry.

Calculating the cash operating cycle

$$1 \quad \text{Av. collection period} \quad \frac{\text{Re ceivables}}{\text{(credit) sales}} \quad \times 365 \quad = \quad \text{days}$$

2 Inventory days

$$(a) \quad \text{Finished goods} \quad \frac{\text{Finished goods}}{\text{Cost of sales}} \quad \times 365 \quad = \quad \text{days}$$

$$(b) \quad \text{W.I.P} \quad \frac{\text{WIP}}{\text{Cost of production}} \quad \times 365 \quad = \quad \text{days}$$

$$(c) \quad \text{Raw material} \quad \frac{\text{Raw material}}{\text{Raw material purchases}} \quad \times 365 \quad = \quad \text{days}$$

$$3 \quad \text{Av. payables period} \quad = \quad \frac{\text{Payables}}{\text{(credit) purchases}} \quad \times 365 \quad = \quad \text{(days)}$$

Cash operating cycle = _____

3.3 By comparing the cash operating cycle from one period to the next or one company to another it should be possible to identify potential deficiencies.

Lecture example 2

Technique demonstration

The table below gives information extracted from the annual accounts of Management plc for the past year.

Management plc – Extracts from annual accounts

	Year 1
Inventory: raw materials	£108,000
work in progress	£ 75,600
finished goods	£ 86,400
Purchases of raw materials	£518,400
Cost of production	£675,000
Cost of goods sold	£756,000
Sales	£864,000
Receivables	£172,800
Payables	£ 86,400

Required

Calculate the length of the working capital cycle (assuming 365 days in the year).

Solution

1	Av. collection period	$\frac{\text{Receivables}}{\text{(credit) sales}}$	$\times 365$	=	days
2	Inventory days				
	(a) Finished goods	$\frac{\text{Finished goods}}{\text{Cost of sales}}$	$\times 365$	=	days
	(b) W.I.P	$\frac{\text{WIP}}{\text{Cost of production}}$	$\times 365$	=	days
	(c) Raw material	$\frac{\text{Raw material}}{\text{Raw material purchases}}$	$\times 365$	=	days
3	Av. payables period	$= \frac{\text{Payables}}{\text{(credit) purchases}}$	$\times 365$	=	(days)
					<hr/>
		Cash operating cycle =			<hr/> <hr/>

4 Forecasting cash flow needs

- 4.1 The cash operating cycle can be used to determine the amount of cash needed at any sales level, and to identify the possibility of a cash shortfall if sales rise too rapidly. Referring back to the previous lecture example, we can identify a relationship between sales and cash required by using the **sales / net working capital ratio**.

Management plc – Extracts from annual accounts

	<i>Year 1</i>
Sales	£864,000
Inventory: raw materials	£108,000
work in progress	£ 75,600
finished goods	£ 86,400
Receivables	£172,800
Payables	<u>(£ 86,400)</u>
Net working capital	£356,400

$$\text{Sales / net working capital ratio} = 864,000 / 356,400 = \underline{\underline{2.42}}$$

Lecture example 3

Technique demonstration

Required

What level of net working capital (ie cash) is needed to support sales, if sales rise by 30% over the next year?

Solution

-
- 4.2 If a business fails to plan how to supply its forecast level of cash flow needs, it will be in danger of **overtrading**. Overtrading is where a business has inadequate cash to support its level of sales. To deal with this risk a business must either:
- (a) Plan the introduction of new long-term capital
 - (b) Improve working capital management
 - (c) Reduce business activity

5 Summary of Chapter 4

- 5.1 The two main objectives of working capital management are:
- (a) To increase the **profits** of a business
 - (b) To provide sufficient **liquidity** to meet short term obligations as they fall due
- 5.2 There is often a **conflict** between the two main objectives of working capital management; ie management need to carefully consider the level of investment in working capital and to consider the impact that this is having on a company's liquidity position; an overview of this is given by the **cash operating cycle**.
- 5.3 The cash operating cycle can be used to determine the amount of cash needed at any sales level, and to identify the possibility of a cash shortfall if sales rise too rapidly using the **sales / net working capital ratio**.
- 5.4 By comparing the cash operating cycle from one period to the next or one company to another it should be possible to identify potential deficiencies.
- 5.5 When considering techniques to reduce the operating cycle time, it is important that a review of any proposed action is taken to ensure the expected benefits exceed the expected costs; this is **analysed in the next chapter**.

4: WORKING CAPITAL

END OF CHAPTER

Managing working capital

5

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Discuss, apply and evaluate the use of relevant techniques in managing inventory, including the Economic Order Quantity model and Just-in-Time techniques.
- Discuss and evaluate the use of relevant techniques in managing accounts receivable, including:
 - (i) assessing creditworthiness
 - (ii) managing accounts receivable
 - (iii) collecting amounts owing
 - (iv) offering early settlement discounts
 - (v) using factoring and invoice discounting
 - (vi) managing foreign accounts receivable
- Discuss and apply the use of relevant techniques in managing accounts payable, including:
 - (i) using credit effectively
 - (ii) evaluating the benefits of discounts for early settlement and bulk discounts
 - (iii) managing foreign accounts payable

Exam Context

This chapter was tested for 13 marks in the pilot paper.

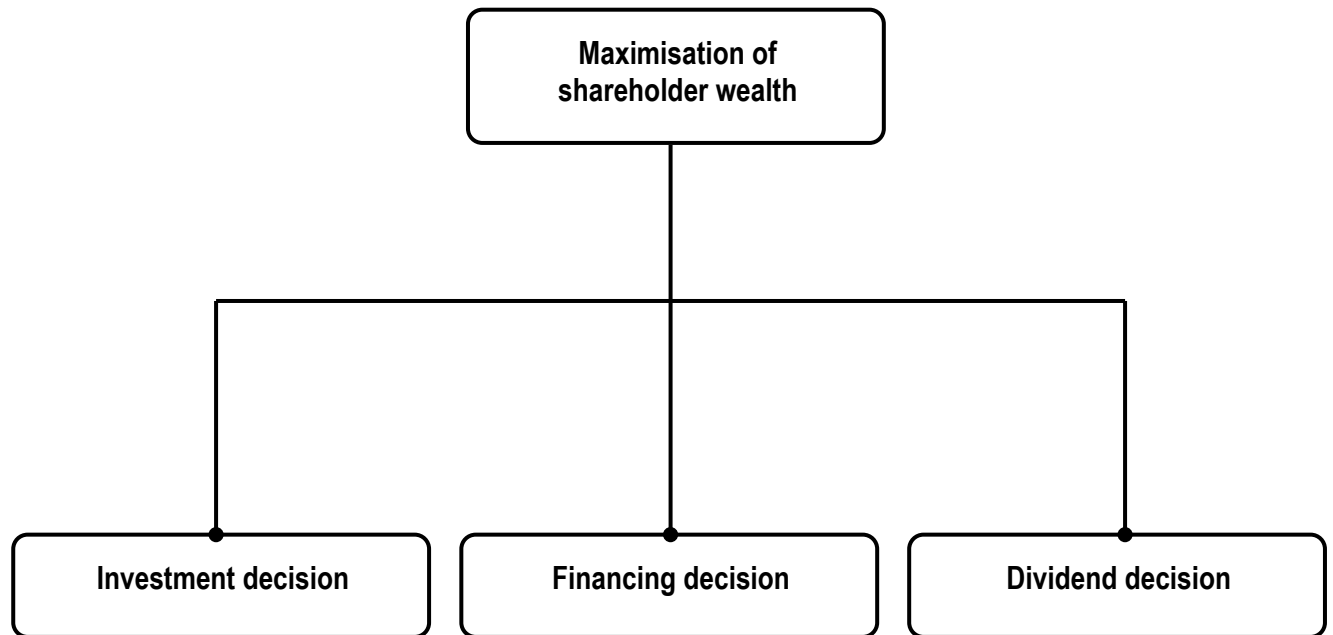
Qualification Context

You will have seen the EOQ model before, if you have completed paper F2 Management Accounting.

Business Context

Failure to manage inventory in 2006, was a major reason for Chrysler's losses of \$1.5bn in the 3rd quarter of 2006.

Overview



Managing working capital

Higher inventory is an investment that may bring benefits to a company but will result in higher holding costs.

Higher receivables can be an investment that help to boost future cash flows but can cause higher finance (eg overdraft) costs.

1 Managing inventory (stock)

- 1.1 Inventory management has traditionally been about **minimising the total cost of inventory** without running the risk of stock-outs.
- 1.2 The **inventory days** ratio (see chapter 4) gives an overview of a company's overall inventory position and is a useful method of monitoring a company's overall stock position; but major companies may well have thousands of items in stock, and will want to calculate how much stock to hold of **each individual item**. A simple stock classification system called **an ABC system** is often used to achieve this.
- A** – high value stock items, requiring careful stock control using sophisticated methods such as the **EOQ method** discussed below with regular review and control
- B** – medium value stock items, as above but with less frequent review
- C** – low value stock items, aim to keep a **continuous availability**

Economic order quantity model

- 1.3 The level of inventory that minimises costs can be established by the economic order quantity model. This model analyses how to minimise the total stock related costs of a company. Stock related costs are:
- (a) **Holding costs**
- (i) Warehouse
 - (ii) Insurance
 - (iii) Obsolescence
 - (iv) Opportunity cost of capital
- (b) **Ordering costs** – admin & delivery costs.
- 1.4 **EOQ terms**
- D = Annual demand in units
 - Co = Cost of placing an order
 - Ch = Annual cost of holding one unit in stock
 - P = Purchase price per unit
 - Q = Number of units ordered.

1.5 Quantifying the costs of holding inventory:

(a) **Holding Cost**

Q is the initial order quantity at the start of a period, and stock is assumed to run down to 0 so average stock is $Q/2$.

$$Ch \times Q/2$$

(b) **Ordering Cost**

D is the level of demand, and Q is the initial order quantity, so D/Q is the number of orders placed during the year.

$$Co \times D/Q$$

5: MANAGING WORKING CAPITAL

1.6 EOQ formula

$$\text{Economic Order Quantity} = \text{EOQ} = \sqrt{\frac{2CoD}{Ch}}$$

(given in exam)

This formula gives the ideal order quantity, but the **stock level** that results from this is **Q/2**. Q is ideal because it will minimise the **total** annual stock related costs (holding + ordering).

Lecture example 1

Technique demonstration

Demand is 150 units per month
Purchase cost per unit £25
Fixed order cost £32
Holding cost 18% p.a. of stock value.

Required

- (i) Calculate the economic order quantity.
- (ii) Calculate total cost at the EOQ.

Solution

Discounts

- 1.7 Discounts may be available if the order quantity is above a certain size. Thus this needs to be considered in determining the best order quantity. The following approach should be used:
- (a) Calculate EOQ in normal way
 - (b) Calculate annual costs using EOQ
 - (c) Calculate annual costs at the lower boundary of each discount above the EOQ
 - (d) Select order quantity which minimises costs.

Lecture example 2

Technique demonstration

Required

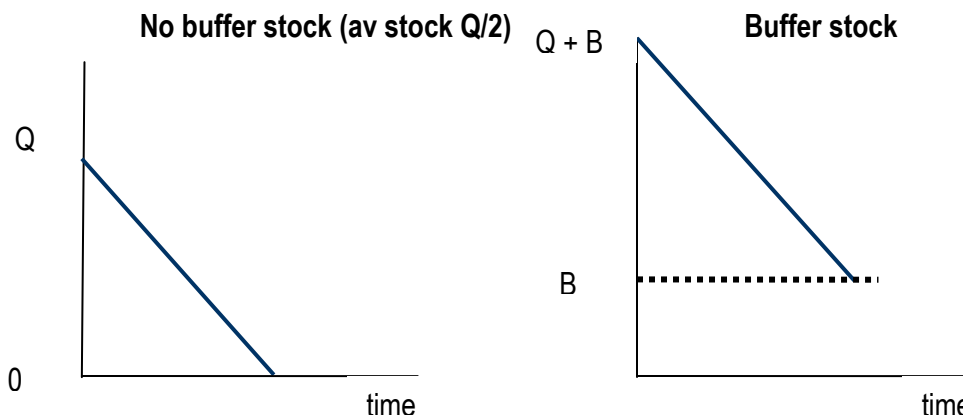
Using the same information given in lecture example 1 calculate the minimum total cost assuming the following discount applies:

- Discount of 1% given on orders of 150 and over
- Discount of 2% given on orders of 300 and over
- Discount of 4% given on orders of 800 and over.

Solution

5: MANAGING WORKING CAPITAL

- 1.8 The simplified version of the EOQ model ignores the delay between ordering and receiving the order from the supplier; in reality there is a **need for buffer stock** to deal with this delay.



The expected usage during the lead time requires buffer stock (**B**) to be held, and the **average stock level becomes $B + Q/2$** .



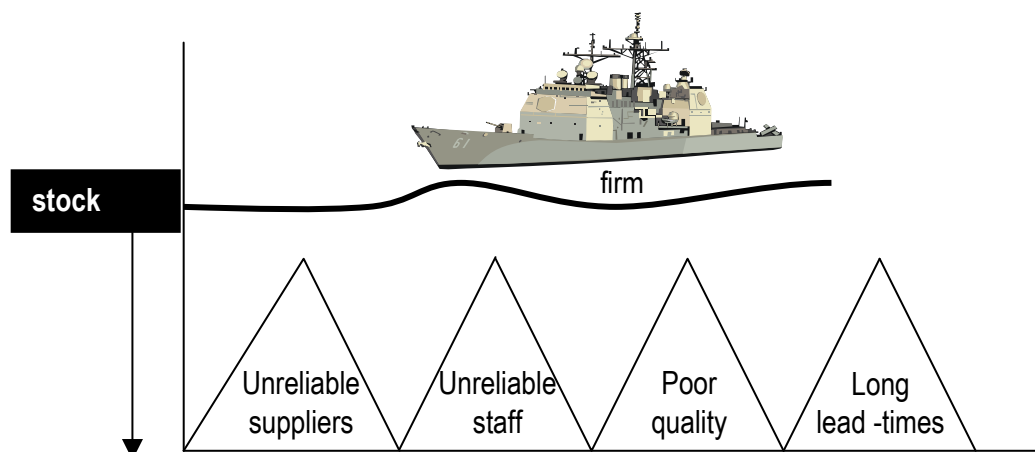
Q2

- 1.9 The drawbacks of the EOQ model are that it:

- assumes 0 lead times, and 0 bulk purchase discounts – although these can be adjusted for as shown above
- ignores the possibility of supplier shortages or price rises
- ignores **fluctuations in demand**
- ignores the **benefit** of holding stock to customers (choice, short lead times)
- ignores the **hidden costs** of holding stock (see Just-in-time below)

JIT (just-in-time)

- 1.10 JIT is a philosophy which involves the elimination of inventory. According to JIT, inventory allows a firm to compensate for inefficient processes; its failure to deal with its inefficient processes are seen as **hidden costs**. This is often illustrated as a ship diagram.



- 1.11 Lowering the stock level forces a company to hit the rocks ie to deal with its inefficient processes, leading to:
- (a) Faster / high quality suppliers
 - (b) More motivated staff who care about quality
 - (c) Faster delivery of high quality products
 - (d) Cost savings from carrying lower stock

2 Managing receivables (debtors)

Policy formulation

- 2.1 The decision to **offer credit** can be viewed as an **investment decision**, resulting in higher profits. For many businesses offering generous payment terms to customers is essential in order to be competitive.

Lecture example 3

Exam standard question for 6 marks

Greedy Ltd is considering a proposal to change its credit policy from allowing debtors credit of 2 months to credit of 3 months. Sales are currently £600,000 p.a. and as a result of the proposed change will increase by 15%. The contribution/ sales ratio is 20% and the cost of capital is 10%.

Required

Should the proposed change be made?

Solution

Framework for managing receivables

- 2.2 To keep control over the level of the level of debtors it is important to have an effective debtors policy; this will involve:

- ↓
- (a) A credit analysis system
 - (b) A credit control system
 - (c) A debt collection system

Credit analysis system

- 2.3 Before offering credit to particular customer, it is important to **analyse the risk** of trading with that customer by asking for **bank references and trade references**. A **credit rating agency** will also provide details on a customer's trading history, debt levels and payment performance.

Credit control system

- 2.4 After credit analysis, a decision will be taken on the **credit limit** to be offered. It is important that this is not exceeded without senior management approval. Credit limits should also be regularly reviewed.

Debt collection system

- 2.5 On a regular basis a company should:
- (a) Prepare an aged listing of debtors
 - (b) Issue regular statements and reminders
 - (c) Have clear procedures for taking legal action or charging interest
 - (d) Consider the use of a debt factor (considered later)
 - (e) Analyse whether to use cash discounts to encourage early payment

Lecture example 4

Exam standard question for 6 marks

Pips Limited is considering offering a cash settlement discount to its customers. Currently its annual sales are \$10m and its normal payment terms are 90 days. Customers will be able to take a 2% discount for payments after 10 days. Pips anticipates that 20% of customers will take the discount.

Currently Pips has an overdraft on which it is paying 10% interest.

Required

Assess whether Pips should offer the discount.

Solution

Managing foreign accounts receivable

2.6 Exporting carries a high risk of slow or non payment by customers, and requires closer control, this can involve :

(a) **Letters of credit**

The customer's **bank** guarantees it will pay the invoice after delivery of the goods.

(b) **Bills of exchange**

An IOU signed by the customer. Until it is paid, shipping documents that transfer ownership to the customer are withheld; it can also be sold to raise finance

(c) **Invoice discounting**

The sale of selected invoices to a debt factor

(d) **Export factoring**

Factors provide 3 main services (at a cost): invoicing & debt collection, bad debt insurance (**non-recourse**), and cash advances in advance of the debtor paying.

Advantages	Disadvantages
(i) saving in staff time/administration costs	(i) can be expensive
(ii) providing a new source of finance to help with short term liquidity	(ii) possible loss of customer goodwill if too aggressive at chasing for payment
(iii) supports a business when sales are rising (unlike a bank overdraft)	(iii) sometimes viewed as an indication that the company is in financial difficulty

Lecture example 5

Exam standard question for 9 marks

A company with export sales of \$480m pa has an average collection period of 3 months, bad debts are 2%. A factoring company will provide **non-recourse** factoring for a fee of 5% of revenue. As a result of this, administration savings will be made of £8m p.a. and the credit period will remain fall to 2 months.

The company has a cost of capital of 10%, and the exchange rate is currently 2 \$/£.

Required

Assess whether the factor should be used.



Q1

Solution

3 Managing trade payables

- 3.1 It is important that when suppliers offer credit invoices are not paid early; an exception to this is when early payment discounts are offered.

Lecture example 6

Exam standard question for 6 marks

Pips Limited has been offered a discount of 2.5% for an early settlement by a major supplier from which it purchases goods worth £1,000,000 each year. Pip's normal payment terms are 30 days, early settlement requires the payment to be made within 10 days.

Currently Pips has an overdraft on which it is paying 10% interest.

Required

Assess whether Pips should take the discount and settle the invoice after 10 days.

Solution

-
- 3.2 It is also important to be careful that when suppliers offer credit, **invoices are not paid so late** that this endangers the firm's long term relationship with the supplier. The benefits of a long term relationship include:
- (a) Better quality
 - (b) Lower stock
 - (c) Lower switching costs

Managing foreign accounts payable

- 3.3 To avoid the risk of the £ weakening by the time an invoice is due to be paid, companies sometimes pay into an overseas bank account **today** and then let the cash earn some interest so that they can pay off the invoice in the future.

4 Summary of Chapter 5

- 4.1 The economic order quantity model attempts to **manage inventory** costs. This model ignores the hidden costs of stock. JIT suggests that inventory should be driven down to as close to zero as possible.
- 4.2 **Receivables management** requires a 4 step approach:
- (a) A receivables policy
 - (b) A credit analysis system
 - (c) A credit control system
 - (d) A debt collection system
- 4.3 Effective **payables management** involves controlling the timing of the payment of invoices to exploit attractive early payment discounts, and the credit period offered by suppliers; but ensuring that invoices are not paid so late as to endanger long-term supplier relationships.

END OF CHAPTER

Working capital finance

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Explain the various reasons for holding cash and discuss and apply the use of relevant techniques in managing cash, including:
 - (i) preparing cash flow forecasts to determine future cash flows and cash balances
 - (ii) assessing the benefits of centralised treasury management and cash control
 - (iii) cash management models such as the Baumol model and the Miller-Orr model
 - (iv) short-term investments
- Calculate the level of working capital investment in current assets and discuss the key factors determining this level, including:
 - (i) the length of the working capital cycle and the terms of trade
 - (ii) an organisation's policy on the level of investment in current assets
 - (iii) the industry in which the organisation operates
- Describe and discuss the key factors determining working capital funding strategies, including:
 - (i) the distinction between permanent and fluctuating current assets
 - (ii) the relative cost and risk of short-and long-term finance
 - (iii) the matching principle
 - (iv) the relative costs and benefits of aggressive, conservative and matching funding policies
 - (v) management attitudes to risk, previous funding decisions and organisation size

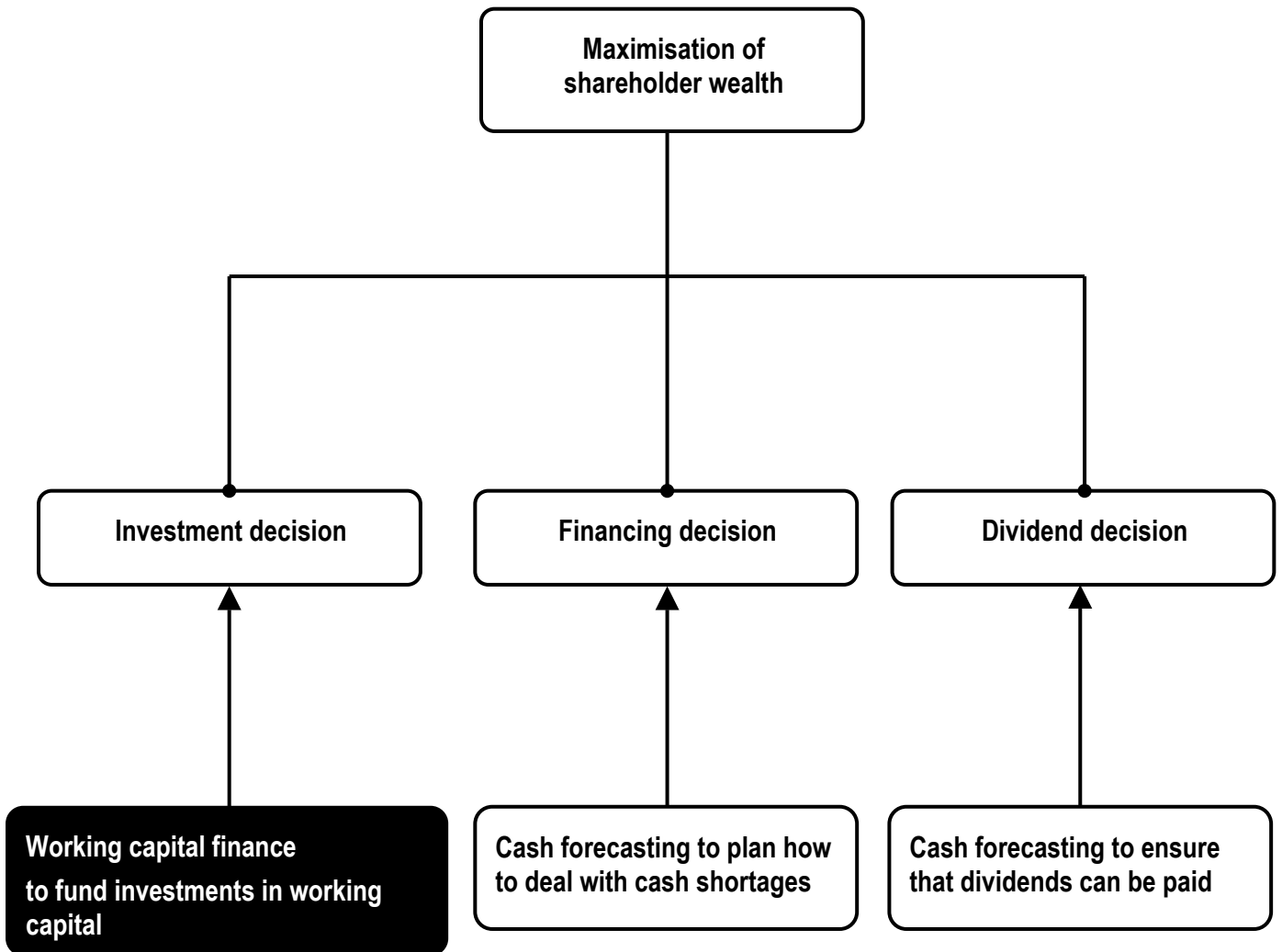
Exam Context

Working capital funding policy and the Miller-Orr model were tested for 13 marks in the pilot paper.

Qualification Context

Treasury management is developed in P4 Advanced Financial Management.

Overview



1 The management of cash



Section 3

- 1.1 As a business grows, its working capital funding needs to also grow. A key question for a **treasury department** is how to fund this working capital growth. This is complicated by the fact that some current assets are **permanent** (eg a certain amount of stock and debtors are always present) and some are **fluctuating** (due to seasonal fluctuations in business).
- 1.2 In this chapter we look at how to:
- forecast cash needs
 - manage (forecast) cash surpluses
 - manage (forecast) cash shortages

2 Forecasting cash needs



Section 1.1

- 2.1 The main reason for holding cash is so that a business can meet its regular commitments, this is sometime called the '**transactions motive**'. The amount of cash that a business needs to keep in its bank account can be assessed in one of two ways:
- a cash flow forecast
 - a mathematical model of a business's cash flows

3 Cash flow forecasting

- 3.1 This is the most important tool in short-term cash flow planning. Cash flow forecasts will be prepared continuously during the year and will allow a business to plan how to deal with expected cash flow surpluses or shortages.
- 3.2 You will need to produce forecasts in the exam that reflect:
- the expected *timing* of receipts and payments of cash during the period
 - that not all items in the income statement will be in the cash budget eg depreciation

Cash Forecast for the Three Months Ended 31 March 20X1

	January	February	March
Cash receipts			
Sales receipts (W1)	X	X	X
Issue of shares		X	
Cash payments			
Purchase payments (W2)	X	X	X
Dividends/Taxes	X		
Purchase of non-current assets			X
Wages	<u>X</u>	<u>X</u>	<u>X</u>
Cash surplus/deficit for month	<u>X</u>	(X)	<u>X</u>
Cash balance, beginning	<u>X</u>	<u>X</u>	(X)
Cash balance, ending	<u>X</u>	(X)	<u>X</u>

Lecture example 1

Exam standard question for 12 marks

Ben is a wholesaler of motorcycle helmets, it is 1 January 20X2.

Credit sales in the last quarter of 20X1 were as follows:

	<i>Helmets</i>
October	2,000
November	2,000
December	2,500

His credit sales in the first quarter will be as follows:

	<i>Helmets</i>
January	3,000
February	5,000
March	4,500

Customers are given 60 days' credit and the average selling price is £10. His biggest customer, Mickster, is given a 2% discount for paying cash when the sale is made. Mickster plc is planning to buy 150 helmets in January and 250 Helmets in March. The sales to Mickster are in addition to those credit sales stated above.

Purchases (an average of 30 days credit) are £4 per helmet. Ben plans to buy in the helmets a month in advance of selling them. Total overheads are £2,000 per month, this includes £400 depreciation and wages of £1,000. All other overheads are paid for after a credit period of 30 days.

Ben plans to inject a further £5,000 of his own money into the business in March to help to buy non-current assets for £24,000. These assets will be depreciated over 5 years.

Required

Prepare a cash flow forecast for the 1st quarter of 20X2; the opening balance is negative £4,550.

Solution

4 Mathematical models

- 4.1 The cash flow forecast calculates the cash needed for a period eg £1.5m might be needed to fund forecast cash outflows expected by a division in a particular year. Some businesses pay the expenses of a particular department or division from a separate sub account. If so, it is not sensible to deposit the £1.5m into this sub-account **at the start** of the year because this will lead to a loss of interest earned from a high interest account or from securities. Instead, it is better to **gradually** transfer the funds as they are needed.
- 4.2 How much to transfer can be calculated by using mathematical models, there are two mathematical models that you need to be aware of:
- (a) Baumol's model
 - (b) Miller-Orr's model

Baumol model

- 4.3 The Baumol Model is an adaptation of the EOQ Model to manage cash. It assumes that cash is used at a steady rate during the year, which will often not be the case.

$$\text{The Economic Order =} \quad \sqrt{\frac{2 \times \text{Annual cash required} \times \text{Cost of ordering cash}}{\text{Quantity of Cash} \quad \text{Net interest cost of holding cash}}}$$

Lecture example 2

Exam standard question for 9 marks

A division requires £1.5m per year; cash use is constant throughout the year.

Required

What is the optimal economic quantity of cash transfer into this division's sub-account if ordering costs are £150 per transaction, and the interest lost on the funds transferred is 4.5% pa?

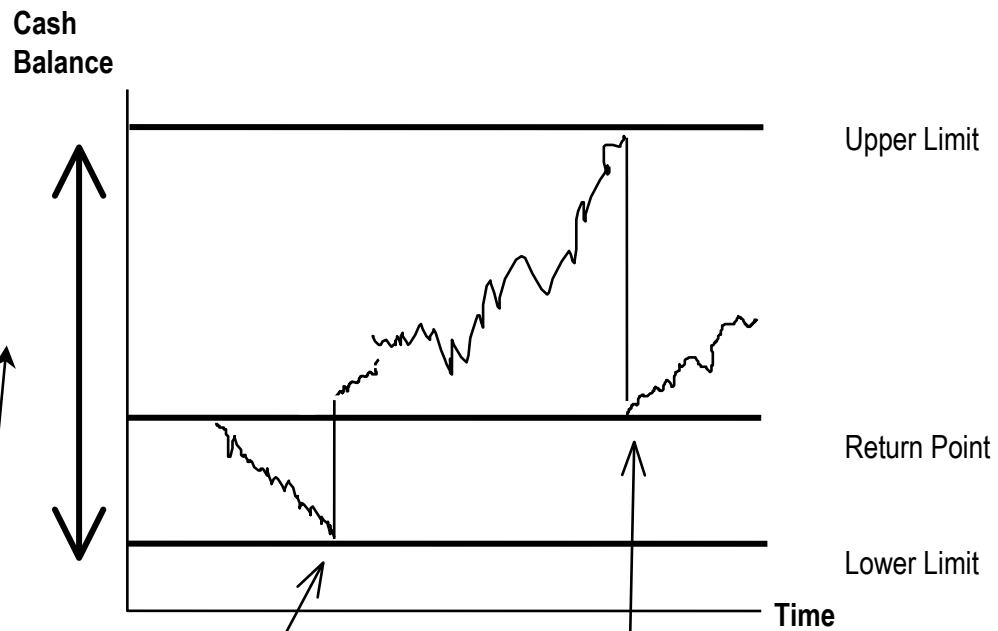
Solution

Miller-Orr model

4.4 Another cash management model is the Miller Orr Model which recognises that cash inflows and outflows **vary** considerably on a day to day basis (unlike the Baumol model). This is clearly more realistic.

It works as follows:

- (a) A safety stock (lower limit) of cash is decided upon.
- (b) A statistical calculation is completed taking into account the variation in cash flow to agree an allowable range or **spread** of cash flow fluctuations.
- (c) Using this **spread**, an upper limit of cash balances is agreed.
- (d) The cash balance is managed to ensure that the balance at any point in time is kept between the lower and upper limits.



The difference between the upper & the lower limits is called the spread, calculated as (formula given)

$$\text{Spread} = 3 \left(\frac{3}{4} \times \frac{\text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate}} \right)^{\frac{1}{3}}$$

Lecture example 3

Exam standard question for 8 marks

If a company must maintain a minimum cash balance of £8,000, and the variance of its daily cash flows is £4m (ie std deviation £2,000). The cost of buying/ selling securities is £50 & the daily interest rate is 0.025 %.

Required

Calculate the spread, the upper limit (max amount of cash needed) & the return point (target level).

Solution

6: WORKING CAPITAL FINANCE

- 4.5 This model assumes that cash flows are unpredictable, in fact an experienced financial controller should be able to predict the cash flows so enabling a company to operate on lower cash levels than the Miller-Orr model calculates.

5 Managing cash flow surpluses

- 5.1 Most companies would want to avoid risk on short-term cash surpluses that are invested because the funds will be needed in the near future. Desirable investments would generally be **low risk** and **liquid**. These could include:

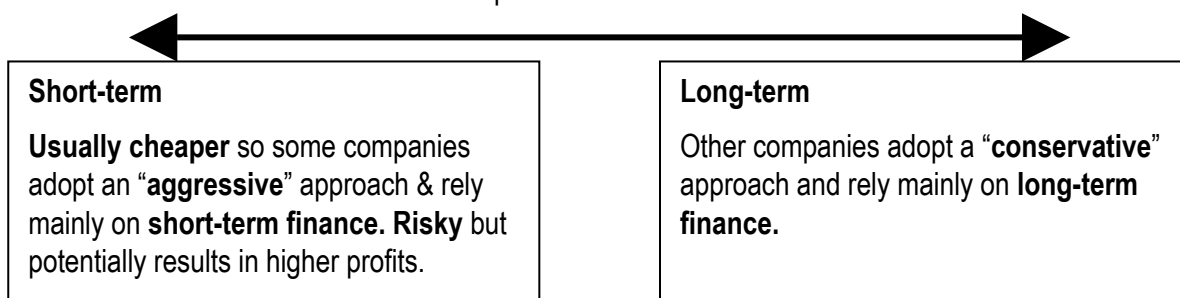
Investments	Definition
Treasury bills	Short-term government IOUs, can be sold when needed.
Term deposits	Fixed period deposits.
Certificates of deposit	Issued by banks, entitle the holder to interest + principal, can be sold when needed.
Commercial paper	Short-term IOUs issued by companies, unsecured.

- 5.2 Long term cash surpluses may be used to fund:
- (a) **Investments** – new projects or acquisitions
 - (b) **Financing** – repay debt, buy back shares
 - (c) **Dividends**

6 Managing cash flow shortages

Working capital funding policy

- 6.1 Cash shortages can be funded by either long-term finance or short-term borrowings; these will be covered in detail in later chapters.



- 6.2 In between these extremes is a **matching policy** which uses **short-term finance to fund fluctuating current assets and long term finance to fund permanent current assets and non-current assets**.
- 6.3 The likelihood of a company **adopting an aggressive approach depends on:**
- (a) Management attitude to risk
 - (b) Strength of relationship with the bank providing an overdraft
 - (c) Ability to raise long-term finance

7 Summary of Chapter 6

- 7.1 As a business grows, its working capital funding needs also grow. To ensure that a business has sufficient cash to fund its needs, it is important that a business:
- (a) establishes its **working capital funding** policy and
 - (b) conducts regular cash flow forecasting to allow early prediction of, and planning for, cash flow surpluses or shortages

END OF CHAPTER

7

Investment decision

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Distinguish between capital and revenue expenditure, and between non-current assets and working capital investment.
- Explain the role of investment appraisal in the capital budgeting process.
- Discuss the stages of the capital budgeting process.
- Identify and calculate the relevant cash flows for investment projects.
- Calculate the payback period and discuss the usefulness of payback as an investment appraisal method.
- Calculate return on capital employed (accounting rate of return) and discuss its usefulness as an investment appraisal method.

Exam Context

A short question on return on capital employed appeared in the pilot paper for 5 marks.

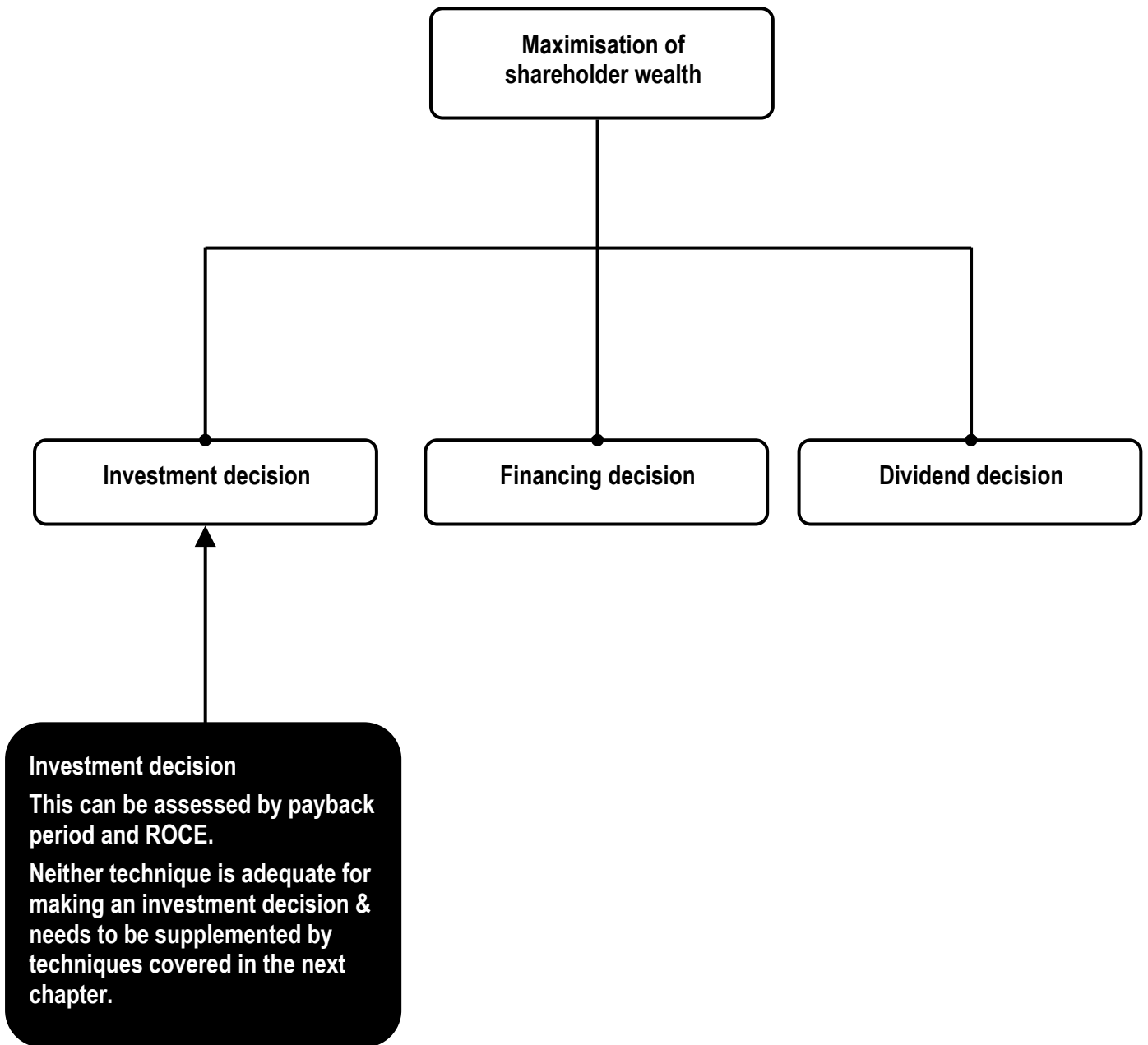
Qualification Context

The investment decision is a major topic in P4 Advanced Financial Management. Contribution and relevant costing have been studied already in P2 Management Accounting and P5 Performance Management.

Business Context

MAN, the German transport-related engineering group, achieved a return on capital employed of 18% in the first quarter of the 2006, and announced that in an attempt to improve still further it was exploring acquisitions and expanding internationally into India & Poland.

Overview



1 Investment

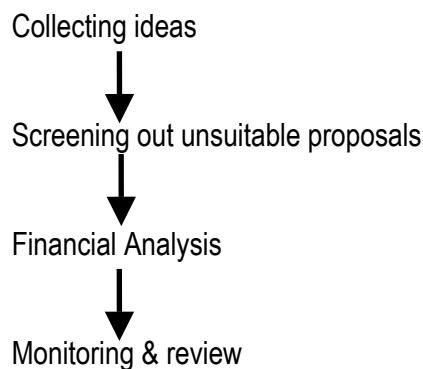


Section 1.3

- 1.1 Investment in current assets can give benefits to the business (see earlier chapters). This is an example of **revenue expenditure** & has been dealt with in earlier chapters. In this chapter we analyse investment in non-current assets, which is aimed at giving benefits in the longer-term, and is defined as **capital expenditure**.

2 Capital budgeting process

- 2.1 Capital expenditure is often expensive and requires careful analysis. This chapter, and the following chapters, deal with **financial analysis** of proposed investment projects. However, this is only a part, albeit the main part, of the capital budgeting process. The main stages in the capital budgeting process are:



Lecture example 1

Idea generation

Required

Can you think of any sensible procedures and structures that an organisation can set up to ensure that each stage of the capital budgeting process is working effectively?

Solution

- (a) Collecting ideas
- (b) Screening out unsuitable proposals
- (c) Financial analysis – **covered in this chapter (so you can ignore this for now)**
- (d) Monitoring & review

3 Return on capital employed (ROCE)

- 3.1 A traditional approach to evaluating investments is to evaluate the **profit** from the investment as a % of the amount invested. ROCE is also called accounting rate of return (ARR) and return on investment (ROI).

$$\text{ROCE} = \frac{\text{Average annual profit from investment}}{\text{initial investment}} \times 100$$

$$\text{or} \quad \frac{\text{Average annual profit from investment}}{\text{average investment}} \times 100$$

This was the definition given in the pilot paper

$$\text{where average investment} = \frac{\text{initial outlay} + \text{scrap value}}{2}$$

Note: profit is **after depreciation but before interest and tax**

Lecture example 2

Technique demonstration

Brenda and Eddie are considering expanding their restaurant business through purchase of the Parkway Diner, which will cost £350,000 to take-over the business and a further £150,000 to refurbish the premises with new equipment. Cash flow projections from the project show the following profits over the next six years.

Year	Net Cash Profits (£)
1	70,000
2	70,000
3	80,000
4	100,000
5	100,000
6	120,000

The equipment will be depreciated to a zero resale value over the same period and, after the sixth year, Brenda and Eddie confidently expect that they could sell the business for £350,000.

Required

Calculate the ROCE of this investment (using the average investment method)

Solution

Decision rule

3.2 Accept all projects with an ROCE above the company's target.

Advantages of ROCE

- 3.3 (a) Consistent with methods used to evaluate the company as a whole
 (b) Relative score (%) is easy to understand
 (c) Considers the whole life of the project

Disadvantages of ROCE

- 3.4 (a) **Ignores the timing** of the cash flows
 (b) Worsens if a small amount of **extra cash** is earned in an **extra year** of the project
 (c) Profits can be affected by costs that are **not relevant costs** (see next section)

4 Relevant costs

- 4.1 Only the **cash flows affected by the decision to invest** should be taken into account when appraising investments, these are called **relevant costs**.
- 4.2 Here are some examples of non-relevant costs that you will come across in the exam:

Examples	Explanation
Non cash flow expenses	Eg depreciation, apportioned overheads (these affect ROCE)
Sunk costs	Eg market research
Historic cost of material	If materials are used by a project then they will either (a) need to be replaced, so the replacement cost is the cash flow or (b) they won't, so the cost is zero (or lost revenue if they could have been sold as scrap) So only use the historic cost of materials if these other issues are not mentioned in a question.
Cost of labour	If labour used by a project is (a) idle , then the cost of using that labour is zero (b) At full capacity , then the cost is wages paid + contribution lost on the work that they have had to stop doing So only use the wages paid as the labour cost if these issues are not mentioned in a question.

Lecture example 3

Technique demonstration

Brenda and Eddie have further analysed the profit made in the first year and are concerned that the project could be loss making. Their **year 1** costs and revenues are forecast as follows:

Year 1	£
Revenue	200,000
Depreciation	25,000
Materials (note 1)	49,000
Labour (note 2)	100,000
Overheads (note 3)	<u>100,000</u>
Profit/ (loss)	(74,000)

Note 1 – the materials include £10,000 of surplus stock that Brenda & Eddie have in their existing restaurants. This stock has a scrap value of £1000.

Note 2 – Labour includes 20% of the £50,000 salary of a manager of an existing branch, who will assist the existing manager of the restaurant in its first year of operation.

Note 3 – This is an allocation of corporate overheads

Required

Assess the **relevant cash flows** of the project in the 1st year to Brenda & Eddie (ignore the initial start up costs of the project) and advise Brenda & Eddie whether they are right to be concerned.

Solution

5 Payback period

- 5.1 This is a measure of how many years it takes for the **cash flows affected by the decision to invest** to repay the cost of the original investment. A long payback period is considered risky because it relies on cash flows that are in the distant future.

Lecture example 4

Technique demonstration

Brenda and Eddie are worried about the length of time it will take for the cash flows from the Parkway Diner to repay their total investment of £500,000 (£350,000 to take-over the business and £150,000 to refurbish it). Cash flow projections from the project are reproduced below.

Year	Net Cash flows (£)
1	70,000
2	70,000
3	80,000
4	100,000
5	100,000
6	120,000

After the sixth year, Brenda and Eddie confidently expect that they could sell the business for £350,000.

Required

Calculate the payback period for the project, and advise Brenda & Eddie whether they are right to be concerned.

Solution

7: INVESTMENT DECISION

Decision rule

5.2 Accept all projects with a payback period within the company's target payback period.

Advantages of payback

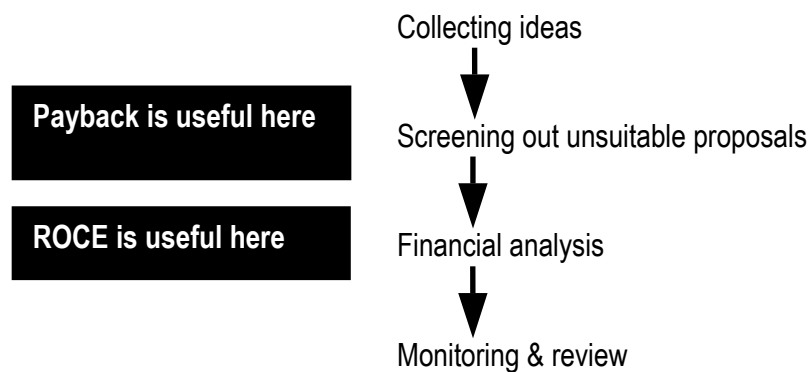
- 5.3 (a) A simple way of **screening out** projects that look too risky
(b) Useful when a company has cash flow problems

Disadvantages of payback

- 5.4 (a) Ignores the timing of the cash flows within the payback period
(b) Ignores the cash flows outside the payback period

6 Summary of Chapter 7

6.1 Capital expenditure is often expensive and requires careful analysis.



6.2 Neither ROCE nor payback are adequate methods of appraising capital investments by themselves; the main problem with both methods is that they ignore **the time value of money**, this area is addressed in the next chapter. Both methods are **useful complements** to the more sophisticated methods that are looked at in the next chapter.

END OF CHAPTER

Investment appraisal using DCF methods

8

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Explain and apply concepts related to interest and discounting, including:
 - (i) the relationship between interest rates and inflation, and between real and nominal interest rates
 - (ii) the calculation of future values and the application of the annuity formula
 - (iii) the calculation of present values, including the present value of an annuity and perpetuity, and the use of discount and annuity tables
 - (iv) the time value of money and the role of cost of capital in appraising investments
- Calculate the net present value and discuss its usefulness as an investment appraisal method
- Calculate the internal rate of return and discuss its usefulness as an investment appraisal method
- Discuss the superiority of DCF methods over non DCF methods
- Discuss the relative merits of NPV and IRR

Exam Context

A discussion of the strengths and weaknesses of the internal rate of return method was tested for 7 marks in the pilot paper.

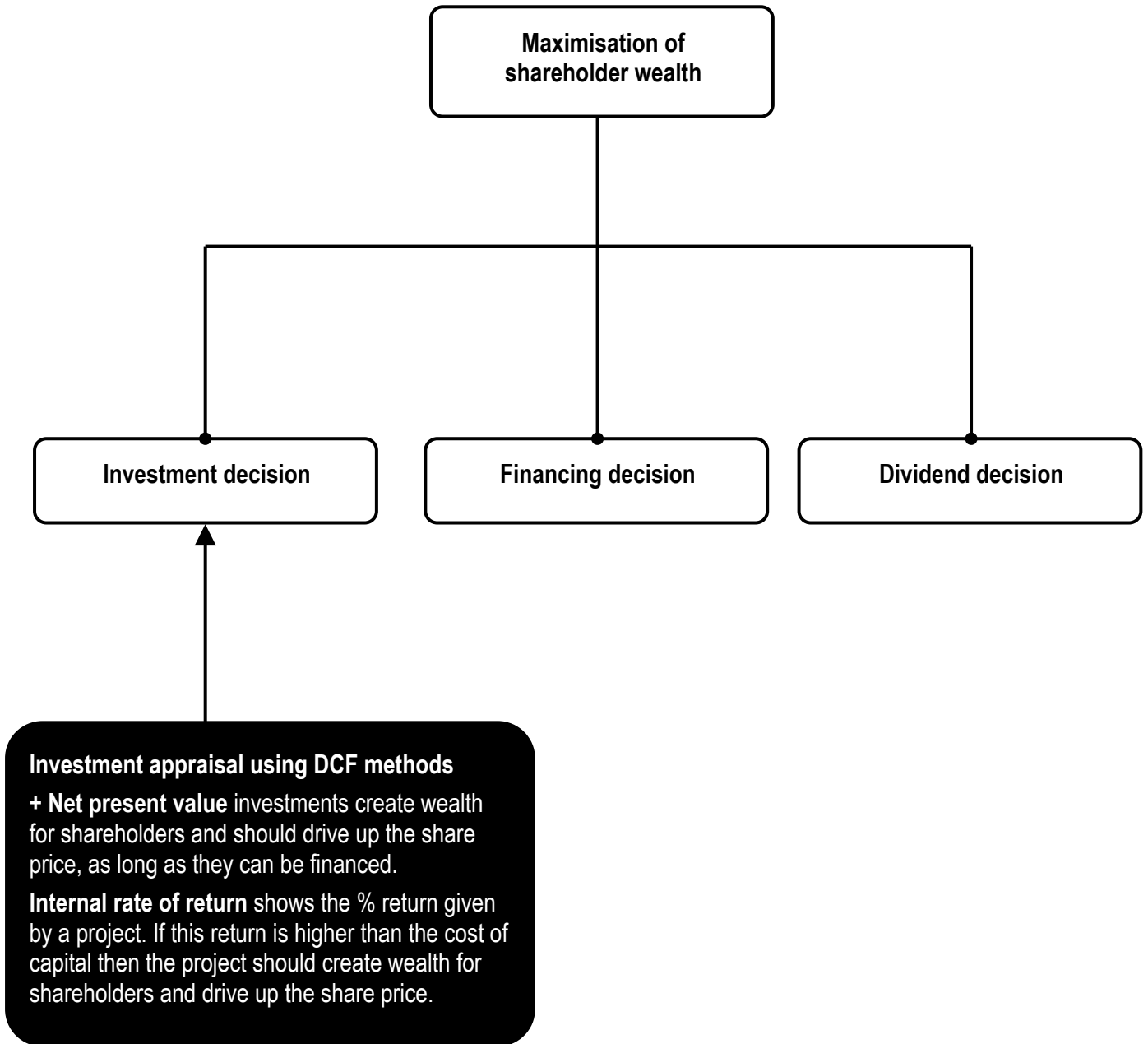
Qualification Context

The investment decision is a major topic in P4 Advanced Financial Management.

Business Context

Prince Al Waleed Bin Talal Bin Abdul Aziz invested in the buy back of Canary Wharf from its bankers in 1995 for £800m at a time when it had severe difficulty attracting tenants. He sold his stake in 2001 realising an internal rate of return of 47.7%.

Overview



1 Time value of money

Lecture example 1

Idea demonstration

Required

- (a) If a project involved the outlay of £1000 today and provided a definite return of £1001 **immediately**, would you accept it?
- (b) If a project involved the outlay of £1000 today and provided a definite return of £1001 in **1 year's time**, would you accept it?

Solution

- (a)
- (b)

- 1.1 It is common sense to reject £1,001 received in 1 year's time but accept if £1,001 is received today. £1,001 in 1 year's time is not as attractive as £1001 received today; this is the meaning of the term '**time value of money**'. The **logic** behind rejecting the £1,001 in 1 year's time is that you would be better off if you put £1,000 into a bank account for a year.
- 1.2 Many **projects** involve investing money now and receiving returns on the investment in the future; so the timing of a project's cash flows need to be analysed to see if they offer a better return than the return an investor could get if they invested their money in other ways.
- 1.3 The process of adjusting a project's cash flows to reflect the return that investors could get elsewhere is called **discounting**.

Lecture example 2

Technique demonstration

Required

If a project involved the outlay of £1,000 today and provided a definite return of £1,001 in 1 year's time, would you accept it you could get a return of 5% on investments of similar risk?

Solution

Time _____ 0 _____ 1 _____

Cash flow

2 Net present value (NPV)

- 2.1 If the discounted value of the future cash flows are higher than the cost of setting up a project today, then the project has a **+ Net Present Value** and should be **accepted**.

Lecture example 3

Technique demonstration

Required

If a project involved the outlay of £1,000 today and provided a definite return of £1,001 per year **for 2 years** would you accept the project? (again assume that you could get a return of 5% on investments of similar risk).

Solution

Time 0 1 2

Cash flow

Or

Time 0 1 - 2

Cash flow

Key terms	Definition
Annuity	A series of equal cash flows , use the annuity table or discount each cash flow separately, whichever you prefer (the annuity table is quicker)
Cost of capital	The return required by the providers of finance (5% in the lecture example) – this will be calculated later in the course.

Lecture example 4

Technique demonstration

Required

- (a) If a project involved the outlay of £1,000 today and provided a definite return of £1,001, for **the foreseeable future**, would you accept it you could get a return of 5% on investments of similar risk?
- (b) What if the project gave a return of £1001 per year for the foreseeable future, starting in 3 years' time (ie time 3)?

8: INVESTMENT APPRAISAL USING DCF METHODS

Formula



Section 3.1

$$IRR = a + \frac{NPVa}{NPVa - NPVb} (b-a)$$

Where a is the first discount rate giving NPVa (ie 5%)
b is the second discount rate giving NPVb (ie 10%)

Lecture example 5

Technique demonstration

A project involves the outlay of £1,000 today and provides a definite return of £1,001 per year (ie as lecture example 4(a) **for 2 years?** (Again assume a return of 5% on investments of similar risk).

Required

Calculate the internal rate of return.

Solution

Step 1 is complete - we already know from lecture example 3 the NPV at 5% is +861

Step 2

Time	0	1 - 2
Cash flow	(1000)	1001
Discount factor	@10%	
Present value		
Net present value =		

Step 3

4 NPV or IRR?

4.1 Both NPV and IRR are superior methods for appraising investments compared to the techniques covered in the previous chapter because:

- (a) they account for the **time value of money** (unlike ROCE and payback)
- (b) they focus on **relevant cash flows** (unlike ROCE)
- (c) they look at the cash flows over the whole life of the project (unlike payback)

- 4.2 By examining the advantages and disadvantages of IRR (NPV has the opposite pros and cons) as a DCF technique, it can be shown that NPV is the superior technique.

Advantage of IRR

- 4.3 IRR gives the % return of a project; this concept **is easy** for non financial managers to **understand** and for financial managers to calculate because it does not require the calculation of a cost of capital.

Disadvantages of IRR

4.4

Disadvantages	Explanation
Mutually exclusive projects	A smaller project might be chosen over a larger project because it has a higher IRR. NPV would choose the larger project because it deals in £s not %.
A change in direction of the cash flows	If there is another year of negative cash flows, there may be more than 1 IRR. This means that IRR becomes confusing.
Reinvestment assumption	The IRR method assumes that cash inflows from the project are reinvested at the IRR rate, this is unrealistic when the IRR is high.



Section 4.2



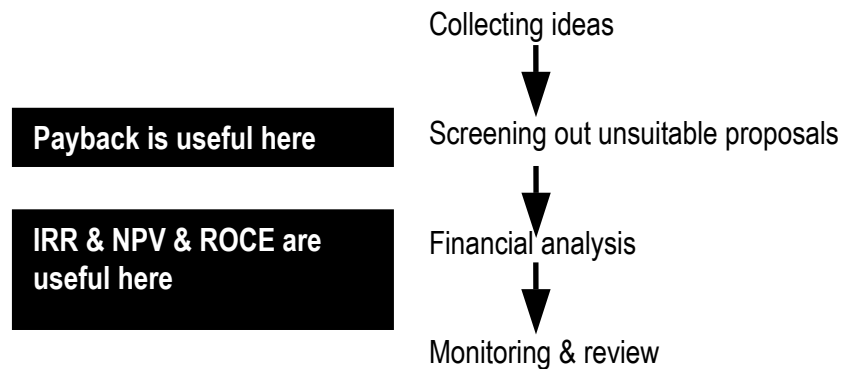
Q4

Conclusion - NPV is a better technique

- 4.5 NPV does not have any of the problems of IRR. The role of IRR is to act as a tool for explaining the benefits of an investment to non-financial managers; it should not be used as the financial analysis used to justify the investment decision.
- 4.6 This is not to say that NPV is perfect; like any financial technique, there is the danger that the non-financial benefits of an investment are ignored.

5 Summary of Chapter 8

5.1 Capital expenditure is often expensive and requires careful analysis.



5.2 Payback is a useful device for screening risky projects, but **NPV is the best method** for the financial analysis of a project. IRR is useful for explaining the benefits of a project to non-financial managers. ROCE is only useful for picturing how an investment might impact on a firm's financial statements.

END OF CHAPTER

Allowing for tax and inflation

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Apply and discuss the real terms and the nominal terms approach to investment appraisal
- Calculate the tax effects of relevant cash flows, including the tax benefits of capital allowances and the tax liabilities of taxable profit.
- Calculate and apply before and after tax discount rates.

Exam Context

NPV with inflation and tax was tested for 13 marks in the pilot paper, and is likely to feature regularly in future exams. Note that the examiner will invent tax rates, timing of tax payments and capital allowance rates – but these are normally based on the UK.

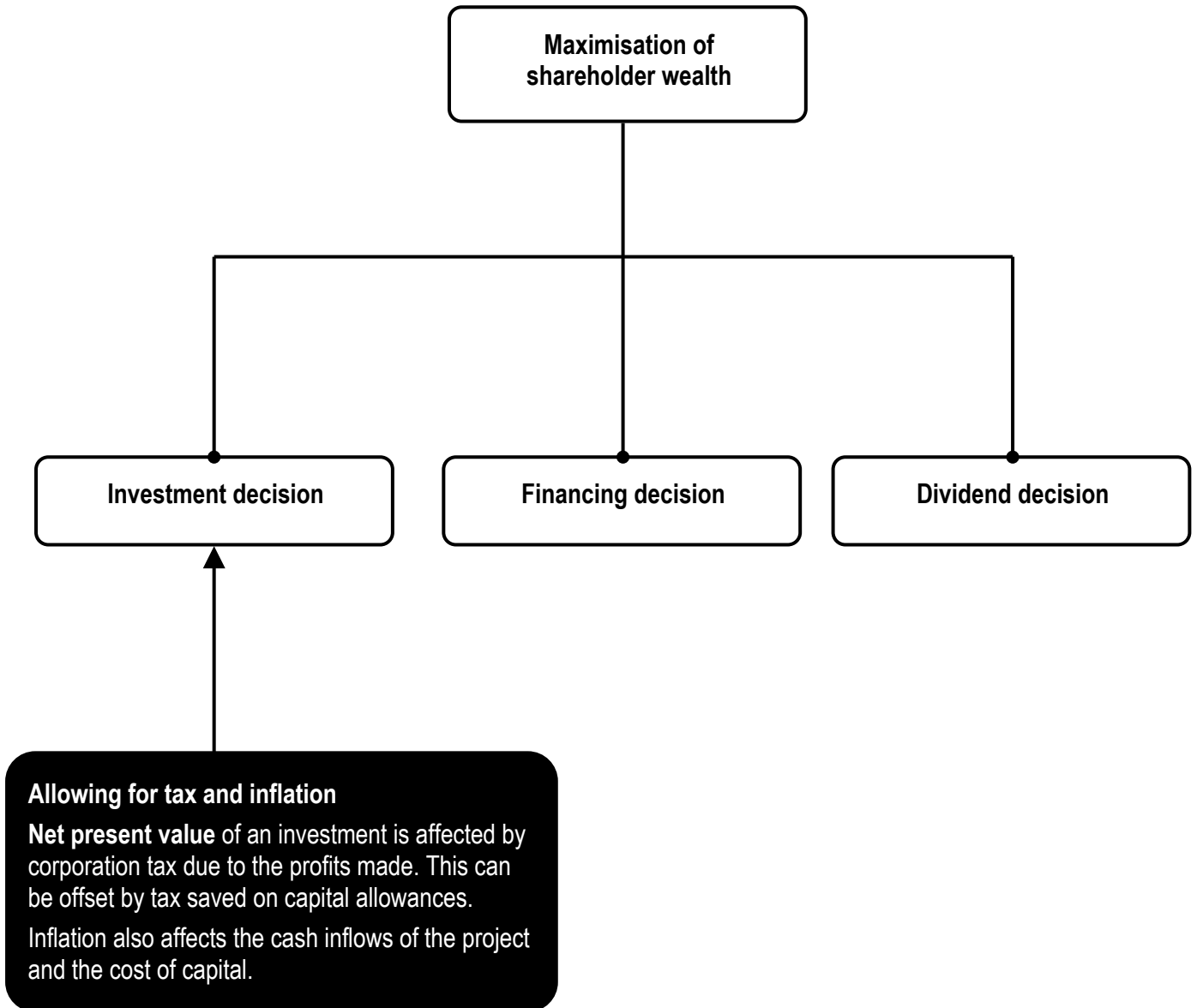
Qualification Context

Capital allowances have been covered in F6 Taxation.

Business Context

Corporation tax in the UK is 20% for small businesses and is paid approximately **1 year** after the year in which the profits were made. The main rate is 30% paid in instalments so that effectively the tax is paid **in the same year** as the profits are earned.

Overview



1 NPV layout

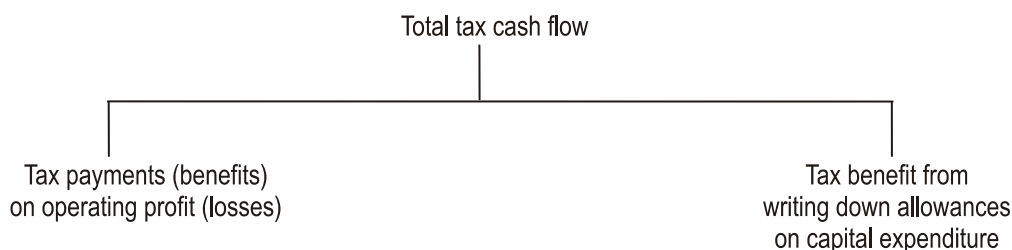
1.1 A neat layout will gain credibility in the exam and will help you make sense of the many different cash flows that you will have to deal with. The points in bold in the table below are the areas not yet covered in the previous chapter; they will all be covered in this chapter.

1.2

	<i>Time</i>					
	0	1	2	3	4	5
Sales		X	X	X	X	
Costs		(X)	(X)	(X)	(X)	
Sales less costs		X	X	X	X	
Taxation		(X)	(X)	(X)	(X)	(X)
Capital expenditure	(X)					
Scrap value					X	
Tax benefit of CAs		X	X	X	X	X
Working capital	(X)	(X)	(X)	X	X	
Net cash flows	(X)	X	X	X	X	X
Discount factors @	X	X	X	X	X	X
post-tax cost of capital						
Present value	(X)	X	X	X	X	X

2 Taxation

2.1 Projects will cause tax to be paid on the profits, net of tax saved on capital allowances. Tax cash flows can be calculated as 1 figure, but we recommend that 2 cash flows are shown:



Corporation tax on profits

2.2 Calculate the taxable profits (before capital allowances) and calculate tax at the rate given.

2.3 The effect of taxation will not necessarily occur in the same year as the relevant cash flow that causes it. *Follow the instructions given in exam question.*

Capital allowances

2.4 These are normally 25% writing down allowances on plant & machinery.

Approach

- 1 Calculate the amount of capital allowance claimed in each year
- 2 Make sure that you remember the balancing adjustment in the year the asset is sold
- 3 Calculate the tax saved, noting the timing of tax payments given in the question

9: ALLOWING FOR TAX AND INFLATION

Cost of capital

- 2.5 The cost of capital will also be affected by taxation, because debt finance becomes cheaper; this is covered later in the course.

Lecture example 1

Exam standard question for 15 marks

Quitongo plc is considering a major investment programme which will involve the creation of a chain of retail outlets throughout the United Kingdom.

The following schedule of expected cash flows has been prepared for analysis.

Time	0	1	2	3	4
	£'000	£'000	£'000	£'000	£'000
Land and Buildings	3,250				
Fittings and Equipment	750				
Gross Revenue		1,000	1,750	2,500	3,200
Direct Costs		800	1,100	1,500	1,600
Marketing		170	250	200	200
Office Overheads		100	100	100	100

Quitongo plc has an accounting year end of 31 December.

Additional information:

- 40% of office overhead is an allocation of head office operating costs.
- The cost of land and buildings includes £120,000 which has already been spent on surveyors' and other advisers' fees.
- Quitongo plc expects to be able to sell the chain at the end of year 4 for £4,500,000.
- Cost of capital is 7%

Quitongo plc is paying tax at 30% and is expected to do so for the foreseeable future.

Tax is payable one year after profits are earned.

The company will claim capital allowances on fittings and equipment at 25% on a reducing balance basis. Capital allowances are not available on land and buildings.

Expenditure on the investment programme will take place in January.

Estimated resale proceeds of £200,000 for the fittings and equipment have been included in the total figure of £4,500,000 given above.

Required

Using the layout on the next page for your solution, calculate **the cash flows needed** for the NPV of the project. **You will be provided with additional information on working capital in the next section, and then you will be able to calculate the NPV.**

Solution

Use this page for the net present value calculation for Quitongo plc.

Time	0	1	2	3	4	5
Sales						
Direct costs						
Marketing						
Overheads	_____	_____	_____	_____	_____	_____
Operating profit						
Taxation						
Fittings						
Sale of business						
Land and buildings						
Tax benefit of Capital Allowances						
Working Capital	_____	_____	_____	_____	_____	_____
Net Cash flow						
7% Discount Factors	_____	_____	_____	_____	_____	_____
Present Value	_____	_____	_____	_____	_____	_____

NPV

3 Working capital

- 3.1 Major projects will need the injection of funds to finance the level of working capital required (normally assumed to be stock). Discounted cash flow techniques will account for the opportunity cost of capital involved.

Questions will show the total amount of working capital required in each year of the project. The DCF working should only show the incremental cash flows from one year's requirement to the next.

- 3.2 At the end of the project, when there is no further requirement for working capital in the project, the full amount invested will be released. This is shown in the DCF calculation as an income.

Lecture example 1 continued

Quitongo plc expects the following working capital requirements during each of the four years of the investment programme. (All figures in £'000s)

Year 1	Year 2	Year 3	Year 4
250	300	375	400

Required

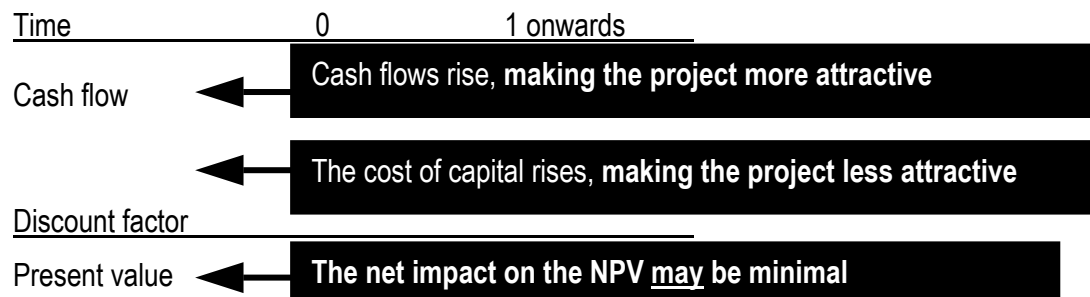
Show workings below for the relevant working capital flows for the DCF calculation, **and complete the NPV using the layout on the previous page.**

Solution

4 Inflation

Key terms	Explanation
Real terms or current prices	Ignoring inflation
Nominal or money	Including inflation

4.1 Inflation has two impacts on NPV:



1 rate of inflation

4.2 If there is 1 rate of inflation, inflation has no net impact on the NPV. 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.

More than 1 rate of inflation

4.2 If there is more than 1 rate of inflation, inflation will have an impact on profit margins and therefore needs to be included in the NPV. In this case **the cash flows must be inflated and inflation must also be incorporated into the cost of capital** (ie a money or nominal rate should be used).

4.3 To incorporate inflation into the cost of capital the following equation must be used:

$$[1 + \text{real cost of capital}] \times [1 + \text{general inflation rate}] = [1 + \text{nominal (inflated) cost of capital}]$$

$$\text{or } (1 + r) (1 + h) = (1 + i)$$

Note: this **WILL** be given in the exam.

The general inflation rate is often given as the Retail Price Index (RPI) or Consumer Price Index (CPI).

Working capital with inflation

4.4 The working capital requirement each year is a function of sales and purchases. It therefore follows that if the sales and purchases figures are to be inflated, then any figure resulting from them (receivables, payables, inventory) should also be inflated.

Only once the total working capital required has been calculated should you calculate the incremental cash flows for DCF calculations.

Lecture example 2

Exam standard question for 7 marks

Bass Limited is a brewing company trying to decide whether to buy a new hop dryer for £10,000. At present, facilities are rented at £6,600 p.a.; this **cost will not rise with inflation**. Running costs for the new dryer would be £1,200 p.a. All cash flows are quoted in current terms and are expected to rise in line with the consumer's prices index at 6% p.a. (except rent). The dryer has no resale value. Bass's **real** cost of capital is 13.2%.

Required

Should the new dryer be purchased if its life is expected to be 3 years?

Solution

Q5

5 Summary of Chapter 9

5.1 An exam standard NPV will have to deal with tax, working capital and inflation.

Tax

5.2 Follow the rules given by the examiner to work out the timing and the amount of tax paid on the project's cash flows and the tax saved on capital allowances

Working capital

5.3 Work out the changes in working capital, these become the cash flows for the NPV – don't forget to run working capital down to zero in the final year.

Inflation

5.4 **If there is 1 rate of inflation – ignore inflation** (use real cash flows and the real cost of capital)

If there is more than 1 rate of inflation - include inflation (use nominal cash flows and a nominal cost of capital).

END OF CHAPTER

Project appraisal & risk

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe & discuss the differences between risk & uncertainty in relation to probabilities and increasing project life.
- Apply sensitivity analysis to investment projects and discuss the usefulness of sensitivity analysis in assisting investment decisions.
- Apply probability analysis to investment projects and discuss the usefulness of probability analysis in assisting investment decisions
- Apply & discuss other techniques for adjusting for risk and uncertainty in investment appraisal, including:
 - (i) Simulation
 - (ii) Adjusted payback
 - (iii) Risk adjusted discount rates.

Exam Context

NPV will regularly feature in the exam and given that all projects offer highly uncertain returns, then this chapter is likely to be regularly examined too. Risk adjusted discount rates are covered in chapter 16.

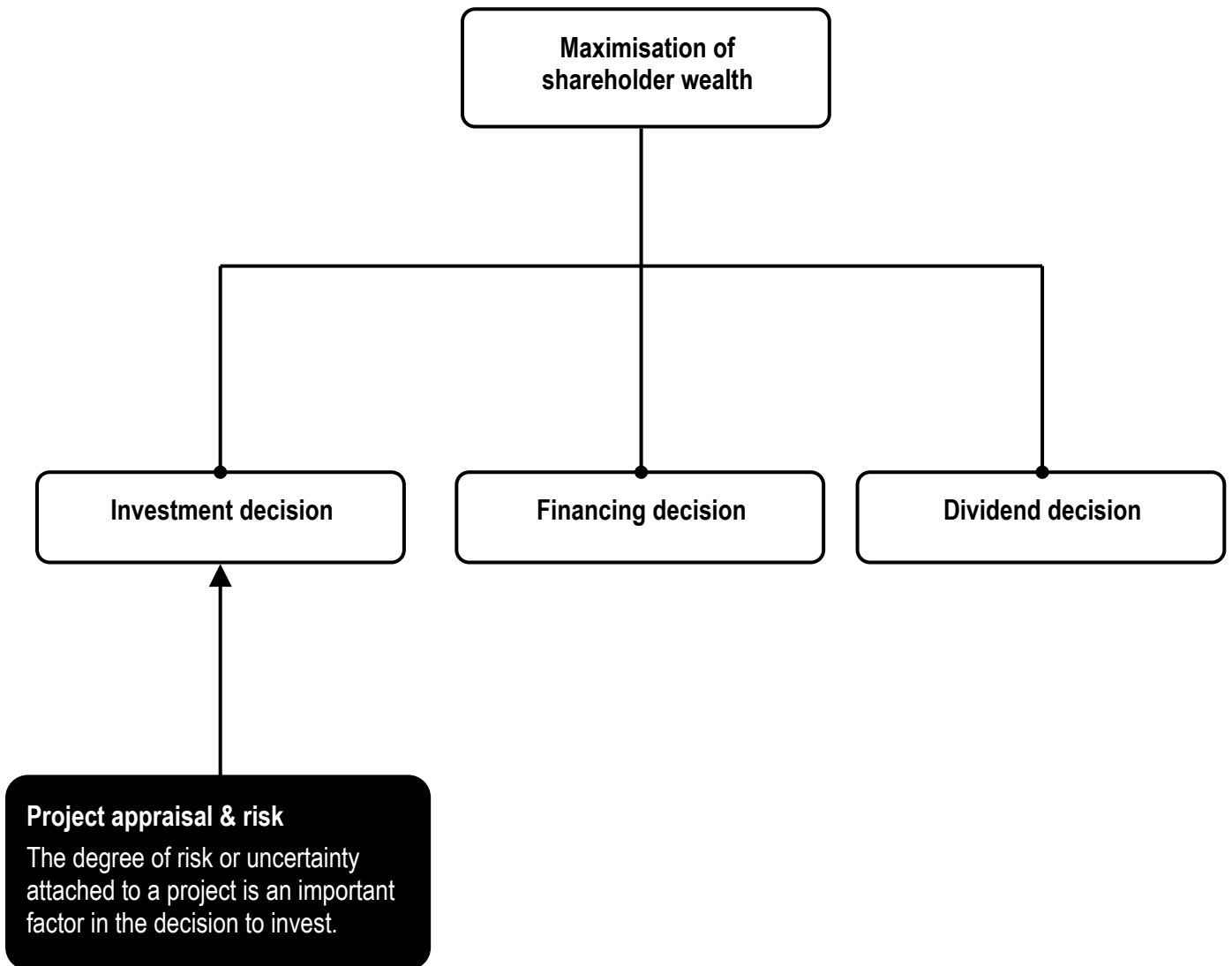
Qualification Context

This area is developed in the advanced investment appraisal section of P4 Advanced Financial Management.

Business Context

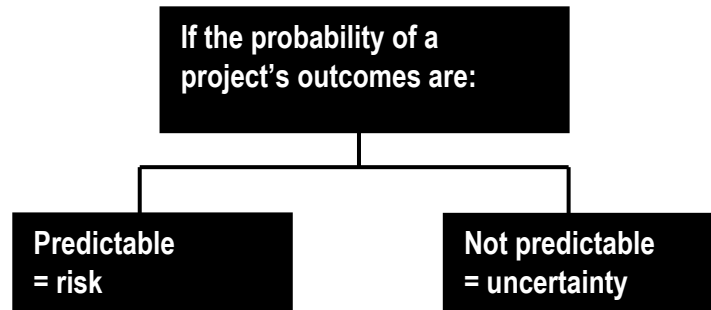
The construction of the £43m National Botanical Garden of Wales, a millennium project funded partly by the public, was criticised by the auditor-general for Wales for failing to apply appropriate project appraisal techniques such as sensitivity analysis. The garden's over-optimistic forecasts of visitors led to its collapse in 2003 and subsequent rescue by the Millennium Commission in 2004.

Overview



1 Risk and uncertainty

- 1.1. Before deciding to spend money on a project, managers will want to be able to make a judgement on the risk / uncertainty of its returns. In Financial Management a distinction is made between **risk** and **uncertainty**.



Risk

- 1.2 Risk can be quantified and built into an NPV using the following techniques.

Techniques	Description
Expected values	Using probabilities to create an assessment of the average expected NPV from an investment
Risk adjusted discount factor	Using a higher cost of capital if the project is high risk, this is discussed in chapter 16.

Uncertainty

- 1.3 Uncertainty cannot be quantified, but can be described using the following techniques.

Techniques	Description
Payback period	Covered earlier, the quicker the payback the less reliant a project is on the later, more uncertain, cash flows.
Adjusted payback period	As above but uses the discounted cash flows.
Sensitivity analysis	An analysis of what % change in one variable (eg sales) would be needed for the NPV of a project to fall to zero. Calculated as NPV of project / PV of sales (for example)
Simulation	An analysis of how changes in more than 1 variable (eg market share and sales price) may affect the NPV of a project



Case 2

Lecture example 1

Technique demonstration

A botanical garden is being planned by a local authority. Its success is heavily dependent on the number of visitors that the garden attracts. By analysing the experience of other similar projects the best, most likely and worst case visitor numbers have been estimated; this has resulted in the following revenue projections:

Best case	£26m	18% chance
Most likely outcome	£23m	50% chance
Worst case	£12m	32% chance

Set up costs are £43m and the running costs of the botanical garden are £10m per year; it will last for 5 years before a major refurbishment is needed. The local authority uses an 8% cost of capital.

The project manager has already calculated a positive NPV on the basis of the most likely revenue projections and is keen to go ahead with the project.

You are the management accountant and you are worried about the risk of the project.

Required

Assess the risk and uncertainty of the project using

- Expected values
- Sensitivity analysis (analyse sensitivity to outlay, visitor numbers and project life)
- Adjusted payback period **on the assumption that the most likely cash flows are used**

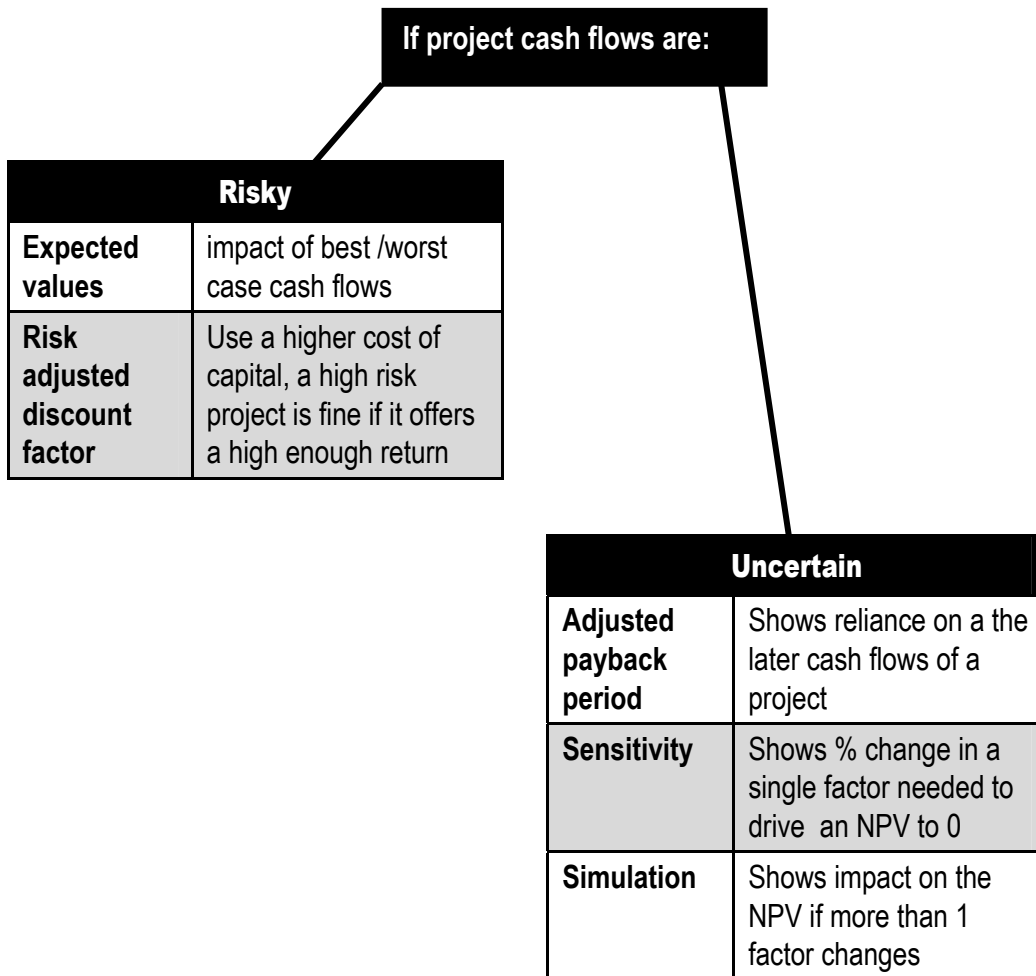
Also note any drawbacks with the methods that you have used.

Ignore tax.

Solution

2 Summary of Chapter 10

2.1 An exam standard NPV may well ask you to analyse the risk or uncertainty of a project.



2.2 The drawbacks of each factor are the same as the insights of an alternative.

END OF CHAPTER

Specific investment decisions

11

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Evaluate leasing and borrowing to buy using the before-and after-tax costs of debt.
- Evaluate asset replacement decisions using equivalent annual cost.
- Evaluate investment decisions under single period capital rationing, including:
 - (i) the calculation of profitability indexes for divisible investment projects
 - (ii) the calculation of NPV of combinations of non-divisible investment projects
 - (iii) a discussion of the reasons for capital rationing

Exam Context

NPV will regularly feature in the exam and any of these techniques could be tested as part of an NPV question; leasing is probably the most important area to focus on.

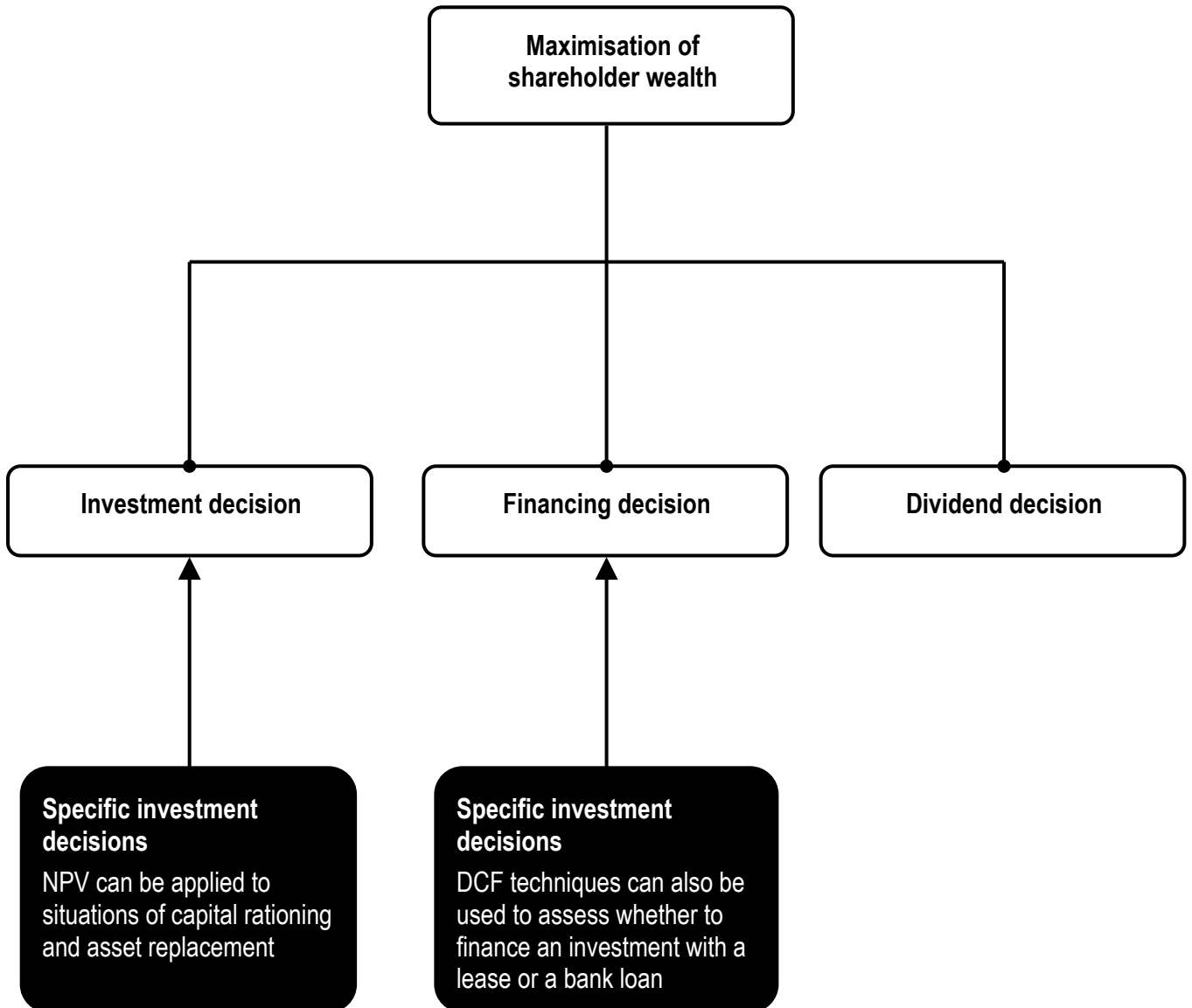
Qualification Context

You will have come across leases before in F7 Financial Reporting, and how to deal with rationing of limiting factors in F2 Management Accounting.

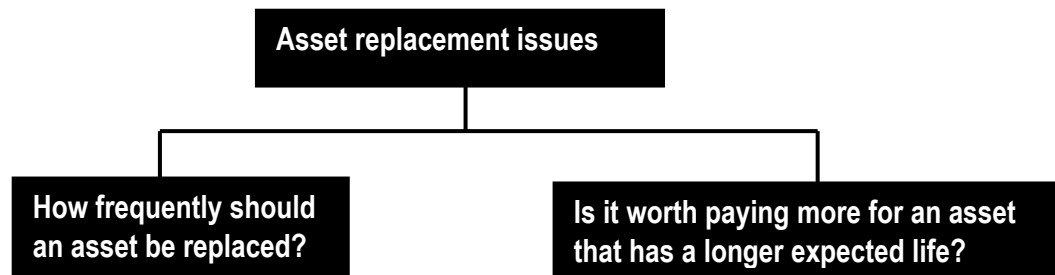
Business Context

Leasing is an extremely important source of finance in the UK, it funds approximately 25% of investment in non-current assets.

Overview



1 Asset replacement decisions



1.1 In both of these scenarios, the ideal approach is to keep the costs per annum (in NPV terms) to a minimum. This is calculated as an **equivalent annual cost (EAC)**.

1.2
$$EAC = \frac{\text{NPV of costs}}{\text{annuity factor for the life of the project}}$$

1.3 The best decision is to **choose the option with the lowest EAC**.

Lecture example 1

Naurfold regularly buys new delivery vans. Each van costs £30,000, has running costs of £3,000 and a scrap value of £10,000 in its 1st year. In its 2nd year the van has higher running costs (£4,000) & a lower scrap value (£7,000). Vehicles are not kept for > 2 years for reliability reasons.

Required

Using Naurfold's cost of capital of 15%, identify how often the van should be replaced. Ignore tax.

Solution

<u>Every year</u>	<u>Time</u>	<u>0</u>	<u>1</u>	
	£			
	d.f. @15%			
	PV	_____		
	Total PV			
	Annuity factor for 1 year			
	EAC			
<u>Every 2 years</u>	<u>Time</u>	<u>0</u>	<u>1</u>	<u>2</u>
	£			
	d.f. @15%			
	PV	_____		
	Total PV			
	2 year annuity factor			
	EAC			

11: SPECIFIC INVESTMENT DECISIONS

- 1.4 The **same technique** is used to choose between a cheap asset with a short expected life and a more expensive asset with a longer expected life.

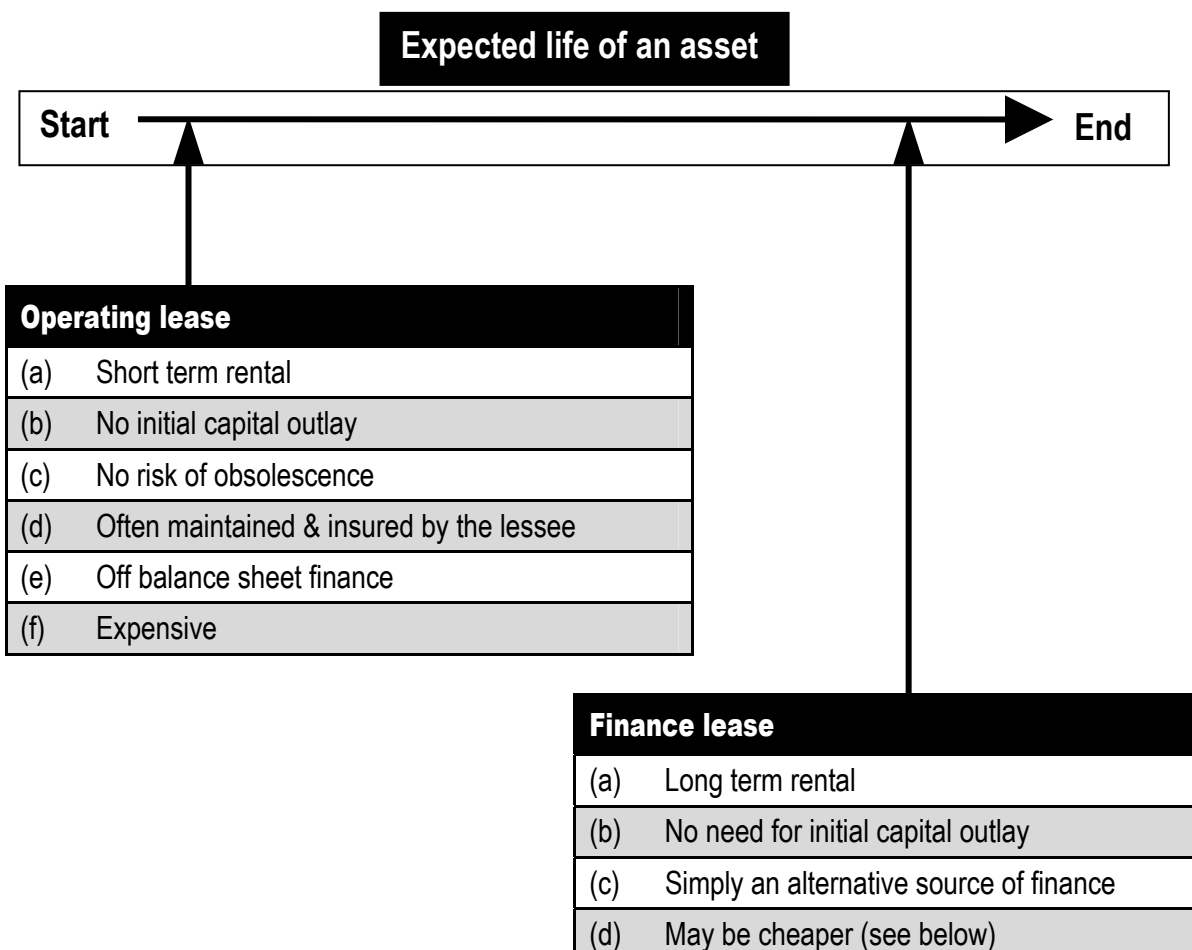
2 Lease vs buy

- 2.1 After deciding on the viability of an investment using NPV analysis, a separate decision may be needed to determine whether a lease would be better than an outright purchase.

Key terms	Definition
Lessor	Receives lease payments (the r in lessor)
Lessee	Makes lease payments

Types of leases

- 2.2 There are two main types of leases, **finance leases** and **operating leases**.



- 2.3 The **benefits of any type of lease to the lessee** can be:
- (a) **Availability**; a firm that cannot get a bank loan to fund the purchase of an asset (**capital rationing** – see next section for further discussion); the same bank that refused the loan will often be happy to offer a lease.
 - (b) **Avoiding tax exhaustion**; if a firm cannot use all of their capital allowances (the lessor can use the capital allowances and then set a lease that transfer some of the benefit to the lessee).
 - (c) **Avoiding covenants**; restricting future borrowing capability.

Leases in the real world

Operating leases	Finance leases
(a) Projects (plant hire) where an expensive asset is only needed for a specific job	(a) Used in vehicle rental (planes, trains, cars) where the lessor has the opportunity to obtain bulk purchase discounts that are not available to the lessee or where the lessor can borrow at a lower rate of interest .
(b) High tech equipment (computer leasing) where leases often offer protection against technological risk and break down.	

Numerical analysis

- 2.4 The benefits of leasing vs purchasing (with a loan) can be assessed by an NPV approach:
- Step 1** the **costs of leasing** (payments, lost capital allowances and lost scrap revenue)
 - Step 2** the **benefits of leasing** (savings on loan repayments = PV of loan = initial outlay)
 - Step 3** discounting at the **post tax cost of debt**.
 - Step 4** calculate the NPV – if positive it means that the **lease is cheaper than the post tax cost of a loan**
- 2.5 An **alternative method** is to evaluate the NPV of the cost of the loan and the NPV of the cost of the lease separately, and to choose the cheapest option.
- 2.6 Note that the cost of the loan **should not include the interest repayments on the loan** eg the NPV of the repayments on a loan for £10,000 repayable in 1 year at 10% interest is £10,000 when discounted at 10% - so **the cost of a loan is just its initial time 0 value**, here £10,000.
- 2.7 In numerical questions you can assume that the lessee is not able to claim capital allowances unless told otherwise.

Lecture example 2

Technique demonstration

A company has decided to undertake an investment project which involves the acquisition of a machine which costs £10,000. The machine has a 5 year life with 0 scrap value, 20% straight line writing down allowances are available.

It could finance the acquisition at with a bank loan at 7.143% pre tax and purchase the asset outright or make 5 equal lease payments of £2500 in arrears.

Tax is 30% payable in the same year in which profits are made.

Required

- (a) Evaluate the lease from the lessee's viewpoint
- (b) Evaluate the lease from the lessor's view point (pays tax at 30%).

Solution

- (a)

(b)



Q6

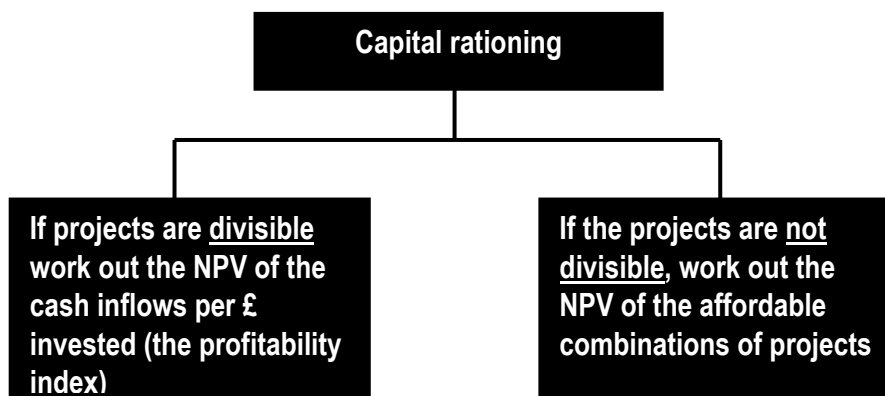
Benefits to the lessor

- 2.8 **Banks offer leases** to exploit their ability to raise low cost capital
- 2.9 **Companies (eg IBM)** offer leases to attract customers
- 2.10 **Profitable companies set up leasing subsidiaries** to shelter their own profits from tax (eg M&S, Tesco)

3 Capital rationing

- 3.1 Capital rationing arises when there is insufficient capital to invest in all available projects which have positive NPVs **ie capital is a limiting factor**. In this exam, you only need to be able to analyse how to analyse situations where this is a problem in a **single year**.
- 3.2 Capital rationing arises for 2 main reasons:
 - (a) **Hard** capital rationing – a firm cannot get cash from the capital markets; typically this means that the firm is small or does not have an established trading record.
 - (b) **Soft** capital rationing – a firm can get the cash but decides not to; this is typical of a larger company that wants to keep its gearing under control.

Dealing with capital rationing



Divisible projects

3.3 Where a project **can** be done in part, the **profitability index** allows you to advise which projects are worth completing in full, which should be done in part and which should not be chosen.

3.4 The profitability index = $\frac{\text{PV of cash inflows}}{\text{Initial cash outflow}}$

Non-divisible projects

3.5 Where a project **cannot** be done in part, you need to explore the NPV of different affordable combinations.

Practical methods of dealing with capital rationing

3.6 Practical steps to deal with capital rationing include:

- (a) **Leasing**
- (b) Entering into a **joint venture** with a partner
- (c) **Delaying** one of then projects to a later period
- (d) Issuing **new capital** (if possible)

Lecture example 3

Technique demonstration

A company has maximum capital to invest of £800 k. Five capital projects have been identified which are of similar of risk. The initial step analysis shows the following:

<i>Project</i>	<i>Required initial outlay</i>	<i>NPV</i>	<i>Profitability index</i>
No 1	£298,000	£128,000	1.4295
No 2	£240,000	£100,000	1.4166
No 3	£400,000	£160,000	1.40
No 4	£160,000	£ 60,000	1.375
No 5	£798,000	£239,000	1.300

Projects cannot be postponed and multiples of the same project are not allowed.

Required

What is the optimal combination of projects to maximise NPV assuming

- (a) projects are **divisible**? (include a working to demonstrate how the profitability index numbers have been calculated for one of the projects)
- (b) projects are **not divisible**?

Solution

4 Summary of Chapter 11

- 4.1 An exam standard NPV may well ask you to apply discounted cash flow techniques to the areas of asset replacement, leasing or capital rationing.

Asset replacement

- 4.2 You will need to calculate the lowest **equivalent annual cost** of the asset replacement issue that you are analysing.

Leasing

- 4.3 You will need to do an NPV of the benefits of leasing at the post tax cost of capital. The **post-tax rate is calculated as the pre-tax cost of capital x (1-tax rate)**.
- 4.4 There are 2 main types of leases; **operating leases** (short-term) and **finance leases** (long-term). Each type of lease has very different advantages.

Capital rationing

- 4.5 If the projects are **divisible use the profitability index** to assist decision-making, if not use a trial and error approach to assess which combinations of projects maximises total NPV.
- 4.6 **Leasing** may help a firm deal with its capital rationing problems.

END OF CHAPTER

Sources of finance

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify & discuss the range of short-term sources of finance available to businesses, including:
 - (i) overdraft
 - (ii) short-term loan
 - (iii) trade credit
 - (iv) lease finance
- Identify & discuss the range of long-term sources of finance available to businesses, including:
 - (i) equity finance
 - (ii) debt finance
 - (iii) lease finance
 - (iv) venture capital
- Identify & discuss the range of raising equity finance, including:
 - (i) rights issue
 - (ii) placing
 - (iii) public offer
 - (iv) stock exchange listing

Exam Context

Sources of finance can be linked into questions on NPV or on cost of capital (covered later), the ability to discuss the sources that are **appropriate** for a company will be important in the exam.

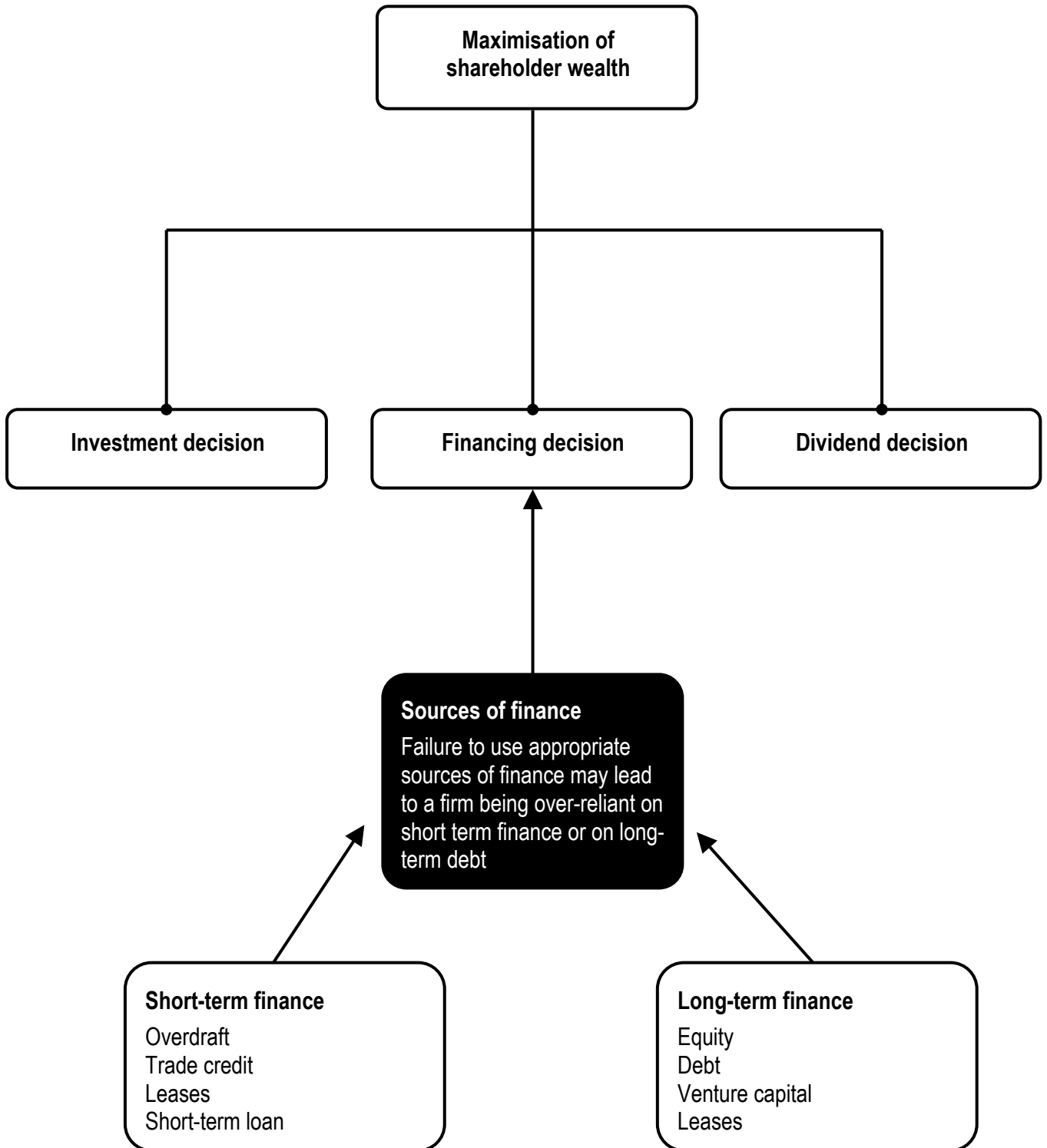
Qualification Context

Sources of finance is taken into an international context in P4 Advanced Financial Management.

Business Context

In 2000, Easyjet raised £600m to expand its fleet by listing on the London Stock Market. Since then it has been able to retain and motivate staff with share options, and its original owner has been able to gradually sell of his shares.

Overview



1 Short-term finance

- 1.1 In chapter 6 we looked at the idea of financing working capital needs through a matching policy which uses short term finance to fund fluctuating current assets. Here we look at the types of short-term finance available to a firm.

Lecture example 1

Idea generation

Required

Assess the pros and cons of the following forms of finance

Solution

Types	Pros & cons
Overdraft - a limit is agreed with a bank, interest is paid on the daily cash balance, subject to instant recall	
Short-term loan	
Trade credit - paying suppliers later	
Lease finance – operating leases	Covered in previous chapter

- 1.2 As noted in chapter 6 **short-term finance is usually cheaper** than long term finance so some companies adopt an “**aggressive**” approach and rely mainly on **short term finance**. This carries risk but potentially results in higher profits.

2 Long-term finance

- 2.1 In chapter 6 we looked at the idea of financing working capital needs through a matching policy which uses long term finance to fund permanent current assets and fixed assets. Here we look at the types of long-term finance available to a firm, some of these have been introduced in chapter 3, which looked at the capital markets.



Lease finance

- 2.2 Covered in the previous chapter.

Section 1.5

12: SOURCES OF FINANCE

Debt finance

2.3 Types of debt finance include the following:

Bank loans	Bonds (debentures/loan notes)
<ul style="list-style-type: none">Available over a range of time periods, with flexible repayment schedules.	<ul style="list-style-type: none">IOUs sold to investors, normally fixed interest and redeemable (min £200,000)
<ul style="list-style-type: none">Normally secured on the assets of the business by a fixed or floating charge	<ul style="list-style-type: none">Secured & carry loan covenants
<ul style="list-style-type: none">Must be repaid if loan covenants on gearing or asset disposal are broken	<ul style="list-style-type: none">Can often be redeemed early at the company's discretion
	<ul style="list-style-type: none">Carries a credit rating

2.4 Debt finance in general has some attractions **compared to equity & venture capital**:

- avoids **dilution of control**
- avoids **earnings per share dilution**
- provides **tax relief** on interest payments

Lecture example 2

Idea generation



Required

Sections 2.6 – 2.7

Assess the advantages of the following forms of long term debt finance

Solution

Bank loans	Bonds (debentures/loan notes)

12: SOURCES OF FINANCE

3.Public offer - or an offer for sale, at a fixed price	An expensive method appropriate for large issues. Expensive because underwritten & advertised.
--	---

Lecture example 3

Technique demonstration

Fantasia plc is an **all equity financed** company specialising in animated films, it needs to raise £330m and has decided on a rights issue at a discount of 17.5% to its current market price.

Currently Fantasia has 500m shares in issue and a market price of £2.00 / share.

Required

- (a) Calculate the terms of the rights issue
- (b) Calculate the theoretical ex rights price (the price after the rights issue)
- (c) Assess the impact on the wealth of a shareholder who owns 10,000 shares and can only afford to take up half of their rights

Solution

4 Summary of Chapter 12

- 4.1 This chapter has reviewed the main sources for long & short-term finance in the UK.
- 4.2 You should note that retained earnings can also be a source of equity, this is discussed in the next chapter.
- 4.3 A crucial issue for a company is the balance of debt & equity that it uses; this is discussed in chapter 14.

12: SOURCES OF FINANCE

END OF CHAPTER

Dividend policy

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify & discuss internal sources of finance, including:
 - (i) retained earnings
 - (ii) increased working capital efficiency
- Discuss the relationship between the dividend decision and the financing decision, including:
 - (i) legal constraints
 - (ii) liquidity
 - (iii) shareholder expectations
 - (iv) alternatives to cash dividends

Exam Context

This area is not likely to be a major question in the exam, it is covered briefly here and you will be asked to do a limited amount of reading from the Study Text.

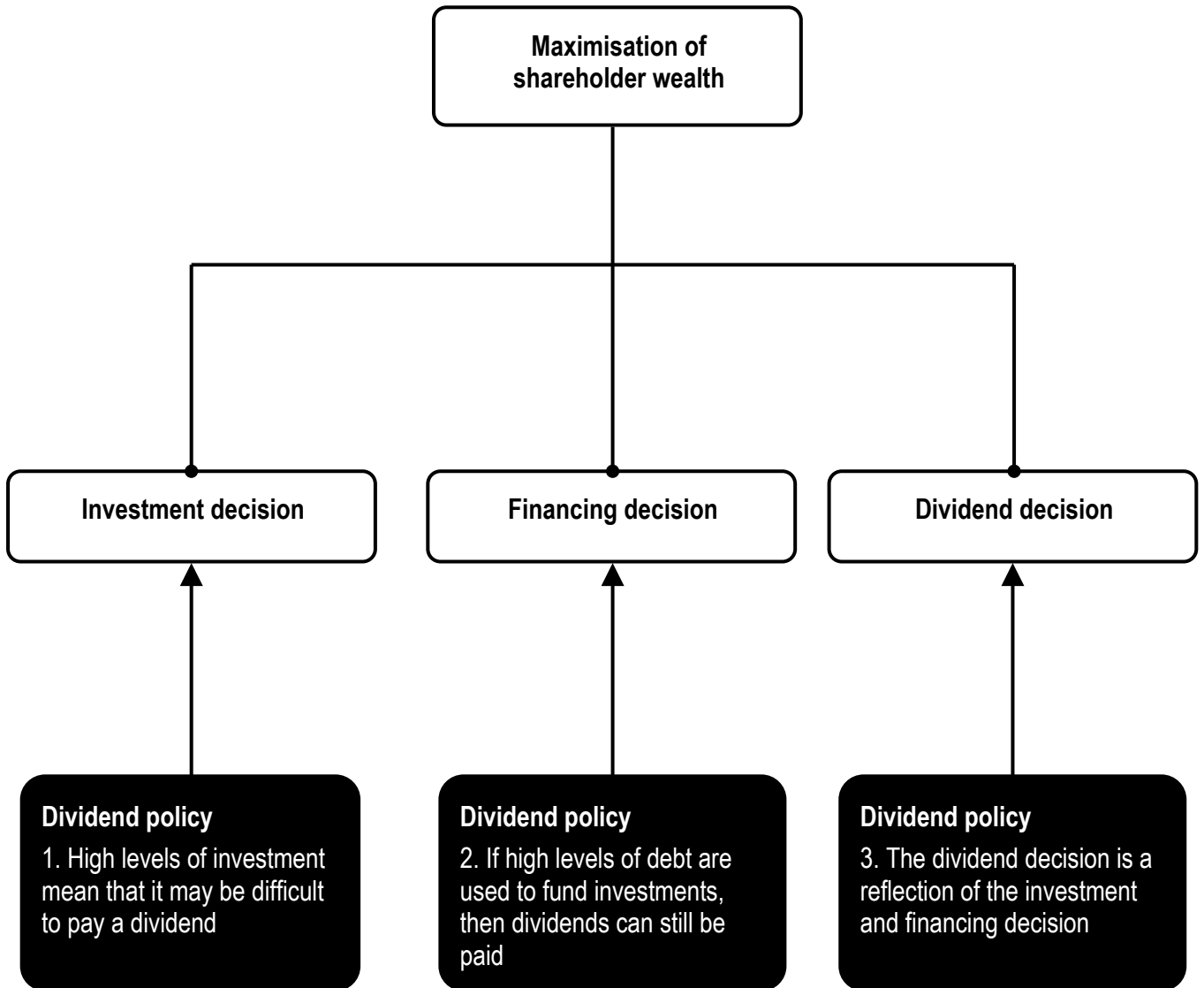
Qualification Context

Dividend policy is taken into an international context in P4 Advanced Financial Management.

Business Context

Up to 2006 RyanAir has never paid a dividend to its shareholders.

Overview



1 Internal sources of finance

- 1.1 In chapter 12 we looked at the external sources of finance available to a business. If a business is generating surplus cash from its operations then this is an obvious and important source of finance (note that this is **not the same as retained profits**).
- 1.2 The **main advantages** of retained earnings are the **speed** of availability, and the lack of **no issue costs**.
- 1.3 The **main disadvantage** is that you are using shareholders' funds (equity) and this is an **expensive source of finance** (see chapter 15) in the sense that shareholders expect high returns.



Section 1

2 Dividend policy

- 2.1 Dividend policy is largely a matter of common sense, and is a reflection of the investment decision and the financing decision.

Investment decision



Section 2

- 2.2 If the company is going through a growth phase, it is unlikely to have sufficient **liquidity** to pay dividends. In this case **shareholder expectations** may well be for the dividend to remain low or 0. This will not be a problem as long as the share price is rising.

Financing decision

- 2.3 If a company can borrow to finance its investments, it can still pay dividends. This is sometimes called borrowing to pay a dividend. There are **legal constraints** over a company's ability to do this; it is only legal if a company has accumulated realised profits.

3 Summary of Chapter 13

3.1



Young company

Zero / Low dividend

High growth / investment needs

Wants to minimise debt

Mature company

High stable dividend

Lower growth

Able & willing to take on debt

END OF CHAPTER

Gearing and capital structure

14

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify and discuss the problems of high levels of gearing.
- Assess the impact of sources of finance on financial position and financial risk using appropriate measures, including:
 - (i) ratio analysis using balance sheet gearing, operational & financial gearing, interest coverage ratio & other relevant ratios
 - (ii) cash flow forecasting
 - (iii) effect on shareholder wealth
- Describe the financing needs of small businesses.
- Describe the nature of the financing problem for small businesses in terms of the funding gap, the maturity gap and inadequate security.
- Explain measures that may be taken to ease the financing problems of SMEs, including the responses of government departments and financial institutions.
- Identify appropriate sources of finance for SMEs and evaluate the financial impact of different sources of finance on SMEs.

Exam Context

Ratio analysis of the impact of debt finance is a key area of the chapter, and was tested for 8 marks in the pilot paper.

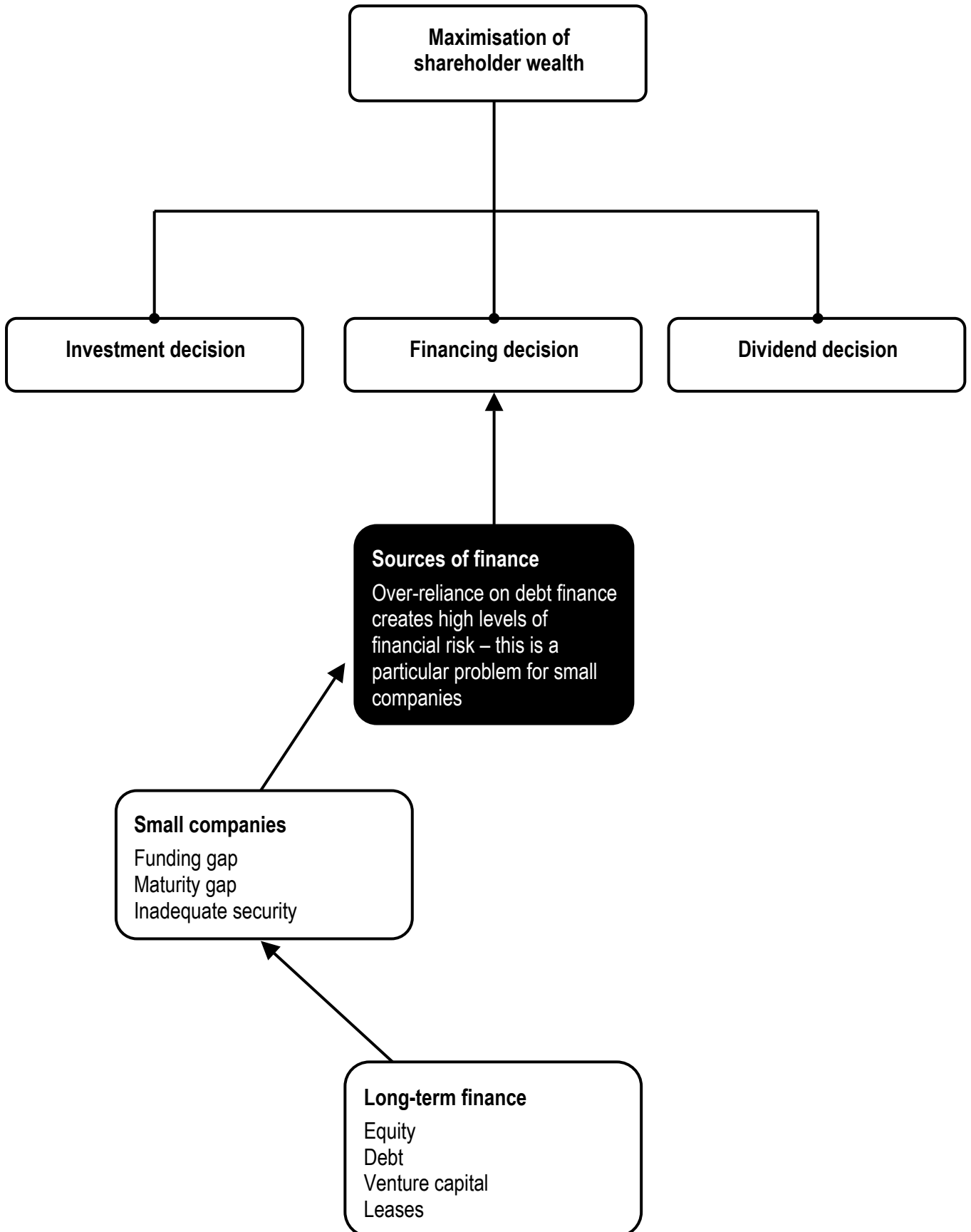
Qualification Context

Gearing and capital structure are taken into an international context in P4 Advanced Financial Management.

Business Context

The difficulties faced by Eurotunnel in paying its interest charges have delayed its payments of dividends to shareholders; this was initially expected to be paid in 2006, but has now been deferred.

Overview



1 Gearing

1.1 In chapter 1 we used **gearing ratios** and **interest cover** to look at the idea that high levels of gearing are **dangerous** for a company. However, **debt can bring benefits** too.

Lecture example 1

Idea generation

Goodtimes plc is an airline. Its latest financial data is as follows:

£m	<i>Last year</i>
Profits before interest and tax	12,000
Interest	3,000
Tax	<u>2,700</u>
Profits after interest and tax	6,300
Preference dividends	200
Dividends	<u>2,000</u>
Retained earnings	5,324
No ordinary shares issued	100,000

Required

Calculate Goodtimes' earnings per share, and interest coverage and discuss why it may have chosen to use significant levels of debt finance.

Solution

Discussion of the advantages of debt finance

1.2 Debt finance may add to shareholder wealth for many reasons, these are debated below.

Advantages of debt finance	Discussion
Debt is a cheap source of finance	And any profit left after paying the interest belongs to the shareholders (discussed in chapters 15 & 16).
The use of debt is a signal of confidence in the company's cash flows	This can be true, but banks would still expect to see some equity being invested.
The use of debt is a discipline on management	Careful cash flow management is needed eg good management of working capital.
The use of debt avoids dilution of earnings per share	A motive in the real world but not may not be valid if higher debt results in a lower P/E ratio.

1.3 A key **problem** of debt finance is that if there is a downturn in business there will be a dramatic cut in the funds available to pay a dividend because of the need to pay interest first. This is illustrated below.

Lecture example 2

Idea generation

Goodtimes plc's latest forecast financial data for the current year is as follows:

£m	<i>Last year</i>	<i>Forecast</i>
Profits before interest and tax	12,000	6,000
Interest	3,000	3,000
Tax	<u>2,700</u>	<u>900</u>
Profits after interest and tax	6,300	2,100
Preference dividends	200	200
Dividends (assuming the same % of earnings is paid out)	2,000	623

Required

Compare the % change in PBIT to the % change in dividends and explain the difference.

Solution

Disadvantages of debt finance

- 1.4 (a) Debt creates higher variability in dividends ie higher 'financial risk'.
 (b) Debt creates higher default risks which can lead to **financial distress costs** such as lower sales or higher supplier costs (this is explored in chapter 16).

Practical influences on the levels of debt ie gearing

- 1.5 In reality the sensible level of gearing for a company will be affected by:

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.
Operational gearing - <i>contribution / PBIT</i>	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.

2 Finance for small and medium sized companies

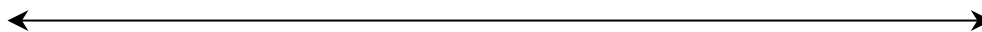
- 2.1 The high failure rate for small companies means that they face particular problems in raising external finance and have few shareholders which makes it difficult to raise internal finance; this is sometimes referred to as the **funding gap**.
- 2.2 Even medium-sized companies will sometimes find that they cannot obtain more debt finance, due **inadequate security** (in the form of assets). This is a particular problem for medium-term projects (eg new advertising campaign) which often do not have the security offered by long-term investments in land & buildings create. The difficulty in obtaining medium-term financing is called **the maturity gap**.
- 2.3 The government has recognised these difficulties and has tried to encourage investment in SMEs.



Section 3.4

3 Summary of Chapter 14

- 3.1 The level of gearing that is appropriate for a business depends on the type of industry that it is in. Mature, asset intensive industries tend to have high gearing; which reflects the advantages that debt finance can bring. High growth companies tend to have low gearing, which reflects the problems that debt finance can bring.



Keep gearing low if:

SME
Volatile cash flows
(high fixed costs, dynamic environment)

High gearing is fine if:

Mature company, stable cash flows

- 3.2 Other topics that relate to this chapter are cash flow forecasting and ratio analysis; these have been covered in earlier chapters.

END OF CHAPTER

The cost of capital

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe the relative risk-return relationship and describe costs of equity and debt.
- Apply the dividend growth model and discuss its weaknesses.
- Describe and explain the assumptions and components of the CAPM.
- Calculate the cost of capital on a wide range of capital instruments, including:
 - (i) irredeemable debt
 - (ii) redeemable debt
 - (iii) convertible debt
 - (iv) preference shares
 - (v) bank debt
- Distinguish between average and marginal costs of capital
- Calculate the weighted average cost of capital (WACC) using book value and market value weightings.

Exam Context

Calculation of the WACC was tested for 9 marks in the pilot paper; and can be expected to feature regularly in the exam.

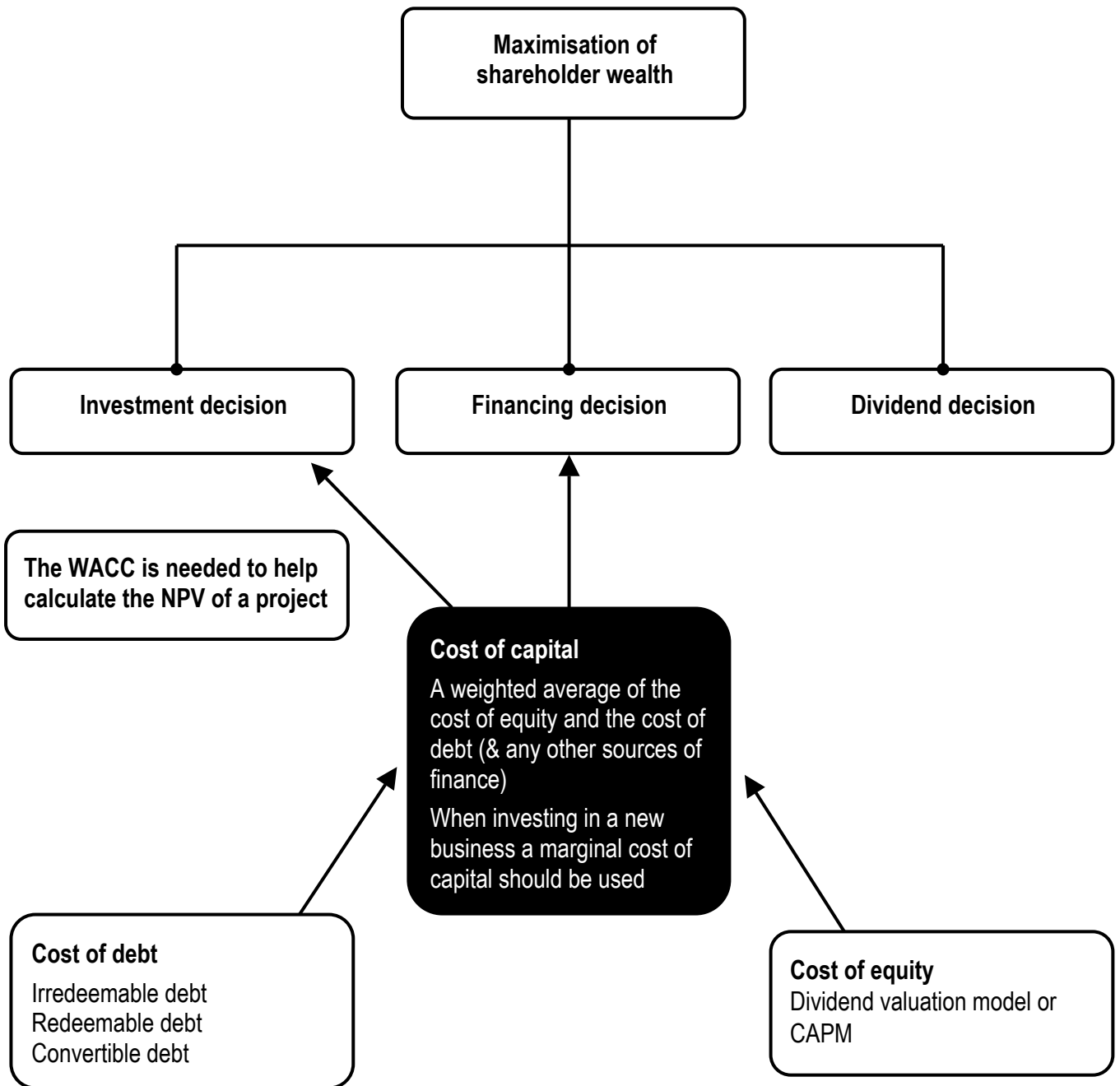
Qualification Context

Cost of capital calculations are developed in P4 Advanced Financial Management to include calculation of international sources of finance.

Business Context

At the time that the Eurotunnel project was initiated, the shareholders invested on the assumption that they would earn an annual return of 14% in this highly risky project.

Overview

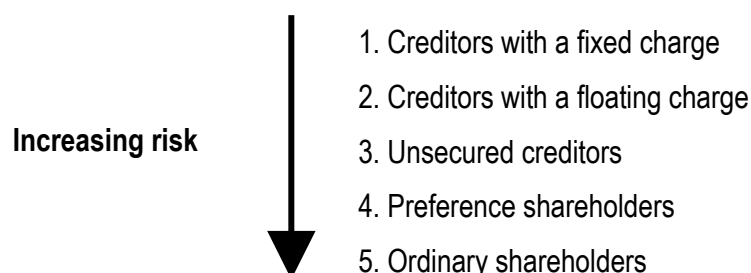


1 Risk-return relationship

- 1.1 To calculate an NPV, a cost of capital is needed. In this chapter you will see how to assess how much does a company has to pay its providers of finance in order to keep them satisfied. The main principle is that the higher the risk faced by the investor, the higher the return they will expect to be paid; this is the **risk-return relationship**.

Creditor hierarchy

- 1.2 In the event of a company being unable to pay its debts and going into liquidation, there is an order in which it has to repay its creditors and investors.



Implications & terminology

- 1.3 The **cheapest finance is debt** (especially if secured) – the cost of debt is **Kd** (pre tax).
The **most expensive finance is equity** (ordinary shares) – the cost of equity is **Ke**.

2 The cost of equity – the dividend growth model

- 2.1 Shareholders often expect a dividend to be paid at the end of the year (D_1), and for that dividend to grow in the future (g). By looking at how much shareholders are prepared to pay for this share (P_0), it is possible to estimate the return that they find acceptable.

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

This equation is **not** given in the exam.

- 2.2 If a firm fails to provide this return to shareholders, then **its share price will fall**; remember that the main aim of financial management is to maximised shareholder wealth.

Lecture example 1

Technique demonstration

Wright plc has just paid a dividend of 60p and has a market value of £5.50. The dividend growth rate is 8%.

Required

What is its cost of equity?

Solution**Assumptions**

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

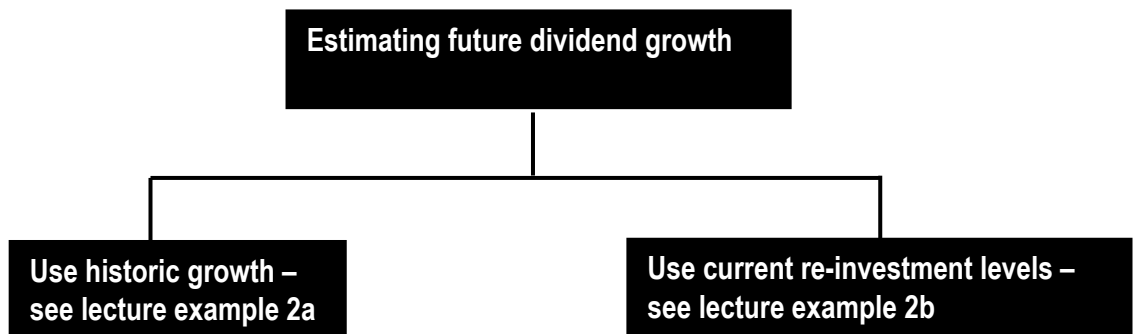
Dividends are paid
& the company has a share price

dividend growth can be estimated & is constant

Footnote : if there is a dividend about to be paid & the share is cum div, then the share price needs to be adjusted by stripping the dividend out of the share price.

Estimating g

2.3 There are 2 methods of estimating g that you need to know, but the examiner may give you the rate in the exam (this is what happened in the pilot paper).



- 2.4 If using the current re-investment level approach – note that the formula $g = br$ is given in the exam.

Lecture example 2

Based on a past exam question worth 6 marks

- (a) PB plc has just declared a dividend of 39.25p per share. Previous dividends have been

4 years ago	30.00p
3 years ago	32.40p
2 years ago	35.40p
1 year ago	36.50p

Required

What is the estimated cost of equity capital if the share price is £8.31?

- (b) RB plc has just paid a dividend per share of 20p. This was 50% of earnings per share. In turn, earnings per share were 30% of net assets per share. The current share price is 125p.

Required

What is the cost of equity capital?

Solution

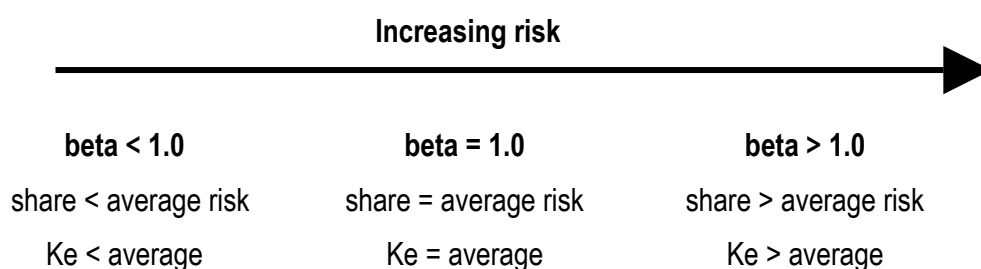
3 The cost of equity – using the CAPM



Section 3.6

- 3.1 The **other method** of calculating the cost of equity (K_e) is to use the **capital asset pricing model (CAPM)**. This model assumes that investors have a broad range of investments, and are worried about how a fall in the stock market as a whole would affect their investments; **some shares are very sensitive to stock market downturns** and because of this risk shareholders would expect a high return on these shares..
- 3.2 Commercial databases monitor the sensitivity of firms to a stockmarket downturn by calculating the **average fall in the return on a share each time there is a 1% fall in the stockmarket as a whole**; this is called a beta factor.

Beta factors



Cost of equity

- 3.2 Having worked out the risk of a company, by measuring its beta, the **Capital Asset Pricing Model** gives a formula for calculating required return.
- 3.3 The CAPM is shown on your formula sheet as:

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

where	$E(r_i)$	=	expected (target) return on security by the investor
	$E(R_m)$	=	expected return in the market
	β	=	the beta of the investment
	R_f	=	the risk-free rate of interest
	$(E(R_m) - R_f)$	=	market premium

Lecture example 3

Technique demonstration

Required

If there is a market premium for risk of 8%, and the risk-free rate is 4%

- (a) what is the required rate of return on a share with an equity beta of 1.6?
- (b) what is the cost of equity if the equity beta of a share is 0.8?

Solution**4 Cost of irredeemable debt**

- 4.1 After making an investment in bonds/debentures/loan stock (nominal value £100), debtholders receive fixed interest only.

Irredeemable debentures (no tax)

- 4.2 Similar to the dividend growth model; the **formula is not given in the exam**:

$$K_d = \frac{i}{P_0} \text{ where } P_0 \text{ is the market value of the debt}$$

Lecture example 4

Technique demonstration

Chappy plc has 8% debentures quoted at 82%.

Required

What is the cost of debt (ignore tax)

Solution

15: THE COST OF CAPITAL

Corporation tax

- 4.3 Paying interest reduces taxable profits which reduces the tax charge, so the cost of debt to the company is reduced.

Irredeemable debt (with tax)

$$K_d = \frac{i(1-t)}{P_0} \text{ where } P_0 \text{ is the market value of debt ex-interest (not given in the exam)}$$

Lecture example 5

Technique demonstration

Required

Recalculate the cost of debt for Chappy plc (see previous example) given that corporation tax is at 30%.

Solution

5 Cost of redeemable debt

- 5.1 If the debt is **redeemable**, the cost of raising the debenture is assessed by looking at the following cash flows:

Time

0	Market value
1 – n	(Interest × [1 – tax])
n	(Redemption value)

- 5.2 (a) Easiest to assess one unit of £100 debt
(b) Tax has no effect on either the market value or the redemption value

IRR approach

- 5.3 In chapter 8, you used internal rate of return to calculate the % return given by a project. The same technique is applied here, and **it is helpful if the cash flows above are laid out so that they look like a project ie**

Time

0	(Market value)
1 – n	Interest × [1 – tax]
n	Redemption value

5.4 Then it is the usual 3 step approach:

5.5 **Step 1 – calculate the NPV of the project at 5%**

If for example the NPV is +, we know that the project gives >5% return

Step 2 – calculate the project at 10%

If for example the project is negative we know that the project gives <10% return

Step 3 – calculate the internal rate of return using the formula

IRR formula

$$\text{IRR} = a + \frac{\text{NPV}_a}{\text{NPV}_a - \text{NPV}_b} (b - a) \quad (\text{not given in the exam})$$

Lecture example 6

Based on a past exam question worth 6 marks

Willco plc has £100,000 5% redeemable debentures in issue. Interest is paid annually on 31 December. The ex-interest market value of the stock on 1 January 2004 is £90 and the stock is redeemable at a 10% premium on 31 December 2009. Corporation tax 30%.

Required

What is the cost of debt?

Solution

15: THE COST OF CAPITAL

- 5.6 If the examiner gives you a **debt beta**, then the cost of debt can be estimated using the CAPM.

Lecture example 7

Technique demonstration

Required

If the market return is expected to be 10% and the risk-free rate is 5%, on debt which has a debt beta of 0.3; what is the cost of debt to the company if the tax rate is 30%?

Solution

6 Convertible debt

- 6.1 Convertible debt can be converted to equity at some future date. Its cost in interest terms tends to be lower than straight debt, but at the date of redemption the debtholders may convert their debt into shares.
- 6.2 If, in example 6, debtholders had the right to convert £100 into 20 shares and the share price at the redemption date was £4, then they would not convert and the calculations would be unchanged. However if the share price was £6 then you would need to redo the IRR using these cash flows:

Time

0	(Market value)
1 – n	Interest \times [1 – tax]
n	Value of the shares (here £120)

7 Cost of preference shares

- 7.1 The preference shareholder will receive a fixed income, based upon the nominal value of the shares held (not the market value). These dividends, whilst fixed and hence showing debt characteristics, are paid out of post-tax profits and therefore **DO NOT** receive tax relief. The cost of preference share capital is calculated as:

$$K_{\text{pref}} = \frac{\text{Preference Dividend}}{\text{Market Value}_{(\text{ex div})}} = \frac{d}{P_0}$$

not given in exam but similar to the dividend growth model

Lecture example 8

Technique demonstration

A company has £100,000 12% preference shares in issue. The nominal value of these shares is £1.

The market value today of the shares is £1.25. A dividend has recently been paid.

Required

Calculate the cost of preference share capital.

Solution

8 Cost of bank debt

- 8.1 The cost of a bank loan will be given by the examiner – multiply this by (1-t) to get the post tax cost.

9 Weighted average cost of capital

Introduction

- 9.1 In the examination, you may be required to calculate the weighted average cost of capital for the business by **combining together the costs of 2 or more of the types of capital covered above.**

WACC formula (given in the exam)

$$9.2 \quad \text{WACC} = \left(\frac{V_e}{V_e + V_d} \right) K_e + \left(\frac{V_d}{V_e + V_d} \right) K_d (1-T)$$

Where 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



Section 5.4

15: THE COST OF CAPITAL

9.3 A third source of finance may have to be added in to the formula

Lecture example 9

Based on a past exam question worth 8 marks

C plc is financed by 10 million £1 ordinary shares and £8,000,000 8% redeemable debentures having market values of £1.60 ex div and £90% ex interest respectively. A dividend of 30p has just been paid and future dividends are expected to grow by 5%. The debentures are redeemable at par in 5 years time.

Required

If taxation is 30%, calculate the WACC.

Solution

Lecture example 10

Supplementary homework example

The current date is 20X5.

Relevant data

	Book values (£m)	Market values (£m)
Equity (50m shares)	140	214
Debt: 10% debentures 20X9	80	90
	Per share	Annual growth rates
Current dividend	24p	6%

Required

If taxation is 30%, calculate the WACC.

Solution



Q7

Use of the WACC

9.4 The WACC can be used as a discount rate at which to appraise projects; if the project has a positive NPV when discounted using the WACC, it should be accepted.

Assumptions

9.5 The WACC can only be used for project evaluation if:

- (a) In the long-term the company will maintain its existing capital structure (Financial Risk)
- (b) The project has the same risk as the company (Business Risk).

Changing risk

9.6 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 called a **marginal cost of capital**. This is **covered in the next chapter**.

10 Summary of Chapter 15

10.1 In order to complete an NPV, you will need to calculate a weighted average cost of the types of capital used by a business. In this chapter we have covered how to calculate the costs of each different type of capital.

Irredeemable debt *	$K_d = \frac{i(1-t)}{P_0}$
Bank loan*	$K_d = \text{interest} \times (1-t)$
Redeemable debt & convertible debt*	$K_d = \text{IRR of the cash flows or CAPM}$
Ordinary shares and preference shares	$K_e = \frac{D_1}{P_0} + g$
Ordinary shares	$E(r_i) = R_f + \beta(E(R_m) - R_f)$

*formula not given

10.2 These costs are then put into the **WACC formula** (given) to calculate the costs of capital for a project.

10.3 If 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 called a **marginal cost of capital** and is covered in the next chapter.

END OF CHAPTER

Capital structure

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe the traditional view of capital structure and its assumptions.
- Describe the views of Modigliani & Miller on capital structure, both without and with corporation tax, and their assumptions.
- Identify a range of capital market imperfections and describe their impact on the views of Modigliani & Miller on capital structure.
- Explain the relevance of pecking order theory to the selection of sources of finance.
- Explain the relationship between company value and cost of capital.
- Discuss the circumstances under which WACC can be used in investment appraisal.
- Discuss the advantages of the CAPM over WACC in determining a project specific cost of capital.
- Apply the CAPM in calculating a project specific cost of capital.

Exam Context

Chapter 14 has already discussed how much debt a company should use; this chapter covers Modigliani and Miller theory and is a contribution to this debate, but is not as important as the material covered in chapter 14. The most important part of this chapter is the section on betas and the marginal cost of capital.

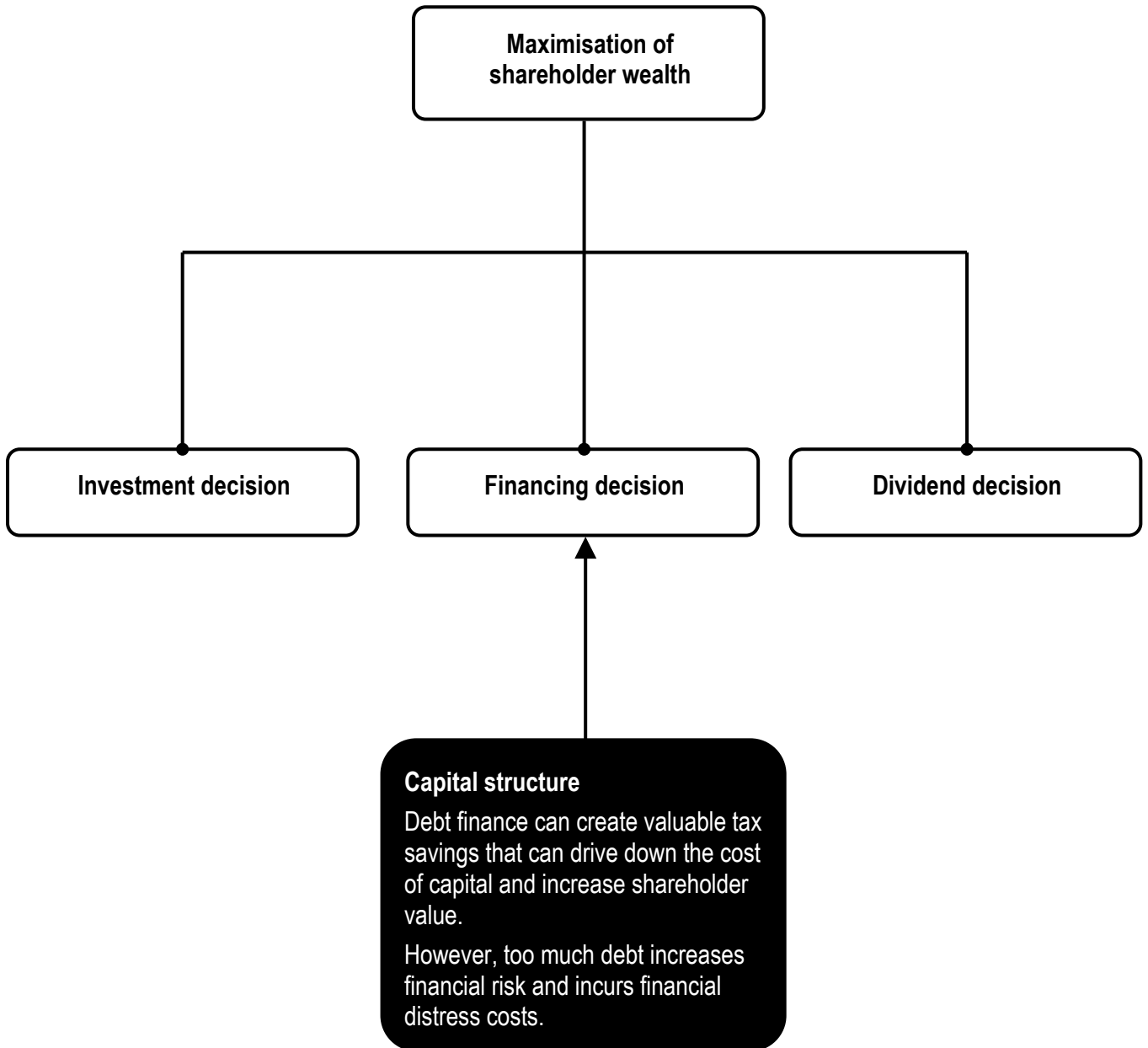
Qualification Context

Betas and capital structure are core areas that are developed in P4 Advanced Financial Management.

Business Context

Brixton became the UK's largest industrial landlord in 2004 through a series of acquisitions that pushed its gearing from 61% to 131%. The company reassured shareholders that it planned to reduce this level to 85% by a series of asset disposals.

Overview

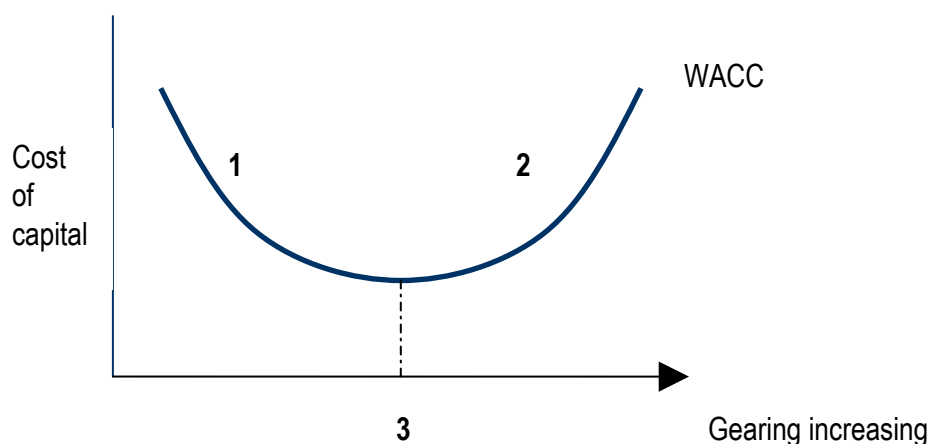


1 Theories of capital structure

- 1.1 In chapter 14 we have already considered a number of **practical influences** on **how much debt a company should use**.
- 1.2 **Here we return to this theme** and review a number of theories of how much debt a company should use. **If debt can be used to lower the cost of capital, then shareholders will benefit.**
- 1.3 **All theories of capital structure aim to focus on the impact of a company changing its gearing so they assume that anything else that could affect a company's cost of capital is constant** (eg business risk) or does not exist (eg issue costs on new capital).

2 Capital structure – traditional theory

- 2.1 A traditional approach to gearing suggests that **debt brings benefits, up to a certain level of gearing that varies from industry to industry**. This is illustrated below.



Lecture example 1

Idea generation

Required

Identify what is happening and why at points 1 & 2 above – and explain the significance of point 3.

Solution

What is happening?

Why?

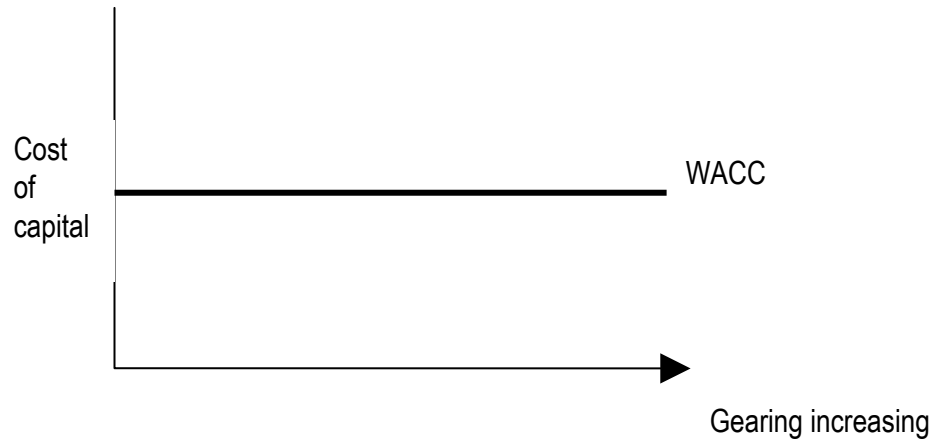
Point 1

Point 2

Point 3 significance?

3 Capital structure – Modigliani & Miller (no tax)

3.1 M&M attempted a more rigorous analysis of the influence of gearing in the late 1950s, initially examining the impact of gearing in a **zero tax environment**.



Lecture example 2

Idea generation

Required

Identify what is happening and why, and whether the level of gearing matters.

Solution

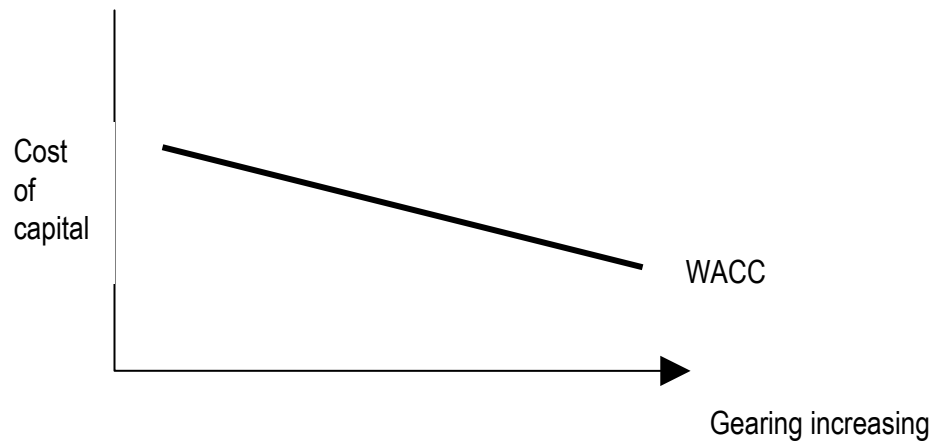
What is happening?

Why?

Does the level of gearing matter?

4 Capital structure – Modigliani & Miller (with tax)

- 4.1 Having shown that debt brought no benefit in a zero tax world, M&M were then able to demonstrate that debt brings benefits in a world with corporation tax, and so a company should use as much debt finance as they can.



Lecture example 3

Idea generation

Required

Identify what is happening and why, and whether the level of gearing matters

Solution

What is happening?

Why?

Does the level of gearing matter?

Key assumptions of M&M

- 4.2 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, higher gearing can give rise to financial distress costs and agency problems. These are explained below.

Capital market imperfections	Examples
Direct financial distress costs	Costs of higher debt payments, and of managing the liquidation process.
Indirect financial distress costs	Loss of sales / higher costs from suppliers. Sale of stock at below market value.
Agency costs	At high levels of gearing, restrictive covenants prevent firms investing.

- 4.3 M&M also ignore the impact of personal tax, which often incentivises share-ownership.
- 4.4 When these factors are taken into account, M&M theory suggests that some debt is good but not too much; this now supports traditional theory.

5 Pecking order theory

- 5.1 This sees the financing decision in practical terms & suggest that firms will finance projects in the following order:

Increasing issue costs ↓	1	Use internal funds if available
	2	Use debt
	3	Issue new equity

- 5.2 This order is partly because of shares being undervalued (the stock market does not know the full benefits of the project being financed so the firm is reluctant to issue new equity).
- 5.3 Pecking order theory is an explanation of what some firms do, **but this does not mean that it is right or that all firms should do it.**

6 Capital structure summary

- 6.1 In chapter 14 we said that the level of gearing that is appropriate for a business depends on the type of industry that it is in. This is supported by the theories of capital structure.



Keep gearing low if:

SME
Volatile cash flows
(high fixed costs, dynamic environment)
If tax benefits < financial distress costs (M&M)

High gearing is fine if:

Mature company, stable cash flows
If tax benefits > financial distress costs (M&M)

7 Project specific (marginal) costs of capital

- 7.1 Differences in capital structure also affect project appraisal (see below) but the precise source of finance used on a project (eg a loan) is often part of a broader plan by a company to keep its gearing at a target level **ie finance is often not specific to a project**.
- 7.2 However, business risk is specific to a project, so when investing in projects with **different business risk a marginal cost of capital (using the CAPM) should be used**. It is inappropriate to use the WACC (as mentioned in chapter 15).



Section 2.7

Step 1 – find a quoted company in that business

- 7.3 An equity beta is the beta of a share, and will be an indication of the risk of the business.

Lecture example 4

Exam standard question

Train plc is an **all equity financed** established company experienced in the provision of training courses. Shares in Train have a beta value of 1.2.

The directors of Train plan to expand their business by buying hotels which are located near their training centres.

Thirté plc is a listed hotel company with **zero gearing**. Its shares have a beta value of 1.5.

The market premium for risk is 8% and the risk-free rate is 4%.

Required

What cost of equity should go into the NPV to appraise the new investment in hotels?

Solution

- 7.4 In reality an equity beta will be also be affected by a company's gearing; if a company has a high equity beta this may be because it has high gearing not because it is a high risk business.
- 7.5 To understand the level of business risk the **equity beta needs to be adjusted** by stripping out the effect of gearing **to create an ungeared or an asset beta** – this measures business risk.

Lecture example 5

Technique demonstration

If Train plc (from lecture example 4) now has a **debt :equity ratio of 1:10** & Thirté plc is a listed hotel company with a **debt: equity ratio of 1:1 and a beta value of 1.5**.

Required

Why can't Train use Thirté's beta of 1.5 to calculate its Ke?

Solution**Step 2 – adjust the beta to reflect differences in gearing**

7.6 Adjust the equity beta by **stripping out the impact of the other company's debt**.

7.7 **Formula (given in the exam)**

$$\beta_a = \left(\frac{V_e}{(V_e + V_d(1-T))} \right) \beta_e + \left(\frac{V_d(1-T)}{(V_e + V_d(1-T))} \right) \beta_d$$

Lecture example 6

Idea generation

If Train plc (from lecture example 4) now has a **debt:equity ratio of 1:10** & Thirté plc is a listed hotel company with a **debt:equity ratio of 1:1 and a beta value of 1.5**.

The market premium for risk is 8% and the risk-free rate is 4%. Tax is 30%.

Required

- Calculate the asset beta of Thirté's beta (assume debt has a beta of zero).
- Can Train use this to calculate its Ke?

Solution

- 7.8 The asset beta will be an indication of the business risk faced but will need to be adjusted for the company's (ie Train's) own gearing. **The asset beta needs to be re-gearred.**

Lecture example 7

Technique demonstration

If Train plc (from lecture example 4) has a **debt:equity ratio of 1:10** & Thirté plc is a listed hotel company with an **asset beta of 0.882**.

The market premium for risk is 8% and the risk-free rate is 4%. Tax is 30%.

Required

Calculate the **equity beta** for Train's shareholders (assume debt has a beta of zero).

Solution

Step 3 – use the re-gearred beta to calculate an appropriate cost of capital

- 7.9 The **regeared beta** shows the risk of the project to shareholders and is **used to calculate a Ke**. This **Ke** is then included in the **WACC** if a combination of debt and equity are used to finance the investment.

Lecture example 8

Technique demonstration

Required

The market premium for risk is 8% and the risk-free rate is 4%. Tax is 30%. **Assume a cost of debt of 4% pre tax.**

- Use the equity beta of 0.944 to calculate Train's cost of equity for this project.
- Calculate Train's WACC for this project (remember its debt:equity ratio of 1:10).

Solution

Lecture example 9

Based on a past exam question worth 10 marks

BPP has a debt:equity ratio of 1:2. It wishes to expand into recruitment consultancy. It has identified that the Beta of a highly geared recruitment consultancy company (company X) is 1.8 - this is its equity beta and is influenced by its high level of gearing of 1:1 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 BPP should use to appraise this investment.

Formula (given in the exam)

$$\beta_a = \left(\frac{V_e}{V_e + V_d(1-T)} \right) \beta_e + \left(\frac{V_d(1-T)}{V_e + V_d(1-T)} \right) \beta_d$$

Solution

Step 1 – find a company's equity beta in the area you are moving into.

Step 2 – ungear the beta, then regear the beta.

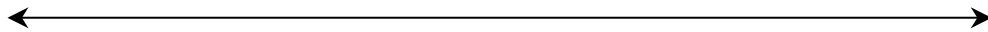
Step 3 – use the equity beta to calculate an appropriate cost of capital.

Problem with a CAPM based marginal cost of capital

- 7.10 A key problem with this approach is **finding a similar company's beta**, this is very difficult in reality.

8 Summary of Chapter 16

- 8.1 The theories of capital structure support the idea that the level of gearing that is appropriate for a business depends on the type of industry that it is in.



Keep gearing low if:

SME
 Volatile cash flows
 (high fixed costs, dynamic environment)
 If tax benefits < financial distress costs (**M&M**)

High gearing is fine if:

Mature company, stable cash flows
 If tax benefits > financial distress costs (**M&M**)

- 8.2 When investing in a new business area, a marginal cost of capital can be calculated by using a 3 step approach:

Step 1 – find a company's beta in the new business area

Step 2 – ungear their beta for their debt, then regear it for your own company's debt

Step 3 – use the K_e to calculate a WACC.

END OF CHAPTER

Business valuations

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Identify and discuss reasons for valuing businesses and financial assets.
- Identify information requirements for valuation and discuss the limitations of different types of information
- Apply asset-based valuation models, including net book value (balance sheet basis), net realisable value basis, and net replacement cost basis.
- Apply income-based valuation models, including: price/earnings methods and earnings yield method
- Apply cash-based valuation models, including : dividend valuation/growth model and discounted cash flow basis.
- Apply appropriate valuation methods to: irredeemable debt, redeemable debt, convertible debt and preference shares.

Exam Context

This chapter is the title of a whole section (section G) within the syllabus. This clearly highlights its importance.

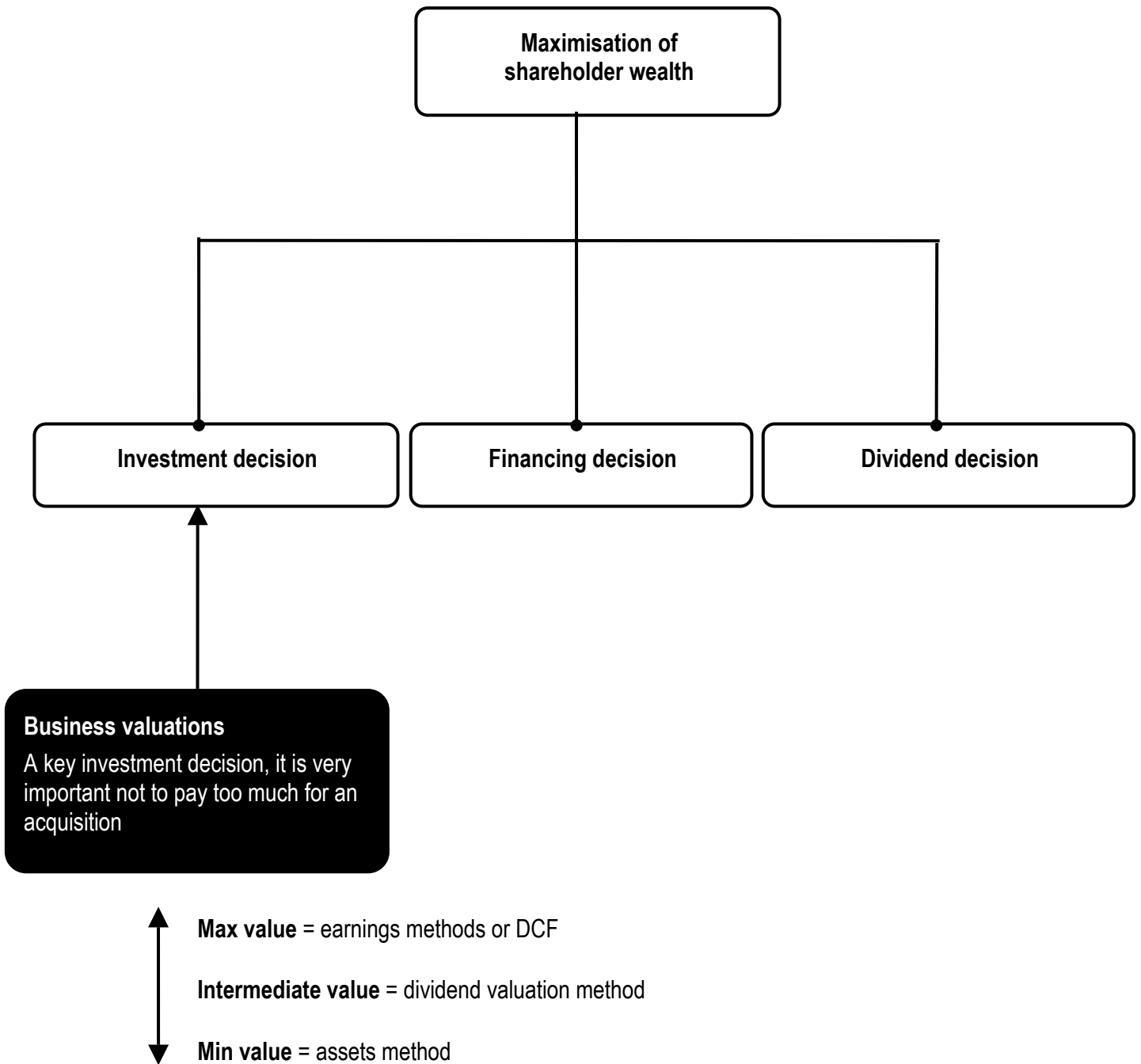
Qualification Context

The detailed practicalities of financing and managing the process of acquiring another company are covered in P4 Advanced Financial Management.

Business Context

Acquisitions are a key investment decision, because of the outlay involved eg in 2000 GlaxoWellcome acquired SmithKline Beecham for £38,600m . If a business pays too much for a target it can seriously harm their shareholders' wealth. This often happens.

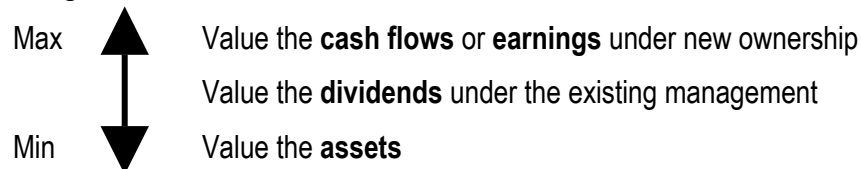
Overview



1 Reasons for business valuations

- 1.1 In making a **bid for another company**, it is important for **the buyer** to create a **range of values** within which a buyer would be prepared to negotiate. When **deciding to float or sell** the company again **the seller** must create a range of values within which to negotiate.

Range of values (normally)



2 Assets basis

- 2.1 If a business is difficult to sell, its owners may be prepared to accept a **minimum bid** that matched the value that they get from a liquidation. There are 2 ways of assessing this:
- (a) **Balance sheet value** - but the book value of assets will differ from their market value
 - (b) **Realisable value** - better, but harder to calculate.
- 2.2 If a company can assess the **replacement value** of the assets, it can work out the cost of setting up the company from scratch without an acquisition. This is very difficult to calculate.

Lecture example 1

Technique demonstration

Groady plc wants to buy an Italian company, Bergerbo, that operates in the same industry.

Bergerbo SpA summarised Balance Sheet as at 31 December 20X3	<i>€(million)</i>
Fixed Assets	50.5
Net current assets	<u>12.3</u>
	62.8
Financed by:	
Ordinary Shares (€100 par value)	10.4
Reserves	19.3
Medium and Long term bank loans	<u>33.1</u>
	62.8

Required

Calculate the balance sheet valuation of Bergerbo

Solution

Disadvantages

2.3 This method ignores intangible assets & future profits.

3 Dividend basis

Range of values (normally)

Max



Min

Value the **dividends** under the existing management

3.1 The value of a share is calculated as the present value of the future dividends being generated by the existing management team. It is generally more relevant for **minority shareholders**.

3.2 Value per share = $P_0 = \frac{d_0 (1+g)}{K_e - g}$ **this is given on the formula sheet**

Where d_0 = dividend paid now

K_e = cost of equity **of the target**

g = growth rate in dividends

3.3 Refer to chapter 14 to revise the 2 methods of estimating 'g'.

Lecture example 2

Technique demonstration

Groady plc wants to acquire an Italian company, Bergerbo SpA, **continued**.

Bergerbo SpA summarised income statement for the year ending 31 December 20X3

	€(million)
PBIT	5.8
Interest expense	2.3
Taxable Profit	<u>3.5</u>
Taxation (25%)	0.9
Profit After Tax	<u>2.6</u>
Dividend	2.0

There are conflicting views on Bergabo's future dividend growth potential, some analysts think that the dividend will not grow for the foreseeable future, others estimate that the dividend growth rate will be 3% pa. **Bergabo's cost of equity** is estimated at 7.6%.

Required

Calculate a dividend valuation for Bergerbo, assuming

- no dividend growth
- 3% pa dividend growth

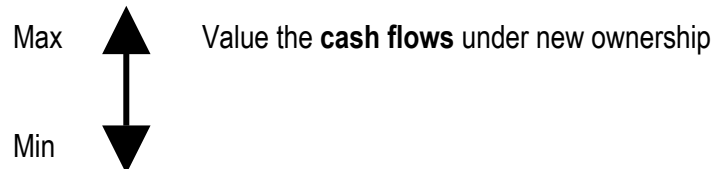
Solution

Disadvantages

- 3.4 (a) It is difficult to estimating future dividend growth
 (b) It is inaccurate to assume that growth will be constant
 (c) It creates zero values for zero dividend companies.
 (d) It creates negative values for high growth companies, if $g > K_e$

4 Discounted cash flow basis

Range of values (normally)



- 4.1 The value of a share is calculated as the present value of the future cash flows that will be **generated by the new management team**. It includes **forecast synergies**.
- 4.2 The **post tax and post interest cash flows** are discounted at the cost of equity of the target company.

5 Earnings basis

Range of values (normally)

Max



Value the **earnings** under new ownership

Min



5.1 Market value = P/E × Earnings



Case 4

Shows the market's view
of the growth prospects /
risk of a company

Shows the current
profitability of the
company

Lecture example 3

Technique demonstration

Groady plc wants to acquire an Italian company, Bergerbo SpA, continued.

Bergerbo SpA summarised income statement for the year ending 31 December 20X3

	€(million)
PBIT	5.8
Interest expense	2.3
Taxable Profit	<u>3.5</u>
Taxation (25%)	0.9
Profit After Tax	<u>2.6</u>
Dividend	2.0

Bergerbo's share price is currently €430

Groady's P/E is currently 21.2 whilst the industry average is 19.5

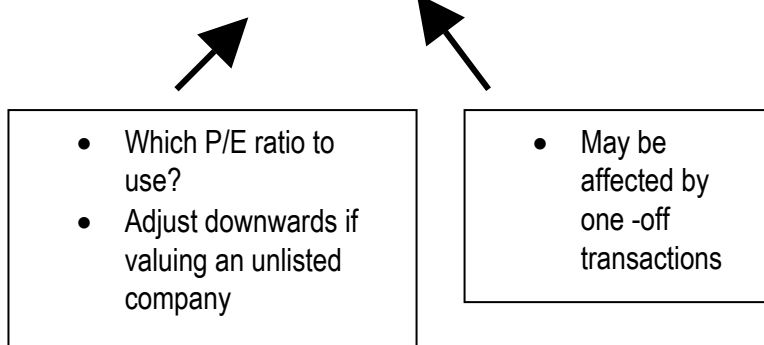
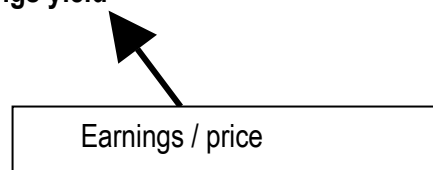
Required

- Calculate possible total share values for Bergerbo, using the P/E method
- Construct a range of share prices within which Groady plc will be prepared to negotiate

Solution



Q8

Disadvantages5.2 $\text{Market value} = \text{P/E} \times \text{Earnings}$ **Earnings yield method**5.3 $\text{Market value} = \text{Earnings} / \text{earnings yield}$ 

6 Valuation of other securities



Section 5

- 6.1 Discounted cash flow techniques can be used to value irredeemable debt, redeemable debt, convertible debt and preference shares.

7 Summary of Chapter 17

- 7.1 In making a **bid for another company**, it is important for **the buyer** to create a **range of values** within which a buyer would be prepared to negotiate. When **deciding to float or sell** the company again **the seller** must value the shares and create a range of values within which to negotiate.

Range of values (normally)

Max	▲	Value the cash flows or earnings under new ownership
	↕	Value the dividends under the existing management
Min	▼	Value the assets

- 7.2 DCF techniques can also be used to value other securities.

END OF CHAPTER

Market efficiency

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Distinguish between and discuss weak form efficiency, semi-strong form efficiency and strong form efficiency
- Discuss practical valuation considerations of shares and businesses, including:
 - (i) marketability and liquidity of shares
 - (ii) availability and sources of information
 - (iii) market imperfections and pricing anomalies
 - (iv) market capitalisation
- Describe the significance of investor speculation and the explanations of investor decisions offered by behavioural finance.

Exam Context

This brief chapter is mainly home study, and is not likely to form a major part of an exam question.

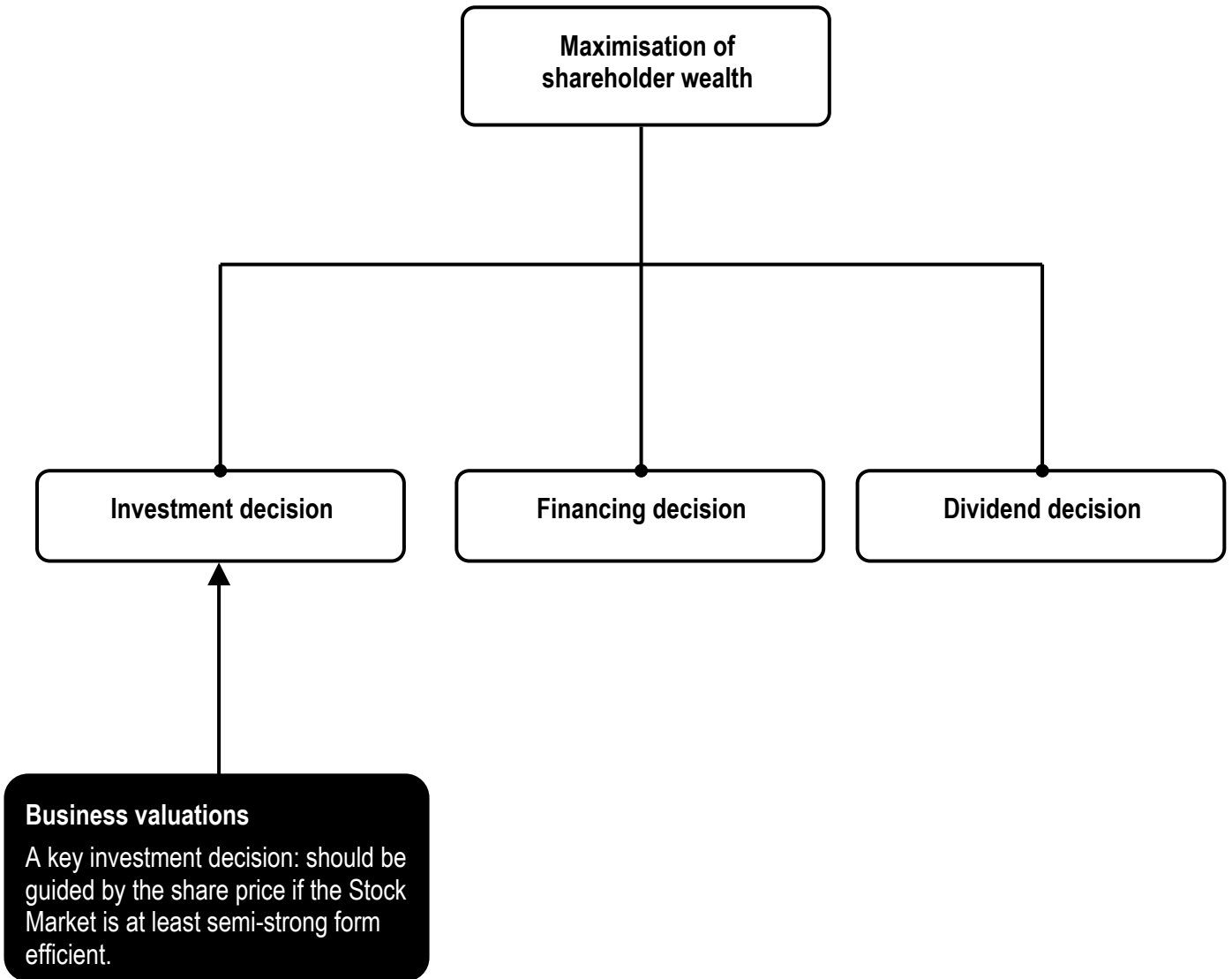
Qualification Context

The detailed practicalities of business valuations are also covered in P4 Advanced Financial Management.

Business Context

Inion, a Finnish medical devices company, chose to list on the London Stock Exchange rather than the Helsinki Stock Exchange because it felt that it would be more accurately priced on the London market.

Overview



1 The efficient market hypothesis



Section 2

- 1.1 The capital markets have been shown to operate at 3 varying levels of efficiency in their speed and accuracy in re-pricing shares as new information becomes available.

Levels of efficiency	Explanation
Weak form efficiency	Share prices reflect all historical information including past share price movements Investors can't make excess profits through chartist techniques (technical analysis)
Semi-strong form efficiency	As above & reflects all publicly available information Professional investors can't beat the market in the long term unless they know something that the market doesn't.
Strong form efficiency	As above & reflects information held privately by the directors

Semi-strong form

- 1.2 Most studies support the view that the London Stock Exchange is semi-strong form efficient. If true, then the implications of this are that:
- the **share price of a company is the best basis for a takeover bid**, a company should only pay more than the market price if there are synergies.
 - the directors should take the correct investment / financing / risk management decisions & **make this information public** (press release, annual accounts).

END OF CHAPTER

Foreign currency risk

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe and discuss different types of foreign exchange risk: translation risk, transaction risk, economic risk.
- Describe the causes of exchange rate fluctuations, including:
 - (i) balance of payments
 - (ii) purchasing power parity theory
 - (iii) interest rate parity theory
 - (iv) four-way equivalence
- Forecast exchange rates using purchasing power parity theory and interest rate parity theory.
- Discuss and apply traditional and basic methods of foreign currency risk management, including: currency of invoice, netting and matching, leading & lagging, forward exchange contracts, money market hedging, asset & liability management
- Compare and evaluate traditional methods of foreign currency risk management
- Identify the main types of foreign currency derivatives used to hedge foreign currency risk and explain how they are used in hedging.

Exam Context

This chapter was tested for 25 marks in the pilot paper!

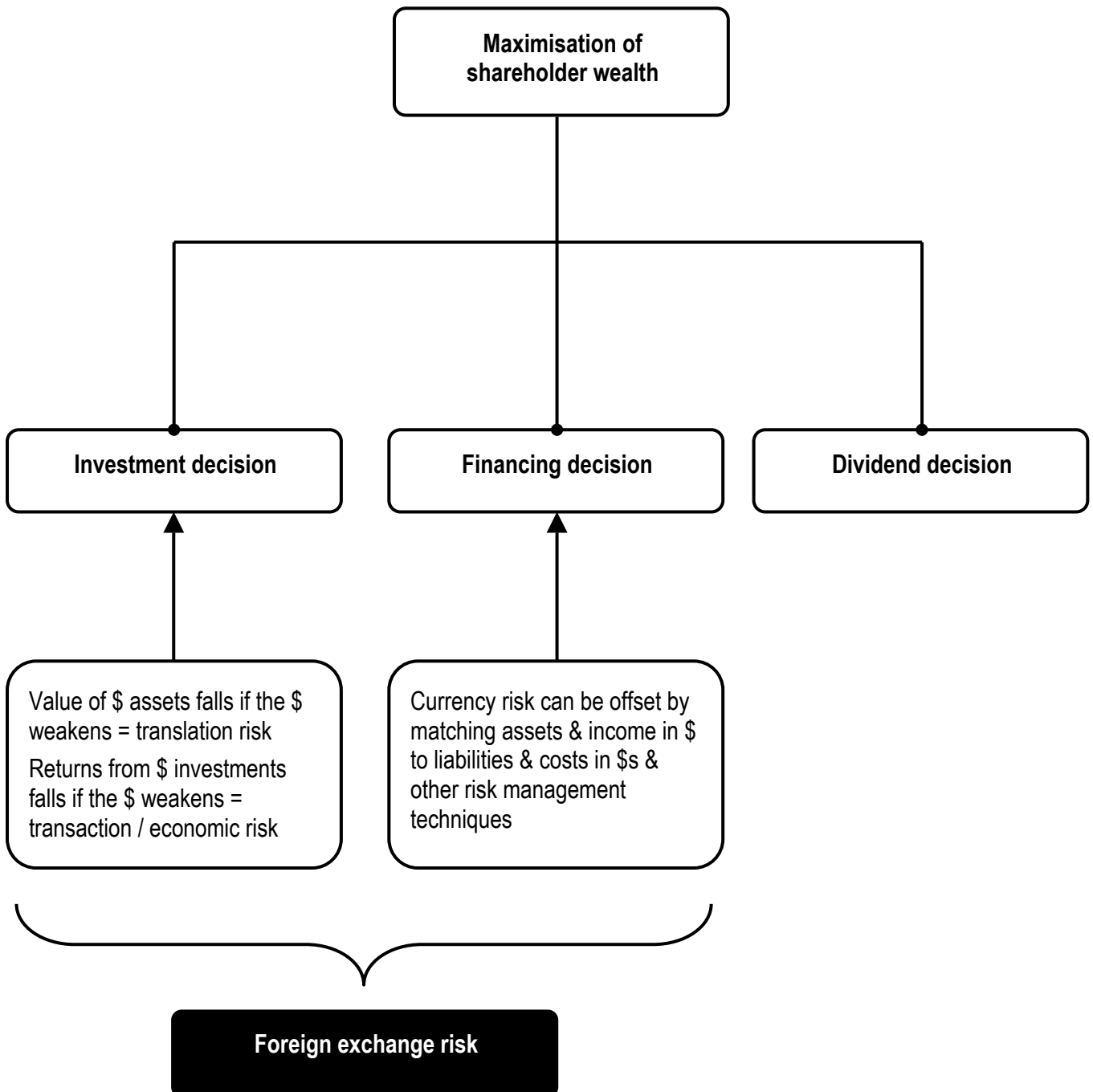
Qualification Context

Derivatives are a major topic in P4 Advanced Financial Management.

Business Context

In 2005 VW made €1.2 billion of currency losses, mainly due to the effect of a weak dollar on the value of their \$ revenue.

Overview



1 Types of foreign exchange risk & terminology

Type of risk	Definition
Translation risk	£ value of overseas assets falls or the £ value of overseas liabilities rises
Economic risk	Long-term movements in the exchange rate damage the value of a company
Transaction risk	£ value of \$ revenue is lower than expected at the time the transaction was agreed or the £ cost of \$ payments is higher than expected

- 1.1 The main focus of this chapter is transaction risk; managing the other types of risk is discussed briefly at the end of the chapter.

Lecture example 1

Preparation

During 2003, the value of the £ increased by 20% against the \$; from 1.5\$/£ to 1.8\$/£.

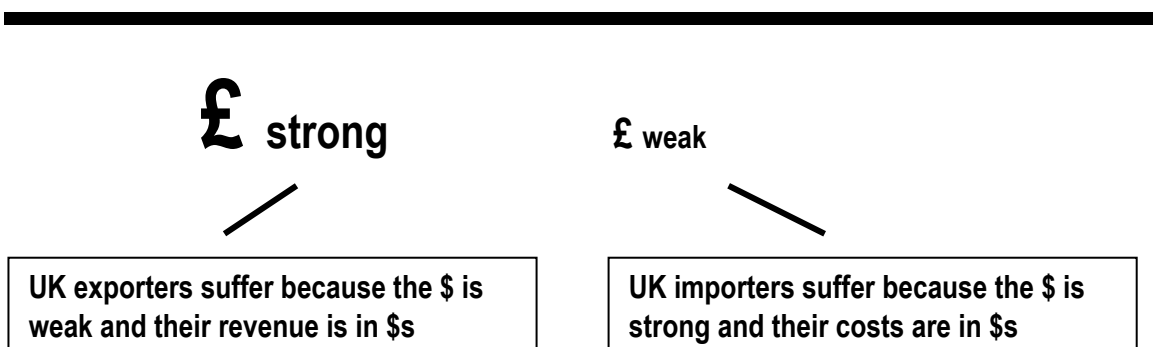
Required

- Calculate the impact of this on a UK exporter due to receive \$180,000 from a US customer
- Calculate the impact of this on a UK importer due to pay \$180,000 to a US supplier

Solution

(a)

(b)



19: FOREIGN CURRENCY RISK

Terminology

- 1.2 A spot rate is the rate available if **buying** or **selling** the currency **immediately**. In the UK exchange rates are shown **per £** eg 1.9615 \$/£.

UK exporter

Receives \$



Buys £

UK importer

Pays out in \$s



Sells £

- 1.3 A bank would not offer a rate of 1.9615 \$/£ to both exporters and importers; instead, it will charge them different rates and make a profit on the **spread**. Spreads can be shown in different ways; you **do not have to remember** these different methods, just make sure you can interpret them.

Spot rate		1.9612	–	1.9618 \$/£
Spot rate	\$/£	1.9615	+/-	0.0003

- 1.4 Remember that a company will always be offered the **worst rate**.

UK exporter



Buys £
Pays a high price

UK importer



Sells £
Receives the low price

- 1.5 You can remember this as 'always use the worst rate' or '**high expectations**' etc.

Lecture example 2

Preparation

Exchange rates on January 30th 2007 were \$/£ 1.9615 +/- 0.0003.

Required

- (a) Calculate the receipts from a \$1m sale to a US customer
(b) Calculate the cost of paying an invoice of \$1m.

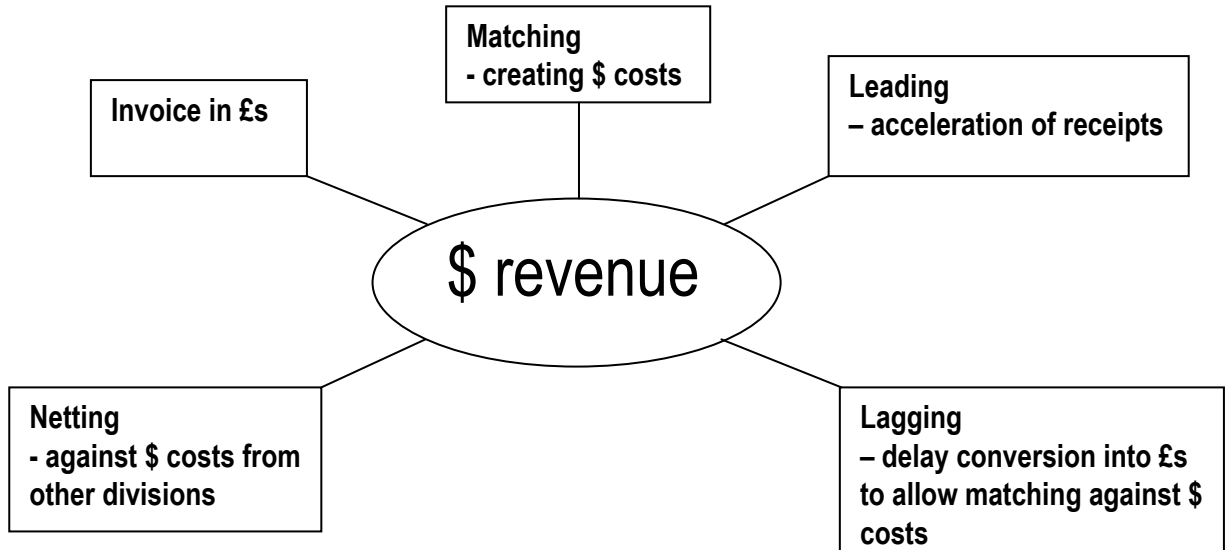
Solution

(a)

(b)

2 Managing transaction risk – internal methods

- 2.1 Simple techniques can be used to eliminate some of the risk faced by a company. These are illustrated below from the viewpoint of a UK company exporting to the USA, so **the risk is that the \$ will fall in value.**



3 Managing transaction risk – forward contracts

- 3.1 A **contract** with a bank covering a **specific amount of** foreign currency (FX) at an **exchange rate agreed now.**

Quotation of forward rates

- 3.2 Again a bank will quote a (larger) **spread**, which can be quoted in different ways.

Forward rate	1.9600	– 1.9612 \$/£
Forward rate	\$/£	1.9606 +/- 0.0006

- 3.3 Again, a company will always be offered the **worst rate**; and you can remember this as 'always use the worst rate' or '**high expectations**' etc.

- 3.4 Finally the forward rate is sometimes quoted as an adjustment to the spot.

	<u>Spot</u>	<u>3 month forward</u>
US \$/£	1.9612 - 1.9618	0.0012 – 0.0006 premium

- 3.5 **If so, subtract the premium (!!)** – or, **add a discount**

Lecture example 3

Preparation

Exchange rates on January 30th 20X7 are \$/£1.9615 +/- 0.0003 and forward rates are \$/£1.9605 +/- 0.0007

Required

- (a) Calculate the receipts from a \$1m sale to a US customer, due to be received in 3 months time if forward rates are used.
- (b) Calculate the cost of paying an invoice of \$1m in 3 months time, if forward rates are used.

Solution

(a)

(b)

Advantages of forward rates	Disadvantages of forward rates
<ul style="list-style-type: none"> • Simple 	<ul style="list-style-type: none"> • Fixed date agreements
<ul style="list-style-type: none"> • Low or zero up-front costs 	<ul style="list-style-type: none"> • Rate quoted may be unattractive
<ul style="list-style-type: none"> • Available for many currencies 	
<ul style="list-style-type: none"> • Normally available for more than a year ahead 	

4 Managing transaction risk – money market hedging

Exports

▲
 Borrow in \$s today

Expect revenue in \$s in 3 months

- 4.1 This is likely to be attractive if having the company has a liquidity problem today.
- 4.2 In the exam a tabular approach can be helpful; it involves 5 steps.

	EXPORTER	
	UK £s	USA \$s
Now	4. pay \$ loan into your UK bank account today	3. take out \$ loan
	(1 + deposit rate)*	(1 + borrowing rate)*
3 months	5. to compare to a forward	1. receive \$ from export 2. pay off \$ loan with export revenue

* remember to take the interest rate quoted and multiply by 3/12 if a 3 month loan

Lecture example 4

Technique demonstration

Three month interest rates on January 30th 20X7 are as follows:

	UK	US
Borrowing rates	5.59%	5.38%
Deposit rates	5.50%	5.31%

The spot rate is \$/£ 1.9615 +/- 0.0003.

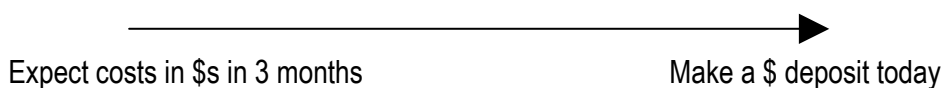
Required

Calculate the receipts from a \$1m sale to a US customer, due to be received in 3 months time if money market hedging is used & compare to a forward contract (example 3a).

Solution

	EXPORTER	
	UK £s	USA \$s
Now		
3 months		

Imports



4.3 This is likely to be attractive if having the company has a cash surplus today.

19: FOREIGN CURRENCY RISK

4.4 In the exam a tabular approach can be helpful; it involves 5 steps.

	IMPORTER	
	UK £s	USA \$s
Now	4. withdraw funds from UK bank account today	3. put money into a US bank account
	(1 + borrowing rate)*	(1 + deposit)*
3 months	5. to compare to a forward	1. Pay \$ invoice from supplier 2. Pay off this invoice with \$s in deposit account

* remember to take the interest rate quoted and multiply by 3/12

Lecture example 5

Technique demonstration

Three month interest rates on January 30th 20X7 are as follows:

	UK	US
Borrowing rates	5.59%	5.38%
Deposit rates	5.50%	5.31%

The spot rate is \$/£ 1.9615 +/- 0.0003.

Required

Calculate the £ cost of an invoice for \$1m payable in 3 months time if money market hedging is used & compare to the result from a forward contract (lecture example 3b).

Solution

	IMPORTER	
	UK £s	USA \$s
<u>Now</u>		
<u>3 months</u>		

4.5 Money market hedging is unlikely to be better than a forward contract, because forward exchange rates are calculated by looking interest rate differences between two countries.

Advantages of money market hedging	Disadvantages
<ul style="list-style-type: none"> May be cheaper if an exporter with a cash flow deficit or an importer with a cash flow surplus 	<ul style="list-style-type: none"> More time consuming than a forward contract and normally no cheaper

Lecture example 6

Exam standard question for 15 marks

Fidden plc is a medium sized UK company with export and import trade with the USA. The following transactions are due within the next six months:

1. Sale of finished goods, cash receipt due in three months: \$197,000.
2. Purchase of finished goods for resale, cash payment due in six months: \$447,000.
3. Sale of finished goods, cash receipt due in six months: \$154,000.

<u>Exchange rates</u>	<u>\$/£</u>	
Spot	1.9615 +/- 0.0003	
Three months forward	1.9605 +/- 0.0007	
Six months forward	1.9596 +/- 0.0011	
<u>Interest rates (3 or 6 months)</u>	<i>Borrowing</i>	<i>Lending</i>
Sterling	5.59%	5.5%
Dollars	5.38%	5.31%

Required

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

- (a) the forward foreign exchange market;
- (b) the money market.

Solution

5 Managing transaction risk – derivatives

Futures

5.1 Here is how a currency future would work for a UK exporter.

Now	3 months time
	1. \$ revenue expected, will be converted into £s <u>at spot rate</u> in 3 months time
2. Agree an exchange rate for 3 months time with the futures market (Contract to buy £s)	
3. Pay a <u>deposit</u>	4. If the exchange rate has moved against you in 3 months time receive compensation or
	4. If the exchange rate has moved in your favour in 3 months time pay out losses
	5. Net effect = fixed outcome

Advantages of futures	Disadvantages of futures
<ul style="list-style-type: none"> Flexible dates ie a September futures can be used on any day up to the end of September 	<ul style="list-style-type: none"> Only available in large contract sizes
	<ul style="list-style-type: none"> Deposit needs to be topped up on a daily basis if the contract is incurring losses

Options

5.2 Here is how a currency option would work for a UK exporter.

Now	3 months time
	1. \$ revenue expected in 3 months time, will be converted into £s <u>at spot rate</u>
2. Agree an optional exchange rate for 3 months time with the options market Call option	
3. Pay a non-returnable <u>premium</u>	
	4. If the exchange rate has moved against you in 3 months time use the option or
	4. If the exchange rate has moved in your favour in 3 months time use the spot rate
	5. Net effect = worst case known, with upside potential

Advantages of options	Disadvantages of options
<ul style="list-style-type: none"> • Flexible dates (like a future) 	<ul style="list-style-type: none"> • Only available in large contract sizes
<ul style="list-style-type: none"> • Allow a company to take advantage of favourable movements in exchange rates. Options are the only form of hedging that does this. 	<ul style="list-style-type: none"> • Expensive
<ul style="list-style-type: none"> • Useful for uncertain transactions, can be sold if not needed 	

6 Other risks

Translation risk

6.1 The risk that the £ value of overseas assets falls or the £ value of overseas liabilities rises



Section 5.3

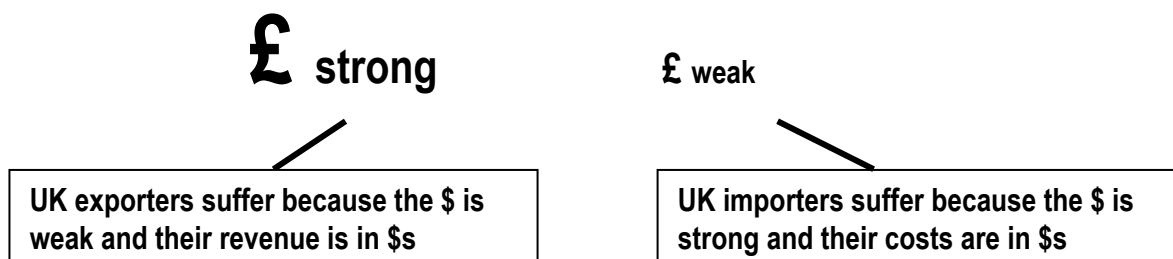
6.2 This is not a cash flow, but is still a worry for some companies because of its potential profit impact. To manage translation risk a company that has \$ assets should **match** them with \$ liabilities (ie use \$ debt finance). One way of obtaining \$ debt finance is to use a **currency swap** (not examinable with numbers).

19: FOREIGN CURRENCY RISK

Economic risk

6.3 Long-term movements in the exchange rate that damage the value of a company. Long-run exchange rate movements (see next section) should be **carefully analysed**.

6.4 We saw earlier that



6.5 A company should be **careful about developing export markets whose currencies are likely to weaken**, or in relying on suppliers where the currency is likely to strengthen.

7 Forecasting exchange rate movements

7.1 There are a number of factors that influence exchange rates over the long term: the balance of payments, inflation and interest rates

Balance of payments

7.2 If an economy is importing more than it is exporting, this can weaken its currency.

Inflation

7.3 **High rates of inflation** in a foreign country erode the purchasing power of that currency. Over time this affects the currency markets, and **leads to a fall in the value of its currency. This is purchasing power parity theory. The formula is given.**

$$S_1 = S_0 \times \frac{(1+hc)}{(1+hb)}$$

hb= base country inflation & hc = inflation in country overseas

Lecture example 7

Exam standard question for 7 marks

The €/£ exchange rate in January 2007 was 1.5; inflation in Europe was 2.1% and 2.7% in the UK

Required

Forecast the €/£ exchange rate for the next 3 years and comment on the implications.

Solution

Interest rates

- 7.4 In the **long term** two countries of similar risk should offer similar rates of return to international investors so **any differences in interest rates should reflect differences in inflation**. High rates of inflation in a foreign country weaken its exchange rate so **high interest rates are associated with weakening currencies**.
- 7.5 In the short-run banks use interest rates to **calculate forward exchange rates**; this is **interest rate parity theory**.

$$F_0 = S_0 \times \frac{(1+ic)}{(1+ib)} \quad \text{b= base country \& c = country overseas} \quad \text{formula given}$$

Lecture example 8

Exam standard question for 7 marks

The €/£ exchange rate in January 2007 was 1.5; inflation in Europe was 2.1% and 2.7% in the UK. A company is considering taking out a 1 year £10m bank loan in euros at 6% or in £ at 6.6%

Required

Advise the company whether to take advantage of lower interest rates in Europe.

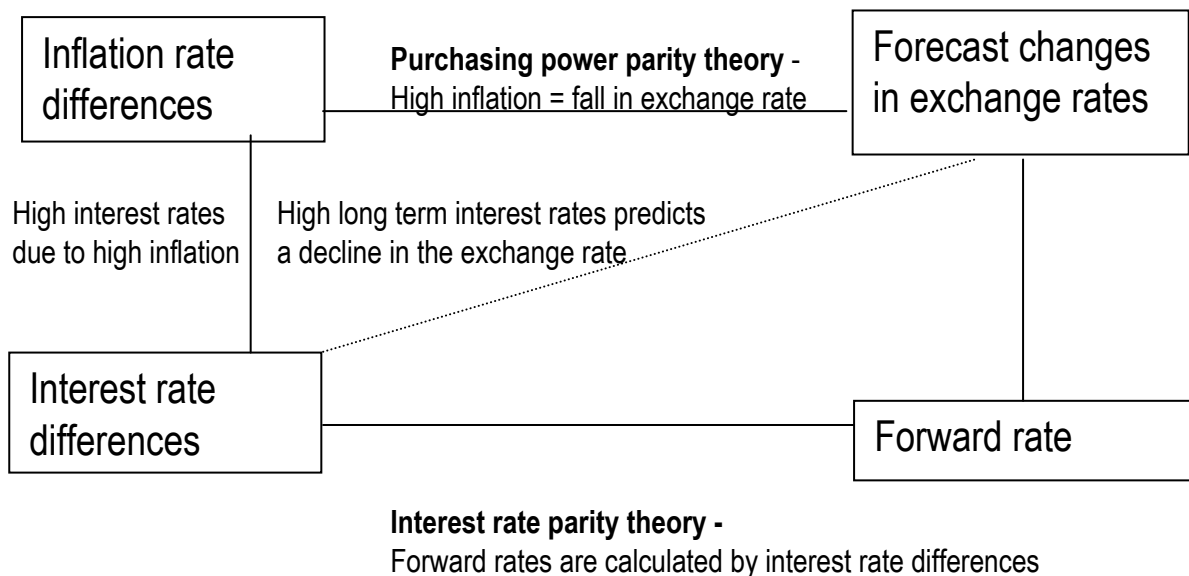
Solution

Four way equivalence

- 7.5 There is a link between interest rates, inflation, the expected forward rate and the expected spot rate. This is sometimes called the four way equivalence model.

19: FOREIGN CURRENCY RISK

7.6



8 Summary of Chapter 19



Cases 3 & 5

8.1 If a company wants to eliminate transaction risk, it has a number of internal and external hedging techniques at its disposal. Internal hedging techniques were also covered in chapter 5 - see 'managing foreign currency receivables and payables'.

8.2 The main external hedging techniques are:

	Pros	Cons
FORWARD CONTRACT	<ul style="list-style-type: none"> any amount / most currencies free & simple to monitor 	<ul style="list-style-type: none"> problem if paid late unattractive rates offered
MONEY MARKET HEDGES	<ul style="list-style-type: none"> good for exporters with a cash flow shortage good for importers with a cash flow surplus 	<ul style="list-style-type: none"> more time consuming than forwards borrowing rates on overseas loan may be high
FUTURES	<ul style="list-style-type: none"> flexible dates 	<ul style="list-style-type: none"> only major currencies standard contract sizes 5% margin (deposit)
OPTIONS	<ul style="list-style-type: none"> exploit favourable exchange rates can be sold on if not needed flexible dates 	<ul style="list-style-type: none"> expensive

8.3 Translation risk and economic risk both require a firm to forecast exchange rates; it is unwise to have assets/ cash inflows in a currency that may weaken.

END OF CHAPTER

Interest rate risk

Syllabus Guide Detailed Outcomes

Having studied this chapter you will be able to:

- Describe and discuss different types of interest rate risk: gap exposure, basis risk.
- Describe the causes of interest rate fluctuations, including: structure of interest rates and yield curves, expectations theory, liquidity preference theory, market segmentation.
- Discuss and apply traditional and basic methods of interest rate risk management, including: matching and smoothing, forward rate agreements and asset & liability management.
- Identify the main types of interest rate derivatives used to hedge interest rate risk and explain how they are used in hedging.

Exam Context

Most of this chapter is based on chapter 19; concentrate on the yield curve section, this is likely to be the most important area for the exam.

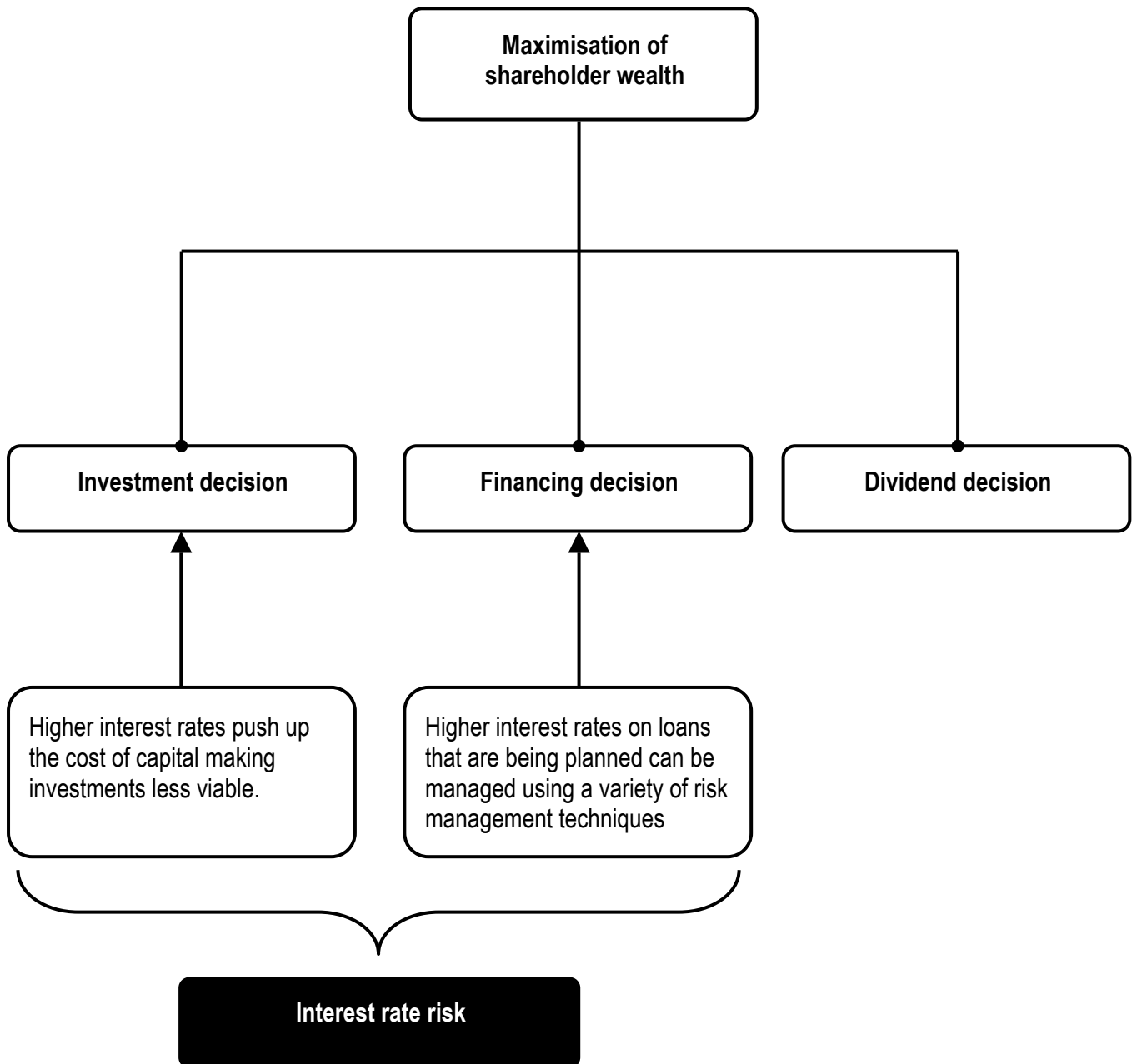
Qualification Context

Derivatives are a major topic in P4 Advanced Financial Management.

Business Context

In 2005, City Lofts, a leading apartment developer announced that it had purchased interest rate options to cap the risk of higher interest rates on £45m of its debt portfolio until 2007.

Overview



1 Types of interest rate risk



Section 2.3-2.4

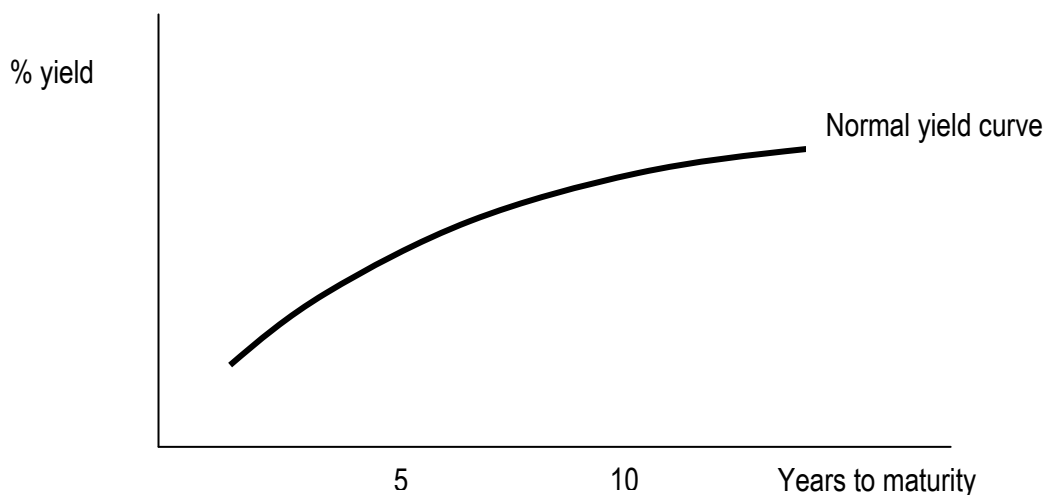
Type of risk	Explanation
Higher costs on existing loans	If loans are at a variable or floating rate
Higher costs on <u>planned</u> loans	Even if fixed interest finance is used
Basis risk	Interest bearing liabilities and interest bearing assets may not move perfectly in line with each other Mainly relevant to banks
Gap exposure	Interest rates on interest bearing liabilities and interest bearing assets may be revised at different time periods Mainly relevant to banks

2 Causes of interest rate fluctuations

- 2.1 In chapter 2 we saw that interest rates are a tool used by the government to achieve its policy objectives; here the focus is on how interest rates are expected to change in the near future.

The yield curve and the term structure of interest rates

- 2.2 The term structure of interest rates refers to how the yield on bonds of a certain type eg government bonds vary according to the term of the borrowing. Normally, the longer the term of an asset to maturity, the higher the rate of interest paid on the asset. This can be shown as a **yield curve**.



- 2.3 There are a number of explanations of the yield curve; these are not competing explanations, and at any one time all may be influencing the shape of the yield curve.
- 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.
 - Liquidity preference theory** – the curve reflects the compensation that investors require higher returns for sacrificing liquidity on long-dated bonds.

20: INTEREST RATE RISK

- (c) **Market segmentation theory** – short-dated bonds tend to be more popular with banks, and long-dated bonds are more popular with pension funds, ie there are different markets. If demand for bonds is higher in one of these markets the government can offer lower returns on its bonds in that market.

The significance of yield curves to financial managers

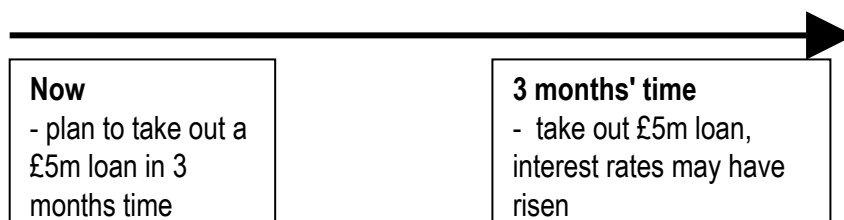
- 2.4 Financial managers can inspect the shape of the yield curve when deciding the term of borrowing or deposits. The curve is influenced by the market's expectations of future interest rate movements.

For instance a yield curve sloping steeply upwards suggests a rise in interest rates in the future; in this case a company will be more concerned about **managing interest rate risk**.

3 Managing interest rate risk – internal methods

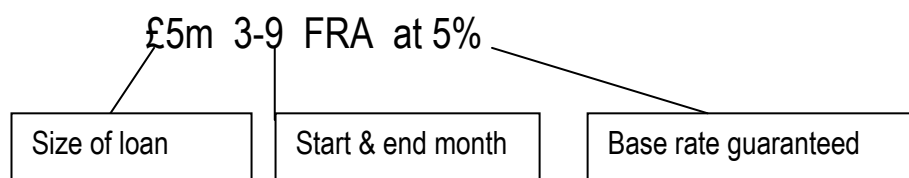
Method	Explanation
Smoothing	Using a balance of fixed and floating rate borrowing; this smoothes the impact of interest increases or decrease. Use more fixed rate finance if rate rises are expected.
Matching	Used by banks; matching the interest rates on assets to the interest rates on liabilities eg if income is from fixed rate mortgages, use fixed rate finance (using variable rate finance would be risky).

4 Managing interest rate risk – forward rate agreements



- 4.1 A **contract** with a bank covering a **specific amount** of money to be borrowed over a specific time period **at an interest rate agreed now**.

Quotation of forward rates



- 4.2 An FRA is separate from the bank loan and allows a company to borrow in say 3 months' time at the best rate available.

Lecture example 1

Technique demonstration

Frantic plc is planning to take out a 6-month loan of £5m in 3 months' time. It is concerned about the base rate (LIBOR) rising above its current level of 4.75%.

Frantic has been offered a 3-9 FRA at 5%.

Frantic can borrow at approximately 1% above the base rate.

Required

- (a) Advise Frantic of the likely outcome if in 3 months' time the base rate is 5.5%
- (b) Advise Frantic of the likely outcome if in 3 months' time the base rate is 4.5%.

Solution

(a)

(b)

Advantages of forward rates	Disadvantages of forward rates
<ul style="list-style-type: none"> • Simple 	<ul style="list-style-type: none"> • Fixed date agreements
<ul style="list-style-type: none"> • Low or zero up-front costs 	<ul style="list-style-type: none"> • Rate quoted may be unattractive
<ul style="list-style-type: none"> • Normally available for more than a year ahead 	

5 Managing interest rate risk – derivatives

Futures (recap- same as currency futures)

5.1

- | Now | 3 months' time |
|--|---|
| | 1. Forecast need to borrow in 3 months' time |
| 2. Agree an interest rate for 3 months' time with the futures market | |
| 3. Pay a deposit | 4. If the interest rate has moved against you in 3 months' time receive compensation, or |
| | 4. If the interest rate has moved in your favour in 3 months' time pay out losses |
| | 5. Net effect = fixed outcome |

Advantage of futures	Disadvantages of futures
<ul style="list-style-type: none"> Flexible dates ie a September future can be used on any day until the end of Sept 	<ul style="list-style-type: none"> Only available in large contract sizes
	<ul style="list-style-type: none"> Deposit needs to be topped up on a daily basis to cover expected losses

Options

5.2

- | Now | 3 months' time |
|---|---|
| | 1. Need to borrow in 3 months' time |
| 2. Agree an optional interest rate for 3 months' time with the options market | |
| 3. Pay a non-returnable premium | 4. If the interest rate has moved against you in 3 months' time receive compensation, or |
| | 4. If the interest rate has moved in your favour in 3 months' time use the favourable rate |
| | 5. Net effect = worst case known + upside potential |

Advantages of options	Disadvantages of options
<ul style="list-style-type: none"> Flexible dates (like a future) 	<ul style="list-style-type: none"> Only available in large contract sizes
<ul style="list-style-type: none"> Allow a company to take advantage of favourable movements in interest rates. Options are the only form of hedging that does this. 	<ul style="list-style-type: none"> Expensive
<ul style="list-style-type: none"> Useful for uncertain transactions, can be sold if not needed 	

Swaps

- 5.3 Finally, a company may be able to swap variable rate debt for fixed rate debt if it is worried about interest rate rises.

6 Summary of Chapter 20

- 6.1 The **yield curve** is a useful indicator of the market's expectations of interest rates. If interest rate rises look likely it is particularly important to manage interest rate risk.
- 6.2 **Internal techniques** for managing interest rate risk include:
- Smoothing
 - Matching
- 6.3 **External techniques** for managing interest rate risk include:
- FRAs
 - Futures
 - Options
 - Swaps

END OF CHAPTER

Answers to Lecture Examples



Chapter 1

Lecture Example 1a

- Profits are historic, shareholders care about the future – perhaps they were concerned by information in the press briefing concerning where Ryanair were planning to invest (Eastern Europe) – **investment decisions** are very important to investors
- Investment decisions require new finance, shareholders care about debt levels – perhaps they were concerned by information in the press briefing concerning this – **financing decisions** are very important to investors
- Profits are not cash flows, shareholders often want to see what returns they will be getting as dividends – perhaps they were concerned by information in the press briefing concerning the level of dividend that Ryanair was planning to pay for 2004 (zero!) – **dividend decisions** are very important to investors
- Also profit can be manipulated by depreciation policy and by short-termism

Lecture Example 1b

- The share price is generally felt to capture shareholders feelings about future cash flows and risk

Lecture Example 2

£m	<u>Last year</u>	<u>Current year</u>
Profits before interest and tax	22,300	23,726
Interest	3,000	3,000
Tax	<u>5,790</u>	<u>6,218</u>
Profits after interest and tax	13,510	14,508
Preference dividends	200	200
Earnings	13,310	14,308
Earnings per share	13.3p	14.3p
Growth rate = $(14.3 / 13.3) - 1 = 0.075$ or <u>7.5%</u>		
Dividends	7,986	8,585

Dividend per share = $(0.086 / 0.08) - 1 = 0.075$ or **7.5%**

Magneto has failed to hit these financial objectives but short term profit based measures are not a sufficient basis on which to fully assess the performance of Magneto.

Lecture Example 3

- Not enough NEDs (min 50%)
- NEDs don't seem to be independent, and should not be paid share options
- Remuneration should not be discussed by the main board
- Audit committee should only include NEDs
- No split between Chair & Chief Executive

Lecture Example 4

The question does not tell us what the share price has been over the period, but it does provide the price/earnings (P/E) ratio. We can derive the share price at the time of the announcement of the results as follows:

	<u>Previous year</u>	<u>Current year</u>
ROCE	$8700/33900 = 25.7\%$	$9500/34700 = 27.4\%$
Gearing	$11300/22600 = 50\%$	$9000/25700 = 35\%$
Share price	$17 \times 5100/9000 = 9.63$	$18 \times 5700/9000 = 11.40$
Dividend yield	$(2000/9000) / 9.63 = 2.3\%$	$(2200/9000) / 11.40 = 2.1\%$

- Observe the 18% rise in the share price
- Dividend yield of about 2% gives a total shareholder return of about 20% which is probably sufficient.
- Gearing does not appear to be a problem, in that interest cover is high; and
- The P/E ratio, which is influenced by perceived growth potential, has improved.

Chapter 2

Lecture Example 1

Policy	Impact on a business's planning & decision making
Fiscal policy - boosting spending - cutting taxes	Bidding for government contracts Higher consumer spending Higher profits from investments
Monetary policy - increasing money supply - lower interest rates	Higher consumer demand More likely to use debt finance
Exchange rate policy - lower exchange rates	Possibly caused by lower interest rates Overseas suppliers become more expensive Export markets become more attractive

Lecture Example 2

Policy	Impact on a business's planning & decision making
Fiscal policy - cutting spending - raising taxes	Lower consumer spending, export markets attractive Higher prices (if VAT) so lower sales Lower profits from investments Dividend policy affected if taxes on dividends increased
Monetary policy - higher interest rates	Less likely to use debt finance, consumer demand falls
Exchange rate policy - higher exchange rates	Export markets become less attractive

Lecture Example 3

Policy	Impact on a business's planning & decision making
Fiscal policy - cutting spending - raising taxes	Designed to cut spending on imports but will have a knock on effect on domestic sales
Monetary policy - higher interest rates	Designed to attract capital into the domestic economy from abroad, but reduces investment by local firms.
Exchange rate policy - lower exchange rates	Designed to make exports more competitive,

Chapter 3

Lecture Example 1

- (a) The main Stock Market
Public profile, investor confidence (audited accounts, regular briefings, NEDs, 3 years of successful trading history), access to wider pool of equity finance, allows owners to realise some of their investment
- (b) The Alternative Investment Market
Lower membership fees & compliance requirements (no successful trading history or corporate governance requirements)
- (c) Debentures are a liquid investment, so will often be cheaper than a bank loan. A debenture will be called in if its terms are breached, a bank may be more willing to renegotiate a loan whose terms have been breached (they hope to do more business with the company). Another advantage of debentures is that often they can be redeemed over a range of dates at the company's discretion.

Chapter 4

Lecture Example 1

(a) Profits

Higher inventory means greater stock availability & possibly more choice to the customer of different variants of the product and therefore higher sales and higher profits. Higher receivables may mean better payment terms, which may lead to higher sales and this again may lead to higher profits.

(b) Liquidity

Higher inventory & higher receivables mean more cash tied up in the short term which may lead to cash flow problems.

There is sometimes a conflict between these 2 objectives.

Lecture Example 2

1	Av. collection period	$\frac{172,800 \times 365}{864,000}$	$\times 365$	= 73.0 days
2	Inventory days			
	(a) Finished goods	$\frac{86,400 \times 365}{756,000}$	$\times 365$	= 41.7 days
	(b) W.I.P	$\frac{75,600 \times 365}{675,000}$	$\times 365$	= 40.9 days
	(c) Raw material	$\frac{108,000 \times 365}{518,400}$	$\times 365$	= 76.0 days
3	Av. payables period	$\frac{86,400 \times 365}{518,400}$	$\times 365$	= (60.8) days
	Cash operating cycle =			<u><u>170.8</u></u>

Lecture Example 3

$$£864,000 \times 1.3 = £1,123,200$$

$$£1,123,200 / 2.42 = \underline{\underline{£464,132}}$$

Chapter 5

Lecture Example 1

$$(i) \quad EOQ = \sqrt{\frac{2 \times 1,800 \times \text{£}32}{\text{£}25 \times .18}} = 160 \text{ units}$$

$$(ii) \quad \begin{aligned} \text{Total cost} &= \text{Purchasing} + Ch \times \frac{Q}{2} + Co \times \frac{D}{Q} \\ &= 1,800 \times \text{£}25 + \text{£}4.50 \times \frac{160}{2} + 32 \times \frac{1,800}{160} \\ &= 45,720 \end{aligned}$$

Lecture Example 2

Qualifies for 1% discount so recalculate

$$\text{New EOQ} = \sqrt{\frac{2 \times 32 \times 1,800}{0.18 \times 25 \times 0.99}} = 161 \text{ units}$$

Q	Order cost ($D/Q \times C$)	Holding cost ($Q/2 \times H$)	Purchase cost ($D \times P$)	Total £
161	357.8	358.6	44,550	45,266.4
300	192	661.5	44,100	44,953.5
800	72	1,728	43,200	45,000.0

∴ Order 300 units at a time.

Lecture Example 3

Finance cost of new receivables	$(\text{£}600,000 \times 1.15 \times \frac{3}{12}) - (\text{£}600,000$	<u><u>=(£7,250)</u></u>
	$\times \frac{2}{12}) \times 10\%$	

Additional contribution	$\text{£}600,000 \times 15\% \times 20\%$	= £18,000
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A net benefit of	<u><u>£10,750</u></u>
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Lecture Example 4

Cost

$$\$10\text{m} \times 0.2 \times 0.02 = \underline{\underline{\$40,000}}$$

Benefit

$$\text{Current receivables} = 90/365 \times 10 = \$2,465,753$$

$$\text{New receivables} = (0.2 \times 10/365 \times 10) + (0.8 \times 90/365 \times 10) = \$54,795 + \$1,972,603 = \$2,027,398$$

$$\text{Reduction in receivables} = \$438,355$$

$$\text{Saving in overdraft interest} = \underline{\underline{\$43,836}}$$

Sales may also rise as a result of the policy.

The policy should be introduced.

Lecture Example 5

Cost of debt factor

Factors charge

$$\$480\text{m} \times 5\% / 2$$

£m

12

Benefit of the debt factor

(i) Financing costs

$$\text{Current receivables} \quad (\$480 \times \frac{3}{12}) / 2 = \text{£}60\text{m}$$

$$\text{New receivables} \quad (\$480 \times 2/12) / 2 = \text{£}40\text{m}$$

$$\text{Reduction in receivables} \quad \text{£}20\text{m leads to interest saved of} \quad 2$$

(ii) Bad debts
 $(\$480 \times 2\%) / 2$

4.8

(iii) Admin.

8
14.8

∴ Use the factor as it is estimated to save £2.8m p.a.

Lecture Example 6

Cost

$$\text{Current payables} = 30/365 \times 1,000,000 = \text{£}82,192$$

$$\text{New payables} = 10/365 \times 1,000,000 = \text{£}27,397$$

$$\text{Reduction of } \text{£}54,795 \times 0.1 = \underline{\underline{\text{£}5,480}}$$

Benefit

$$0.025 \times \text{£}1,000,000 = \text{£}25,000$$

$$\text{Saving} = \underline{\underline{\text{£}19,520}}$$

Nb this is an approximate calculation, acceptable for exam purposes – many other approaches are possible

The discount should be accepted

Chapter 6

Lecture Example 1

	Jan £	Feb £	Mar £
Inflows			
Sales			
– Mickster (Cash)			
(98% x £10 x 150; 250)	1,470		2,450
– Debtors (2 months credit)	20,000	25,000	30,000
Capital			<u>5,000</u>
	<u>21,470</u>	<u>25,000</u>	<u>37,450</u>
Outflows	£	£	£
Purchases	12,600	20,000	19,000
Overheads			
(2,000 – 400 – 1,000)	600	600	600
Wages	1,000	1,000	1,000
Fixed assets			<u>24,000</u>
	<u>14,200</u>	<u>21,600</u>	<u>44,600</u>
Net cash flow	7,270	3,400	(7,150)
Balance b/f	<u>(4,550)</u>	<u>2,720</u>	<u>6,120</u>
Balance c/f	2,720	6,120	(1,030)

Lecture Example 2

$$EOQ = \sqrt{\frac{2 \times 1,500,000 \times 150}{.045}} = \text{£}100,000$$

(i.e. Arrange 15 transfers of money into the account of £100,000 each over the year).

Lecture Example 3

The spread between the upper and the lower cash balance limits is calculated as follows.

$$\begin{aligned} \text{Spread} &= 3 \left(\frac{3}{4} \times \frac{\text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate}} \right)^{\frac{1}{3}} \\ &= 3 \left(\frac{3}{4} \times \frac{50 \times 4,000,000}{0.00025} \right)^{\frac{1}{3}} = \text{£}25,303, \text{ say } \text{£}25,300 \end{aligned}$$

The upper limit and return point are now calculated.

$$\text{Upper limit} = \text{Lower limit} + \text{£}25,300 = \text{£}8,000 + \text{£}25,300 = \text{£}33,300$$

$$\text{Return point} = \text{lower limit} + \frac{1}{3} \times \text{spread} = \text{£}8,000 + \frac{1}{3} \times \text{£}25,300 = \text{£}16,433, \text{ say } \text{£}16,400$$

If the cash balance reaches £33,300, buy £16,900 (= 33,300 – 16,400) in marketable securities. If the cash balance falls to £8,000, sell £8,400 of marketable securities for cash.

Chapter 7

Lecture Example 1

- (a) Suggestion schemes, innovation group, customer research
- (b) Project committee reviews for suitability & feasibility, how long the project takes to pay back the initial investment.
- (c) **covered in this chapter (so you can ignore this for now)**
- (d) Audit by an independent team over whether the project achieves its objectives (a post audit)

Lecture Example 2

- (b) Profit calculation:

	£
Total cash flows from operations	540,000
Total depreciation (500,000 – 350,000)	(150,000)
Total profits	390,000
Average profits (÷ 6) =	£65,000 p.a.

Investment calculation

$$\frac{500,000 + 350,000}{2} = \underline{\underline{£425,000}}$$

$$\text{ARR} = \frac{65}{425} = 15.3\%$$

Lecture Example 3

Year 1	£
Revenue	200,000
Depreciation	0
Materials (49,000-10,000+1,000)	40,000
Labour (100,000-10,000)	90,000
Overheads	<u>0</u>
Cash flow	70,000

This looks more promising than the losses figure that we started with, but requires further analysis to see if the project is worth pursuing.

Lecture Example 4

Time	Cumulative cash flow £	
0	(500,000)	
1	(430,000)	
2	(360,000)	
3	(280,000)	
4	(180,000)	
5	(80,000)	
6	40,000	
		∴ Payback = 5 + (80/120) years = 5 years 8 months

This is a long payback period and means that if there is no buyer for the business in 6 years time, then they will only just have recouped their costs. This project is beginning to look risky, but we might not be rejected because this analysis has not considered the total cash flows of the project.

Chapter 8

Lecture Example 1

- (a) Yes, you will be £1 better off.
- (b) No, you would instinctively reject it. £1001 received in 1 year's time is not as attractive as £1001 received today; this is the meaning of the term '**time value of money**'. You would reject the project because you would be better off if you put £1000 into a bank account for a year; it would give you approximately £1050 in 1 year.

Lecture Example 2

Time	0	1
Cash flow	(1000)	1001
Discount factor	1.000	0.952
Present value	(1000)	953

Net present value = - 47

this means that the project does not give a 5% return and should not be accepted

Lecture Example 3

Time	0	1	2
Cash flow	(1000)	1001	1001
Discount factor	1.000	0.952	0.907
Present value	(1000)	953	908

Net present value = + 861

this means that the project gives more than a 5% return and should be accepted

Or

Time	0	1 - 2
Cash flow	(1000)	1001
Discount factor	1.000	1.859
Present value	(1000)	1861

Net present value = + 861

This uses the annuity table to get to the same answer, and is sometimes a quicker method in exam questions.

Lecture Example 4

(a)	Time	0	1 onwards
	Cash flow	(1000)	1001
	Discount factor	1.000	$1/r = 20$
	Present value	(1000)	20,020

Net present value = + 19,020

this is called discounting to perpetuity

(b)	Time	0	3 onwards
	Cash flow	(1000)	1001
	Discount factor	1.000	$1/r = 20$
	Subtract time 1-2 discount factor		1.859
			= 18.141
	Present value	(1000)	18,159

Net present value = + 17,159

this is called discounting a delayed annuity to perpetuity

Lecture Example 5

Step 1 is complete - from lecture example 3 the NPV at 5% is +861

Step 2

	Time	0	1 - 2
	Cash flow	(1000)	1001
	Discount factor @10%	1.000	1.736
	Present value	(1000)	1738

Net present value = +738

Step 3 $IRR = a + \frac{NPVa}{NPVa - NPVb} (b-a)$

$$IRR = 5 + \frac{861}{861 - 738} (10 - 5) = \underline{40\%}$$

Chapter 9

Lecture Example 1

£'000 Time	0	1	2	3	4	5
Turnover		1,000	1,750	2,500	3,200	
Direct Costs		(800)	(1,100)	(1,500)	(1,600)	
Marketing		(170)	(250)	(200)	(200)	
Overheads (60%)		<u>(60)</u>	<u>(60)</u>	<u>(60)</u>	<u>(60)</u>	
Operating Profit		(30)	340	740	1,340	
Taxation @ 30%			9	(102)	(222)	(402)
Fittings & Equipment	(750)				200	
Sale of business					4,300	
Land & buildings	(3,130)					
Tax benefit of Capital Allowances (W2)			56	42	32	35
Working Capital (W3)	<u>(250)</u>	<u>(50)</u>	<u>(75)</u>	<u>(25)</u>	<u>400</u>	<u> </u>
Net Cash flow	(4,130)	(80)	330	655	6,050	(367)
7% Discount Factors	1	0.935	0.873	0.816	0.763	0.713
Present Value	(4,130)	(75)	288	534	4,616	(262)

NPV = + £971,000

(W1) Calculation of corporation tax on profits:

Time	1	2	3	4
Operating profit (£000s)	(30)	340	740	1340
Time	2	3	4	5
Tax	9	(102)	(222)	(402)

(W2) Calculation of tax benefit on capital allowances:

Time	1	2	3	4
WDA (£000s)	188	141	105	116*
Time	2	3	4	5
Tax	56	42	32	35

* outlay – scrap proceeds – claims to date = 750-200-188-141-105 = 116

(W3) Calculation of working capital flows:

Time	0	1	2	3	4
W.Cap	250	300	375	400	0*
£000s	(250)	(50)	(75)	(25)	400

* normal assumption

Lecture Example 2

<u>Time</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>
£	(10000)	5328	5252	5171
<u>d.f.20%</u>	<u>1.000</u>	<u>0.833</u>	<u>0.694</u>	<u>0.579</u>
PV	(10000)	4438	3645	2994
NPV = +1077				
Nb $1.132 * 1.06 = 1.2$				

Chapter 10

Lecture Example 1

(a)	<u>£m</u>	<u>Probability</u>	<u>£m x probability</u>
best	26	0.18	4.7
most likely	23	0.5	11.5
worst	12	0.32	<u>3.8</u>
			20.0
<u>Time</u>	<u>0</u>	<u>1-5</u>	
Revenue		20	
Costs		-10	
Outlay	-43		
Net	-43	10	
df @8%	<u>1</u>	<u>3.993</u>	
PV	-43	39.93	
NPV	-3.07		

This is heavily dependent on the accuracy of the probabilities Even if accurate, the result ignores the fact that the project is a one-off

(b)	NPV of outlay =	43
	Sensitivity to outlay	
	3.07/43	7.1%

Outlay would have to fall by this % for the project to become attractive.

NPV of visitor numbers =	79.86	(20*3.993)
Sensitivity to visitor numbers	3.07/79.86	3.8%

Visitor numbers would have to rise by this % for the project to become attractive.

Sensitivity to project life

Project life required to give NPV=0 ?

Discount factor needed = 4.3

From tables = 4.623 after 6 years

So approx 5.5 years ie approx 10% rise in project life needed.

Sensitivity ignores the possibility of more than 1 variable changing at the same time - this is especially likely if they are related to each other (eg more visitors may make the project life shorter (greater wear and tear on the infrastructure

(c) Time	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Discounted cash flows	-43.0	12.0	11.1	10.3	9.6	
Cumulative NPV	-43.0	-31.0	-19.9	-9.6	0.0	

Even on the project manager's cash flows the discounted payback period of 4 years is long relative to the project's life

Drawback - ignores the potential volatility of the cash flows

All of these techniques would be used in reality as they all offer different insights

The insight of one method is a limitation of another

They all suggest that this project is extremely risky to undertake

Chapter 11

Lecture Example 1

Every year	<u>Time</u>	<u>0</u>	<u>1</u>	
	£	(30000)	7000	
	d.f. @15%	1.0	0.870	
	PV	(30000)	6090	
	Total PV	23910		
	Annuity factor for 1 year	0.870		
	EAC	(27483)		
Every 2 years	<u>Time</u>	<u>0</u>	<u>1</u>	<u>2</u>
	£	(30000)	(3000)	3000
	d.f. @15%	1.0	0.870	0.756
	PV	(30000)	(2610)	2268
	Total PV	30342		
	2 year annuity factor	1.626		
	EAC	(18661)		

The two year replacement cycle is cheaper.

Lecture Example 2

LESSEE –benefits of lease

purchase	<u>Time 0</u>	<u>Time 1-5</u>
Cost	10000	
Tax benefit		-600
Lease		-2500
Tax saved		750
total	10000	-2350
df 5%	1.000	4.329
PV	10000	-10173
npv	-173	

lease is more expensive by £173

LESSOR

	<u>Time 0</u>	<u>Time 1-5</u>
LEASE		2500
Tax AT 30%		-750
Tax benefit		600
	-10000	
NET	-10000	2350
df 5%	1.000	4.329
PV	-10000	10173
npv	+173	

It is not possible for both parties to benefit if lessee - unless

- (a) the lessor can get discounts or has a lower cost of capital
- (b) there is a possible benefit to both parties if lessee pays 0% tax

Note that the interest payments on the bank loan are not relevant cash flows, they are picked up by the time 0 cash outflow.

Lecture Example 3

- (a) Profitability index of project no1 = $(128000+298000)/298000 = 1.4295$

NPV per unit of limiting factor

Rank	Project	NPV per limiting factor	Outlay	Amount of project (%)	NPV
1 st	No. 1	1.4295	£298,000	100	£128,000
2 nd	No. 2	1.4166	£240,000	100	£100,000
3 rd	No. 3	1.4	£262,000	65.5	£104,800
			£800,000		£332,800

- (b) Project 5 gives an NPV of £239,000

Cumulative NPV from Projects 1, 2 & 4 = £288,000

From projects 2,3,4 = £320,000 – **this is the best combination**

Chapter 12**Lecture Example 1**

Types	Pros & cons
Overdraft - a limit is agreed with a bank, interest is paid on the daily cash balance, subject to instant recall	Flexible form of finance, but risky because of instant recall
Short-term loan	More secure than an overdraft but less flexible
Trade credit - paying suppliers later	Tempting but risks loss of supplier goodwill & discounts
Lease finance	Operating leases covered in previous chapter

Lecture Example 2

Bank loans	Bonds (debentures/loan notes)
<ul style="list-style-type: none"> Available to most companies 	<ul style="list-style-type: none"> Often cheaper because avoid bank fees & liquid investment
<ul style="list-style-type: none"> Supported by the loan guarantee scheme for small businesses 	<ul style="list-style-type: none"> Can be convertible
<ul style="list-style-type: none"> Quick to arrange 	<ul style="list-style-type: none"> Can be zero coupon
	<ul style="list-style-type: none"> Can be in foreign currency (Eurobond)

Lecture Example 3

- (a) $£2.00 \times 0.825 = £1.65$
 So $£330\text{m} / 1.65 = 200\text{m}$ shares
 A 2 for 5 rights issue is needed at $£1.65$
- (b) $(200\text{m} \times £1.65) + (500\text{m} \times £2.00) = £1,330\text{m}$
 $£1,330\text{m}$ shares / $700\text{m} = £1.90$
- (c) Pre rights issue, wealth = $10,000 \times £2 =$ £20,000
 After the issue
 Existing shares = $10,000 \times £1.90 =$ £19,000
 New shares (half of 4,000 entitlement)
 $2,000 \times £1.90 =$ £3,800
 Less payment for these shares
 $2000 \times £1.65 =$ (£3,300)
 Sale of rights (half of 2000 entitlement)
 $2000 \times (£1.90 - £1.65) =$ £500
£20,000

There is no impact on shareholder wealth (ie they are not harmed because they can sell their rights).

Chapter 13

No Lecture examples

Chapter 14

Lecture Example 1

Goodtimes plc is an airline. Its latest financial data is as follows:

£m	Last year
Profits before interest and tax	12,000
Interest	3,000
Interest cover =	4
Profits after interest and tax	6,300
Preference dividends	200
Earnings	<u>6,100</u>
No ordinary shares issued	100,000
EPS	6.1p

Advantages of debt:

- Cheap (secured, tax relief)
- Avoids dilution of eps by the issue of more equity, if eps is higher then P/E x eps = **higher share price**
- Avoids trimming the dividend to fund investments.
- Use of debt is a signal of the confidence that management has in future cash flows.

Lecture Example 2

Goodtimes plc's latest forecast financial data for the current year is as follows:

£m	Last year	Forecast
Profits before interest and tax	12,000	6,000
% change = $6000/12000 \times 100 = 50\%$		

Dividends fall by $1377/2000 \times 100 = 69\%$

Dividends fall by more than PBIT because interest and preference shares have to be paid – this is called financial risk.

Chapter 15

Lecture Example 1

The cost of equity is $\frac{60p(1+0.08)}{550p} + 0.08 = 19.8\%$

Lecture Example 2

(a) $0.30 \times (1+g)^4 = 0.3925 \therefore g = 6.95\%$

$$k_e = \frac{0.3925 (1.0695)}{8.31} + 0.0695 = 12\%$$

(b) growth = $50\% \times 30\% = 15\%$ pa

$$k_e = ((20 \times 1.15)/125) + 0.15 = 33.4\%$$

Lecture Example 3

Use the beta of the company; 1.6

$$K_e = 4 + (8 \times 1.6) = 16.8\%$$

Use the beta of 0.8

$$K_e = 4 + (8 \times 0.8) = 10.4\%$$

Lecture Example 4

$$\text{Cost pre tax} = 8 / 82 = 9.8\%$$

Lecture Example 5

$$\text{cost of debt to the company,} = \frac{\text{£}8(1-0.30)}{\text{£}82} = \underline{\underline{6.8\%}}$$

Lecture Example 6

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	<u>68.31</u>	0.784	<u>86.24</u>
			<u>(8.42)</u>		<u>11.39</u>

$$\text{IRR} = 5 + (11.39/19.81 \times 5) = 7.9\%$$

Lecture Example 7

$$\begin{aligned} r_b &= 5 + 0.3 \times (10 - 5) \\ &= 6.5\% \end{aligned}$$

$$\begin{aligned} \text{Cost to company} &= (1 - 0.3) \times 6.5\% \\ &= 4.55\% \end{aligned}$$

Lecture Example 8

$$\text{Cost pre tax} = 12 / 125 = 9.6\%$$

Lecture Example 9

$$\begin{aligned} K_e &= \frac{D_0(1+g)}{P_0} + g = \frac{30(1.05)}{160} + 0.05 \\ &= 24.69\% \end{aligned}$$

$$E = 10\text{m} \times 1.6 = \text{£}16\text{m}$$

Kd : Internal Rate of Return to company per year

Time	£	DF @ 10%	PV £	DF @ 5%	PV £
0	(90)	1	(90)	1	(90)
1-5	8(1-0.30)	3.791	21.23	4.329	24.24
5	100	0.621	<u>62.10</u>	0.784	<u>78.40</u>
			<u>(6.67)</u>		<u>12.64</u>

Using linear interpolation

$$\text{IRR} = 5\% + \left(\frac{12.64}{12.64 + 6.67} \right) \times 5\% = 8.3\%$$

$$D = 8,000,000 \times 90\% = \text{£}7,200,000$$

$$\text{WACC} = (24.69\% \times \frac{16}{16 + 7.2}) + (8.3\% \times \frac{7.2}{16 + 7.2}) = 19.6\%$$

Lecture Example 10

Cost of equity

$$\text{Dividend valuation model: } \frac{D_1}{P_0} + g = \frac{24(1.06)}{428} + 0.06 = 0.1194 \text{ or } 11.94\%$$

Cost of debt

To find the IRR the following approach must be used for the debenture (market value is 12.5% > book value). The cash flows are for a £100 block of debt.

Time	0	1-4	4	
Cash flows(after tax)	(112.5)	7	100	
At 10%	<u>1</u>	<u>3.170</u>	<u>0.683</u>	
PV	(112.5)	22.2	68.3	= (22.0)
At 5%	1	3.546	0.823	
PV	(112.5)	24.8	82.3	= (5.4)

Interpolating:

$$5 + \frac{-5.4}{(-5.4+22) \times 5} = 3.4\%$$

Market value of equity £214m

Market value of debt £90m

Weighted average cost of capital

$$11.94\% * \frac{214}{304} + 3.4 * \frac{90}{304} = 9.4\%$$

Chapter 16

Lecture Example 1

	<u>What is happening?</u>	<u>Why?</u>
Point 1	WACC is falling	Debt is cheap
Point 2	WACC is rising	Bankruptcy risks depress the share price & make equity & debt more expensive
Point 3	Optimal gearing, varies from industry to industry (see chapter 14)	

Lecture Example 2

What is happening?

WACC is unaffected by changes in gearing

Why?

The reason that debt is cheaper is that it is lower risk, but as it is introduced equity becomes more risky and therefore more expensive by exactly the same amount.

Does the level of gearing matter?

No – if there are no taxes

Lecture Example 3

What is happening?

WACC is falling as gearing rises

Why?

Debt saves corporation tax; **this factor was ignored above.**

Does the level of gearing matter?

Yes – maximise gearing

Lecture Example 4

Use the beta of the proxy company; 1.5

$$K_e = 4 + (8 \times 1.5) = 16\%$$

Lecture Example 5

Why can't Train use Thirté's beta of 1.5 to calculate its K_e ?

The equity beta of 1.5 may be high because of Thirté's high level of debt, it needs to be adjusted to become an asset beta.

Lecture Example 6

(a) Asset beta = $1.5 \times (1 / 1.7) = 0.882$

This reflects the risk of Thirté's business.

(b) Train's shareholders face a small amount of financial risk, the asset beta needs to be adjusted for this.

Lecture Example 7

$0.882 = \text{equity beta} \times (10/10.7)$ so equity beta = $0.882 / 0.9346 = 0.944$.

Lecture Example 8

(a) $K_e = 4 + (0.944 \times 8) = 11.55\%$

(b) $WACC = (11.55 \times 10/11) + (4 \times (1-0.3) \times 1/11) = 10.75\%$

Lecture Example 9

Step 1

beta of recruitment company = 1.8

Step 2

ungear

$B_a = 1.8 \times (1/1.7) = 1.059$

regear

$B_e = 1.059 / (2/2.7) = 1.430$

Step 3

$K_e = 4 + (8)1.43 = 15.44\%$

$WACC = (15.44\% \times 2/3) + (4\% \times 0.7 \times 1/3) = 11.23\%$

This is a WACC that reflects the new scenario – that BPP does have debt finance & that it is investing in a new business area. In other words it reflects the financial risk & business risk of the investment.

Chapter 17

Lecture Example 1

Asset Value: €62.8m – debt of 33.1 = **€29.7m**

but we have no information about the industry, the nature of the assets or any intangible values.

Lecture Example 2

(a) $P = 2/.076 = 26.3\text{m}$

(b) $P = 2.06/0.046 = 44.8\text{m}$


Lecture Example 3

(a) **P/E valuation:** Industry average: $19.5 \times 2.6 = \mathbf{€50.70\text{m}}$

Bootstrapping: $21.2 \times 2.6 = \mathbf{€55.12\text{m}}$

The latter **may** be the value attached to the earnings by Groady since both companies are in the same industry and under the management of Groady, Bergerbo's activities **may** perform as well as Groady's.

(b) **Range of values (normally)**

Max		€55.12m earnings €44.8 divi valn €44.7 market price (the strongest indicator of the company's current value)
Min		€29.7m assets.

Chapter 18

No Lecture examples

Chapter 19

Lecture Example 1

- (a) $\$180,000 / 1.5 = \text{£}120,000$ expected
 $\$180,000 / 1.8 = \text{£}100,000$ received
 Losses = $\text{£}20,000$: UK exporters lose when the £ gets stronger
- (b) $\$180,000 / 1.5 = \text{£}120,000$ expected
 $\$180,000 / 1.8 = \text{£}100,000$ paid
 Gains = $\text{£}20,000$:UK importers gain when the £ gets stronger

Lecture Example 2

- (a) $\$1\text{m} / 1.9618 = \text{£}509,736$
 (b) $\$1\text{m} / 1.9612 = \text{£}509,892$

Lecture Example 3

- (a) $\$1\text{m} / 1.9612 = \text{£}509,892$
 (b) $\$1\text{m} / 1.9598 = \text{£}510,256$

Lecture Example 4

	EXPORTER	
	UK £s	USA \$s
Now	4. $\$986,680 / 1.9618 = \text{£}502,946$	3. loan $1000000 / 1.0135 = \$986,680$
	$5.5\% \times 3/12 = 1.375\%$ ie 1.01375	$5.38\% \times 3/12 = 1.35\%$ ie 1.0135
3 months	$\text{£}502,946 \times 1.0138 =$ <u>£509,862</u>	1. $+\$1,000,000$ 2. $-\text{£}1,000,000$ $\text{\$/}$

The same outcome (minimal difference) as a forward contract (but could be better if the company was saving money from repaying a bank overdraft in the UK)

Lecture Example 5

	IMPORTER	
	UK £s	USA \$s
Now	4. $\$986,894 / 1.9612 =$ £503,209	3. $\$1,000,000 / 1.01328 =$ \$986,894
	5.59% x 3/12 = 1.398% ie 1.01398	5.31% x 3/12 = 1.328% ie 1.01328
3 months	5. £503,209 x 1.01398 = £510,244	1. -\$1,000,000 2. <u>+\$1,000,000</u> 0

The same outcome (minimal difference) as a forward contract (but could be better if the company was using money on deposit in the UK)

Lecture Example 6

(a)	3 months	6 months
Net transactions	+\$197,000	-\$293,000
Forward rate	1.9612	1.9585
Forward outcome	<u>+\$100,449</u>	<u>-\$149,604</u>

(b) Money market hedge

	EXPORTER – 3 months	
	UK £s	USA \$s
Now	4. $\$194,376 / 1.9618 =$ £99,080	3. loan $\$197,000 / 1.0135 =$ \$194,376
	5.5% x 3/12 = 1.375% ie 1.01375	5.38% x 3/12 = 1.35% ie 1.0135
3 mths	£99,080 x 1.0138 = <u>£100,442</u>	3. +\$197,000 4. <u>-\$197,000</u> \$0
	IMPORTER – 6 months	
	UK £s	USA \$s
Now	4. $\$285,422 / 1.9612 =$ £145,534	3. $\$293,000 / 1.02655 =$ \$285,422
	5.59% x 6/12 = 2.795% ie 1.02795	5.31% x 6/12 = 2.655% ie 1.02655
6 mths	5. £145,534 x 1.02795 = £149,602	1. -\$293,000 2. <u>+\$293,000</u> 0

<u>Summary</u>	<i>3 months</i>	<i>6 months</i>
Forward	+£100,449	-£149,604
Money market hedge	+ £100,442	-£149,602

Lecture Example 7

- (a) Spot = $1.5 \times 1.021/1.027 = 1.49$ in 1 year
 $1.49 \times 1.021/1.027 = 1.48$ in 2 years
 $1.48 \times 1.021/1.027 = 1.47$ in 3 years
- (b) Europe may become an easier place to export to & a more expensive to buy imports from.

Lecture Example 8

- UK loan costs £10m x 1.066 to repay = **£10.66m**
Euro loan of €15m x 1.06 = €15.9m / forward rate of 1.492 (see below) = **£10.66m**
Forward in 1 year = $1.5 \times 1.06/1.066 = 1.492$ in 1 year
There is not a risk free advantage from using the cheaper euro loan.

Chapter 20

Lecture Example 1

- (a) Bank pays compensation of 0.5% to Frantic
Frantic borrows at the best rate available eg $5.5 + 1 = 6.5\%$
Net costs = 6%
- (b) Frantic pays bank compensation of 0.5%
Frantic borrows at the best rate available eg $4.5 + 1 = 5.5\%$
Net costs = 6%

Question and Answer bank



Index to Question and Answer bank

		Page	
		Questions	Answers
1	H Finance	22.3	22.11
2	Victory	22.3	22.13
3	ZX	22.4	22.15
4	Mezen	22.5	22.17
5	Dinard	22.6	22.19
6	Flocks	22.7	22.20
7	CRY	22.8	22.22
8	Bases of valuation	22.8	22.24

Questions

1 H Finance

H Finance Co is prepared to advance 80% of D Co's sales invoicing, provided its specialist collection services are used by D Co. H Finance Co would charge an additional 0.5% of D Co's revenue for this service. D Co would avoid administration costs it currently incurs amounting to \$80,000 per annum.

The history of D Co's accounts receivable ledgers may be summarised as follows:

	20X8	20X9	20Y0
Revenue (\$'000)	78,147	81,941	98,714
% accounts receivable at year end	17	20	22
% accounts receivable of 90+ days (of revenue)	1.5	2	2.5
Bad debts (\$'000)	340	497	615

D Co estimates that the aggressive collection procedures adopted by the finance company are likely to result in lost revenue of some 10% of otherwise expected levels.

Currently, each \$1 of revenue generates 18 cents additional profit before taxation. D Co turns its capital over, on average, three times each year. On receipt by H Finance Co of amounts due from D Co's customers, a further 15% of the amounts are to be remitted to D Co. The cheapest alternative form of finance would cost 20% per annum.

Required

- Calculate whether the factoring of D Co's accounts receivable ledger would be worthwhile.
- Explain how the factoring of sales invoicing may assist a firm's financial performance.

2 Victory

Victory is a retailer, specialising in vitamin supplements and health foods claimed to enhance performance. One of the products purchased by Victory for resale is a performance enhancing vitamin drink called 'Buzz'.

Victory sells a fixed quantity of 200 bottles of Buzz per week. The estimated storage costs for a bottle of Buzz are \$2.00 per annum per bottle.

Delivery from Victory's existing supplier takes two weeks and the purchase price per bottle delivered is \$20. The current supplier charges a fixed \$75 order processing charge for each order, regardless of the order size.

Victory has recently been approached by another supplier of Buzz with the following offer:

- The cost to Victory per bottle will be \$19 each.
- There will be a fixed order processing charge of \$250 regardless of order size.
- Delivery time will be one week.
- Victory estimates that due to packaging differences, the storage cost per bottle will be \$1.80 per annum per bottle.

Note

The economic order quantity Q, which will minimise costs, is:

$$Q = \sqrt{\frac{2C_0D}{Ch}}$$

Where C_0 = The cost of making one order
 D = Annual demand
 C_h = The holding cost per unit per annum

Required

- (a) Assuming Victory continues to purchase from the existing supplier, calculate:
- (i) Economic order quantity
 - (ii) Reorder level
 - (iii) Total cost of stocking Buzz for one year to the nearest \$ **(6 marks)**
- (b) (i) Calculate the economic order quantity if Victory changes to the new supplier and determine if it would be financially viable to change to this new supplier. **(4 marks)**
- (ii) Discuss TWO limitations of the above calculations and briefly describe THREE other non-financial factors to be taken into account before a final decision is made. **(5 marks)**
- (c) Explain what is meant by a Just-in-Time (JIT) system and briefly describe FOUR of its main features. **(5 marks)**
- (Total = 20 marks)**

3 ZX

ZX is a relatively small US-based company in the agricultural industry. It is highly mechanised and uses modern techniques and equipment. In the past, it has operated a very conservative policy in respect of the management of its working capital. Assume that you are a newly recruited management accountant. The finance director, who is responsible for both financial control and treasury functions, has asked you to review this policy.

You assemble the following information about the company's forecast end-of-year financial outcomes. The company's year end is in six months' time.

	US\$'000
Receivables	2,500
Inventory	2,000
Cash at bank	500
Current assets	<u>5,000</u>
Non-current assets	1,250
Current liabilities	1,850
Forecast sales for the full year	8,000
Forecast operating profit (18% of sales)	1,440

You wish to evaluate the likely effect on the company if it introduced one or two alternative approaches to working capital management. The finance director suggests you adjust the figures in accordance with the following parameters.

	'Moderate' policy	'Aggressive' policy
Receivables and inventory	-20%	-30%
Cash	Reduce to \$250,000	Reduce to \$100,000
Non-current assets	No change	No change
Current liabilities	+10%	+20%
Forecast sales	+2%	+4%
Forecast profit	No change in percentage profit/sales	

Required

Write a report to the finance director that includes the following.

- (a) A discussion of the main aspects to consider when determining policy in respect of the investment in, and financing of, working capital, in general and in the circumstances of ZX. **(10 marks)**
- (b) Calculations of the return on net assets and the current ratio under each of three scenarios shown below.
- The company continues with its present policy.
 - The company adopts the 'moderate' policy.
 - The company adopts the 'aggressive' policy. **(8 marks)**
- (c) A recommendation for the company of a proposed course of action. Your recommendation should be based on your evaluation as discussed above and on your opinion of what further action is necessary before a final decision can be taken. **(7 marks)**

(Total = 25 marks)

4 Mezen

Mezen is currently considering the launch of a new product. A market survey was recently commissioned to assess the likely demand for the product and this showed that the product has an expected life of four years. The survey cost \$30,000 and this is due for payment in four months' time. On the basis of the survey information as well as internal management accounting information relating to costs, the assistant accountant prepared the following profit forecasts for the product.

Year	1	2	3	4
	\$'000	\$'000	\$'000	\$'000
Sales	180	200	160	120
Cost of sales	(115)	(140)	(110)	(85)
Gross profit	<u>65</u>	<u>60</u>	<u>50</u>	<u>35</u>
Variable overheads	(27)	(30)	(24)	(18)
Fixed overheads	(25)	(25)	(25)	(25)
Market survey written off	(30)	—	—	—
Net profit/(loss)	<u>(17)</u>	<u>5</u>	<u>1</u>	<u>(8)</u>

These profit forecasts were viewed with disappointment by the directors and there was a general feeling that the new product should not be launched. The Chief Executive pointed out that the product achieved profits in only two years of its four-year life and that over the four-year period as a whole, a net loss was expected. However, before a meeting that had been arranged to decide formally the future of the product, the following additional information became available:

- (i) The new product will require the use of an existing machine. This has a written down value of \$80,000 but could be sold for \$70,000 immediately if the new product is not launched. If the product is launched, it will be sold at the end of the four-year period for \$10,000.
- (ii) Additional working capital of \$20,000 will be required immediately and will be needed over the four-year period. It will be released at the end of the period.
- (iii) The fixed overheads include a figure of \$15,000 per year for depreciation of the machine and \$5,000 per year for the re-allocation of existing overheads of the business.

The company has a cost of capital of 10%.

Ignore taxation.

Required

- (a) Calculate the incremental cash flows arising from a decision to launch the product. **(10 marks)**
- (b) Calculate the approximate internal rate of return of the product. **(5 marks)**
- (c) Explain, with reasons, whether or not the product should be launched. **(3 marks)**
- (d) Outline the strengths and weaknesses of the internal rate of return method as a basis for investment appraisal. **(7 marks)**

(Total = 25 marks)**5 Dinard**

- (a) Explain the difference between real rates of return and nominal rates of return and outline the circumstances in which the use of each would be appropriate when appraising capital projects under inflationary conditions. **(8 marks)**
- (b) Dinard Co has just developed a new product to be called Rance and is now considering whether to put it into production. The following information is available.

- (i) Costs incurred in the development of Rance amount to \$480,000.
- (ii) Production of Rance will require the purchase of new machinery at a cost of \$2,400,000 payable immediately. This machinery is specific to the production of Rance and will be obsolete and valueless when that production ceases. The machinery has a production life of four years and a production capacity of 30,000 units per annum.
- (iii) Production costs of Rance (at year 1 prices) are estimated as follows.

	\$
Variable materials	8.00
Variable labour	12.00
Variable overheads	12.00

In addition, fixed production costs (at year 1 prices), including straight line depreciation on plant and machinery, will amount to \$800,000 per annum.

- (iv) The selling price of Rance will be \$80.00 per unit (at year 1 prices). Demand is expected to be 25,000 units per annum for the next four years.
- (v) The retail price index is expected to increase at 5% per annum for the next four years and the selling price of Rance is expected to increase at the same rate. Annual inflation rates for production costs are expected to be as follows.

	%
Variable materials	4
Variable labour	10
Variable overheads	4
Fixed costs	5

- (vi) The company's weighted average cost of capital in nominal terms is expected to be 15%.

Required

Advise the directors of Dinard Co whether it should produce Rance on the basis of the information above. **(17 marks)**

(Total = 25 marks)

Note. Unless otherwise specified all costs and revenues should be assumed to rise at the end of each year. Ignore taxation.

6 Flocks

The management of Flocks is trying to decide which of two machines to purchase, to help with production. Only one of the two machines will be purchased.

Machine X costs \$63,000 and machine Y costs \$110,000. Both machines would require a working capital investment of \$12,500 throughout their operational life, which is four years for machine X and six years for machine Y. The expected scrap value of either machine would be zero.

The estimated pre-tax operating net cash inflows with each machine are as follows.

Year	Machine X \$	Machine Y \$
1	25,900	40,300
2	28,800	32,900
3	30,500	32,000
4	29,500	32,700
5	–	48,500
6	–	44,200

With machine Y, there is some doubt about its design features, and consequently there is some risk that it might prove unsuitable. Because of the higher business risk with machine Y, the machine Y project cash flows should be discounted at 15%, whereas machine X cash flows should be discounted at only 13%.

Flocks intends to finance the machine it eventually selects, X or Y, by borrowing at 10%.

Tax is payable at 30% on operating cash flows one year in arrears. Capital allowances are available at 25% a year on a reducing balance basis.

Required

(a) For both machine X and machine Y, calculate:

- (i) The (undiscounted) payback period
- (ii) The net present value

and recommend which of the two machines Flocks should purchase. **(16 marks)**

(b) Suppose that Flocks has the opportunity to lease machine X under a finance lease arrangement, at an annual rent of \$20,000 for four years, payable at the end of each year. Recommend whether the company should lease or buy the machine, assuming it chooses machine X. **(9 marks)**

(Total = 25 marks)

7 CRY

The following figures have been extracted from the most recent accounts of CRY

BALANCE SHEET AS ON 30 JUNE 20X9

	\$'000	\$'000
Non-current assets		10,115
Investments		821
Current assets	3,658	
Less current liabilities	<u>1,735</u>	
		1,923
		<u>12,859</u>
Ordinary share capital	\$'000	\$'000
Authorised: 4,000,000 shares of \$1		
Issued: 3,000,000 shares of \$1		3,000
Reserves		6,542
Shareholders' funds		<u>9,542</u>
7% Debentures		1,300
Deferred taxation		583
Corporation tax		<u>1,434</u>
		<u>12,859</u>

Summary of profits and dividends

Year ended 30 June:	20X5	20X6	20X7	20X8	20X9
	\$'000	\$'000	\$'000	\$'000	\$'000
Profit after interest and before tax	1,737	2,090	1,940	1,866	2,179
Less tax	573	690	640	616	719
Profit after interest and tax	<u>1,164</u>	<u>1,400</u>	<u>1,300</u>	<u>1,250</u>	<u>1,460</u>
Less dividends	620	680	740	740	810
Added to reserves	<u>544</u>	<u>720</u>	<u>560</u>	<u>510</u>	<u>650</u>

The current (1 July 20X9) market value of CRY plc's ordinary shares is \$3.27 per share cum div. An annual dividend of \$810,000 is due for payment shortly. The debentures are redeemable at par in ten years' time. Their current market value is \$77.10 per cent. Annual interest has just been paid on the debentures. There have been no issues or redemptions of ordinary shares or debentures during the past five years.

The current rate of corporation tax is 30%, and the current basic rate of income tax is 25%. Assume that there have been no changes in the system or rates of taxation during the last five years.

Required

- Calculate the cost of capital which CRY plc should use as a discount rate when appraising new investment opportunities.
- Discuss any difficulties and uncertainties in your estimates.

8 Bases of valuation

The directors of Carmen, a large conglomerate, are considering the acquisition of the entire share capital of Manon, which manufactures a range of engineering machinery. Neither company has any long-term debt capital. The directors of Carmen believe that if Manon is taken over, the business risk of Carmen will not be affected.

The accounting reference date of Manon is 31 July. Its balance sheet as on 31 July 20X4 is expected to be as follows.

	\$	\$
Non-current assets (net of depreciation)		651,600
Current assets: inventory and work in progress	515,900	
receivables	745,000	
bank balances	<u>158,100</u>	
		1,419,000
		<u>2,070,600</u>
Current liabilities: payables	753,600	
bank overdraft	<u>862,900</u>	
		1,616,500
Capital and reserves: issued ordinary shares of \$1 each		50,000
distributable reserves		404,100
		<u>2,070,600</u>

Manon's summarised financial record for the five years to 31 July 20X4 is as follows.

<i>Year ended 31 July</i>	<i>20X0</i>	<i>20X1</i>	<i>20X2</i>	<i>20X3</i>	<i>20X4 (estimated)</i>
	\$	\$	\$	\$	\$
Profit before non recurring items	30,400	69,000	49,400	48,200	53,200
Non recurring items	2,900	(2,200)	(6,100)	(9,800)	(1,000)
Profit after non recurring items	<u>33,300</u>	<u>66,800</u>	<u>43,300</u>	<u>38,400</u>	<u>52,200</u>
Less dividends	20,500	22,600	25,000	25,000	25,000
Added to reserves	<u>12,800</u>	<u>44,200</u>	<u>18,300</u>	<u>13,400</u>	<u>27,200</u>

The following additional information is available.

- (1) There have been no changes in the issued share capital of Manon during the past five years.
- (2) The estimated values of Manon's non-current assets and inventory and work in progress as on 31 July 20X4 are as follows.

	<i>Replacement cost</i>	<i>Realisable value</i>
	\$	\$
Non-current assets	725,000	450,000
Inventory and work in progress	550,000	570,000

- (3) It is expected that 2% of Manon's receivables at 31 July 20X4 will be uncollectable.
- (4) The cost of capital of Carmen plc is 9%. The directors of Manon estimate that the shareholders of Manon require a minimum return of 12% per annum from their investment in the company.
- (5) The current P/E ratio of Carmen is 12. Quoted companies with business activities and profitability similar to those of Manon have P/E ratios of approximately 10, although these companies tend to be much larger than Manon.

Required

- (a) Estimate the value of the total equity of Manon as on 31 July 20X4 using each of the following bases:
- (i) Balance sheet value
 - (ii) Replacement cost of the assets
 - (iii) Realisable value of the assets
 - (iv) The dividend valuation model
 - (v) The P/E ratio model. **(13 marks)**
- (b) Explain the role and limitations of each of the above five valuation bases in the process by which a price might be agreed for the purchase by Carmen of the total equity capital of Manon. **(6 marks)**
- (c) State and justify briefly the approximate range within which the purchase price is likely to be agreed. **(6 marks)**
- Ignore taxation. **(Total = 25 marks)**

Answers

1 H Finance

Top tips. In the exam you probably would not get a complete question on factoring. The arrangement would most likely be examined in combination with other methods such as invoice discounting or credit insurance.

However the question is typical of the sort of things that might be asked about factoring, combining calculation with discussion of the general issues involved. When comparing the costs of two possibilities, sometimes as here you would calculate the total costs of each arrangement. On other occasions you would use the differences between each method in your calculation. (a) shows where the differences are likely to lie.

To answer (b) well you needed to bring out benefits in different areas (factoring as a source of finance, use of factors as means of improving working capital management and decreasing administration time and costs.) As far as the effect on the accounts is concerned, the gearing point is significant but note the uncertain effect on return on capital employed.

- (a) Assuming that the historical data presented is a reasonable guide to what will happen in the future, we can calculate whether the factoring of the debts on the accounts receivable ledger of D would be worthwhile as follows. The 20Y0 figures are assumed below to be typical.

Cost of finance

The cost of the finance provided by the factor is 5% of sales, since 80% and then a further 15% is remitted by the factor. This is equivalent to around 23% of accounts receivable ($5 \div 0.22$) based on the 20Y0 year end accounts receivable figure. However, it should be borne in mind that 15% of the finance is only received when the amounts due are received by the finance company: this delay of course makes the finance less attractive than if 95% were received straight away.

Administration costs

In addition, there would be administration costs of $0.5\% \times 98.7\text{m} = \0.5 million which amounts to considerably more than the amount of \$80,000 saved in D's own administration costs.

Bad debts

There may be some saving through a reduction in bad debts, which in 20Y0 amounted to 0.6% of revenue (\$0.6m). However there is against this a loss of contribution amounting to $18\% \times 10\% \times \$98.7\text{m} \approx \$1.8\text{m}$ as a result of the factor's aggressive collection procedures. This will outweigh any savings in the cost of bad debts.

Considering:

- (i) The **cost of the finance** provided
- (ii) The higher administration costs, and
- (iii) The loss in contribution from lost revenue

it would appear that factoring is not justified on the basis of any of these three elements.

- (b) **Aspects of factoring**

The three main aspects of factoring are as follows.

- (i) **Administration** of the client's invoicing, sales accounting and debt collection service.

- (ii) **Credit protection** for the client's debts, whereby the factor takes over the risk of loss from bad debts and so 'insures' the client against such losses. This service is also referred to as 'debt underwriting' or the 'purchase of a client's debts'. The factor usually purchases these debts 'without recourse' to the client, which means that in the event that the client's accounts receivable are unable to pay what they owe, the factor will not ask for his money back from the client.
- (iii) **Making payments** to the client in **advance** of collecting the debts. This might be referred to as 'factor finance' because the factor is providing cash to the client against outstanding debts.

Benefits of factoring

The benefits of factoring for a business customer include the following.

- (i) The business can **pay its suppliers promptly**, and so can take advantage of any early payment discounts that are available.
- (ii) **Optimum inventory** levels can be **maintained**, because the business will have enough cash to pay for the inventories it needs.
- (iii) **Growth** can be **financed** through sales rather than by injecting fresh external capital.
- (iv) The business gets **finance linked** to its **volume of sales**. In contrast, overdraft limits tend to be determined by historical balance sheets.
- (v) The managers of the business do **not have to spend their time** on the **problems** of slow-paying accounts receivable.
- (vi) The business does **not incur the costs** of **running its own sales ledger department**.

Effect on accounts

Factoring of sales invoicing leads to a **reduction of accounts receivable** and therefore of assets employed in the business, accompanied by a reduction in profit as a result of the costs involved. Part of these 'costs' are generally reflected in the fact that less than 100% of the debt is paid to the company by the factor. The effect on the **return on capital employed** will depend upon the cost of factoring and the level of profits without factoring relative to assets employed.

Since they reduce assets, the funds advanced by the factor do not show up as **borrowings** in the balance sheet. The apparent gearing will therefore improve. Factoring is attractive to some companies as a method of avoiding borrowing limits or covenants being breached. It provides a means of financing accounts receivable, which are otherwise unsuitable for secured lending because of their volatility.

Disadvantages of factoring

The main disadvantage of factoring is that it is a **relatively expensive form** of finance compared to loan finance. Some businesses will also find it undesirable for customer relations if the administration of debt collection is passed to a third party.

2 Victory

Top tips. Always note how long it will take to deliver orders as this is an important detail, even though it isn't brought into the economic order quantity calculation.

In (a) (iii) and (b) (i) you need to bring purchasing costs in as they will be affected by the discount.

For questions like (b) (ii) focus on what might differ in the real world from what is assumed to happen for the purposes of the calculation, and think about non-financial factors.

Remember for questions such as (c) that just-in-time is a philosophy that impacts upon the whole production process, not just delivery of stock. That said, relationships with suppliers are critical and do need to be stressed.

- (a) (i) Using the economic order quantity (EOQ) model:

$$Q = \sqrt{\frac{2C_0D}{C_h}}$$

where: C_0 = cost of making one order = \$75

D = annual demand = $200 \times 52 = 10,400$

C_h = holding cost per unit per annum = \$2

$$Q = \sqrt{\frac{(2 \times \$75 \times 10,400)}{\$2}}$$

$$Q = \sqrt{780,000}$$

$$Q = 883.2 \text{ units}$$

The economic order quantity is therefore 883 units (to the nearest unit).

- (ii) Demand is fixed at 200 bottles per week, and delivery from the supplier takes two weeks. Victory must therefore reorder when stocks fall to 400 units (2 weeks demand).
- (iii) The total cost of stocking Buzz for one year will be:

	\$
<i>Purchase cost</i>	
10,400 units \$20 each	208,000
<i>Ordering cost</i>	
Annual demand (units)	10,400
Order size (units)	883
Number of orders per year	11.78
Cost of placing one order	\$75
Annual ordering cost	883
<i>Holding cost</i>	
Average inventory (883/2)	441.5
Holding cost per unit pa	\$2
Annual holding cost	883
Total annual cost	<u>209,766</u>

- (b) (i) The factors for the new supplier are as follows:

$$C_0 = \$250$$

$$D = 10,400$$

$$C_h = \$1.80$$

$$Q = \sqrt{\frac{(2 \times \$250 \times 10,400)}{\$1.80}}$$

$$= 1,699.7$$

The economic order quantity is therefore 1,700 units (to the nearest unit).

To determine whether it is financially viable to change supplier we must calculate the total annual cost of ordering from this supplier and to compare this with the existing annual cost.

	\$
<i>Purchase cost</i>	
10,400 units \$19 each	197,600
<i>Ordering cost</i>	
Annual demand (units)	10,400
Order size (units)	1,700
Number of orders per year	6.12
Cost of placing one order	\$250
Annual ordering cost	1,530
<i>Holding cost</i>	
Average inventory (1,700/2)	850
Holding cost per unit pa	\$1.80
Annual holding cost	1,530
Total annual cost	<u>200,660</u>

This is \$9,106 less than the existing annual purchasing cost, and therefore it would be financially beneficial to switch suppliers.

- (ii) Limitations of the calculations include the following:

- (1) **Demand is assumed to be the same** throughout the year. In practice, there are likely to be variations.
- (2) **It is assumed that the lead-time is constant** and that the **suppliers** are both **completely dependable**.
- (3) **It is assumed that purchase costs are constant**. In practice it is necessary to allow for the effects of differing discount and credit policies.

Non-financial factors to be considered include:

- (1) **Quality** must be consistent and reliable from both suppliers.
- (2) **Packaging differences** must be acceptable, and the product from both suppliers must be equally attractive to consumers.
- (3) **Flexibility**. Both suppliers must be able to respond quickly and efficiently to variations in the level of demand.
- (4) **Environmental effects**. Victory must ensure that the suppliers' production facilities meet any agreed environmental standards that the company requires.

- (c) **Just-in-time (JIT) manufacturing** involves obtaining goods from suppliers at the **latest possible time** (ie when they are needed on the production line), thereby **avoiding the need to carry** any materials or components inventory. Reduced inventory levels mean that a **lower level of investment in working capital** will be required. In certain environments where the cost of a stock-out is high, JIT is inappropriate, eg in a hospital, the cost of a stock-out for certain items could be fatal.

The main features of a JIT system include the following:

- (i) **Deliveries** will be **small and frequent**, rather than in bulk. **Production runs** will also be shorter.
- (ii) **Supplier relationships** must be **close**, since high demands will be placed on suppliers to deliver on time and with 100% quality.
- (iii) **Unit purchasing prices** may need to be **higher** than in a conventional system to compensate suppliers for their need to hold higher inventories and to meet more rigorous quality and delivery requirements. However, savings in production costs and reductions in working capital should offset these costs.
- (iv) **Improved labour productivity** should result from a smoother flow of materials through the process.
- (v) **Production process improvements** may be required for a JIT system to function to full effectiveness. In particular set-up time for machinery may have to be reduced, workforce teams reorganised, and movement of materials within the production process minimised.

3 ZX

Top tips. The key point to emphasise is that holding too much working capital is expensive whereas holding too little can result in system breakdown. However, modern manufacturing techniques and re-engineering of business processes can help achieve the best of both worlds: low working capital *and* efficient production and sales systems.

Important aspects in part (a) are the term of debt and safety inventory (each worth a couple of marks) and investment and financing (worth a mark), with other aspects accounting for the rest of the marks. In (b) you need to show the effects on assets and liabilities, sales and profits, and current ratios and return on assets to score maximum marks. In (c) a couple of marks are available specifically for a recommendation, with the remaining marks being available for the effect on various stakeholders (staff, customers and suppliers) and possible disadvantages.

To: Finance Director
 From: Financial Manager
 Date: 4 December 20X1
 Subject: Working capital policy

- (a) **Policy for investment and financing of working capital**

Choice of policies

The level of investment in working capital should be chosen after considering **manufacturing, marketing and financing factors** and other relevant stakeholder relationships. There is a range of possible investment policies, lying along a spectrum from conservative to aggressive.

Conservative policy

A conservative policy, such as we adopt at present, aims to **reduce the risk of system breakdown** by holding high levels of working capital. Thus customers are allowed **generous payment terms** to stimulate demand, **inventory** of finished goods is **high** to ensure availability for customers, and raw materials and work in progress are high to minimise the risk of running out

of inventory and consequent downtime in the manufacturing process. Suppliers are paid promptly to ensure their goodwill, again to minimise the chance of stock-outs.

Effects of conservative policy

However, the cumulative effect on these policies can be that the firm carries a high burden of **unproductive assets**, resulting in a **financing cost** that can destroy profitability. A period of rapid expansion may also cause **severe cash flow problems** as working capital requirements outstrip available finance. Further problems may arise from inventory obsolescence and lack of flexibility to customer demands.

Aggressive working capital policy

An aggressive working capital investment policy aims to reduce this financing cost and increase profitability by **cutting inventory, speeding up collections from customers, and delaying payments to suppliers**. The potential disadvantage of this policy is an increase in the chances of **system breakdown** through **running out of inventory** or **loss of goodwill** with customers and suppliers. However, modern manufacturing techniques encourage inventory and work in progress reductions through just-in-time policies, flexible production facilities and improved quality management. Improved customer satisfaction through quality and effective response to customer demand can also enable the shortening of credit periods. Our **modern production facility** gives the company the potential to implement radical new management techniques, including those mentioned above, and to move along the working capital policy spectrum towards a more aggressive stance.

Short-term or long-term finance

Whatever the level of working capital in the business, there is a choice as to whether the investment is financed by short-term or longer-term funds. In this sense, a **conservative policy** would finance using **longer-term loans or share capital** whereas an **aggressive policy** would finance using **shorter-term measures** such as **bank overdraft, factoring of debts, or invoice discounting**. The advantage of short-term finance is that it can be cheaper but its disadvantage is that it is more easily withdrawn in the event of a cash crisis.

(b) Ratio analysis

Policy:	Conservative		Moderate	Aggressive	
	(present)	Change		Change	
	\$'000	%	\$'000	%	\$'000
Receivables	2,500	-20	2,000	-30	1,750
Inventory	2,000	-20	1,600	-30	1,400
Cash at bank	500		250		100
Current assets	<u>5,000</u>		<u>3,850</u>		<u>3,250</u>
Current liabilities	<u>(1,850)</u>	10	<u>(2,035)</u>	20	<u>(2,220)</u>
Net current assets	<u>3,150</u>		<u>1,815</u>		<u>1,030</u>
Non-current assets	<u>1,250</u>		<u>1,250</u>		<u>1,250</u>
Net assets	<u><u>4,400</u></u>		<u><u>3,065</u></u>		<u><u>2,280</u></u>
Forecast sales	8,000	2	8,160	4	8,320
Operating profit margin	18%		18%		18%
Forecast operating profit	<u>1,440</u>		<u>1,469</u>		<u>1,498</u>
Return on net assets	33%		48%		66%
Current ratio	2.70		1.89		1.46

Notes

- (1) $\text{Return on net assets} = \frac{\text{operating profit}}{\text{net assets}}$.
- (2) There is no logical reason why sales should increase as a result of a more aggressive working capital policy. The reasoning behind this assumption is unclear.

(c) **Recommended course of action**

The conclusion to be drawn from the figures in (b) above is that **substantial funds** can be released by moving from a conservative to an aggressive working capital position (\$4.40m – \$2.28m = \$2.12m). These funds could be **repaid to shareholders, invested** or used to **reduce borrowings** depending on the company's situation.

Moderate working capital position

My first recommendation is that the company should attempt to move towards a moderate working capital position by **tightening up its debt collection procedures, buying inventory in smaller batches** and **negotiating longer credit periods** from suppliers. Our small size does not help us in this respect but, if achievable, this would result in a significant increase in return on net assets and an acceptable current ratio.

Use of modern techniques

However, further moves towards more aggressive working capital arrangements should be the outcome rather than the driver of policy changes. The key changes that need to be made in our firm are concerned with the adoption of **modern supply chain** and **manufacturing techniques**. These will enable us not only to reduce working capital while avoiding system breakdown but also to improve quality and flexibility and to increase customer demand. At the moment, we have modern equipment but are not taking full advantage of its potential. I therefore recommend that a **comprehensive study** of our **key business processes** is undertaken. I will be happy to evaluate the financial effects of the possible scenarios.

4 Mezen

Top tips. In (a), if you failed to identify which costs were relevant correctly, make sure you understand why. (c) makes the important point about sensitivity of cash flows. Even if a project has a positive NPV, or an acceptable IRR, a company may not go ahead if the profits are felt to be too marginal, and the risk of loss too great.

(a) **Incremental cash flows**

The survey has been undertaken already, even though it has not yet been paid for, and therefore the \$30,000 is a sunk cost.

The depreciation charge of \$15,000 is not a cash-flow. The re-allocated fixed overheads will be incurred whether or Mezen goes ahead with the product. Both of these amounts may be subtracted from the \$25,000 of fixed overheads in the original calculations.

The company forgoes \$70,000 of immediate income from the sale of the machine.

	Time 0	Time 1	Time 2	Time 3	Time 4	NPV
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Sales		180	200	160	120	
Cost of sales		(115)	(140)	(110)	(85)	
Variable overheads		(27)	(30)	(24)	(18)	
Fixed overheads		(5)	(5)	(5)	(5)	
Machine	(70)				10	
Working capital	(20)				20	
Incremental cash flows	(90)	33	25	21	42	
× 10% discount factor	1.00	0.91	0.83	0.75	0.68	
Present value	(90.00)	30.03	20.75	15.75	28.56	<u>5.09</u>

(b) **Approximate internal rate of return**

	<i>Time 0</i>	<i>Time 1</i>	<i>Time 2</i>	<i>Time 3</i>	<i>Time 4</i>	<i>NPV</i>
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Incremental cash flows	(90)	33	25	21	42	
× 14% discount factor	1.00	0.88	0.77	0.68	0.59	
Present value	(90.00)	29.04	19.25	14.28	24.78	<u>(2.65)</u>

$$\text{IRR} = A + \left[\frac{\text{NPV}_A}{\text{NPV}_A - \text{NPV}_B} \times (B - A) \right] \%$$

where A is the lower rate of return, B is the higher rate of return, N_A is the NPV discounted at A, and N_B is the NPV discounted at B.

$$\text{IRR} = 10 + \left[\frac{5.09}{5.09 - (-2.65)} \times (14 - 10) \right] \% = 12.63\%$$

- (c) The product has a positive net present value and an IRR that exceeds the company's cost of capital, and this suggests that it should be launched.

The decision is very marginal, however. It would certainly not be worthwhile if the market survey had not yet been commissioned, in which case the cost of \$30,000 would need to be included. A relatively small drop in sales or a small increase in costs would result in a negative NPV. The company may well be able to find better uses for the \$20,000 that will be spent now, and for the immediate income of \$70,000 on the sale of the machine.

- (d) The **internal rate of return (IRR)** is the rate of return that results in a NPV of zero. The rule with the **internal rate of return (IRR)** method of project evaluation is that a project should be undertaken if it is expected to achieve a return in excess of the company's cost of capital. A project that has an IRR in excess of the cost of capital must have a positive NPV.

Strengths

The main **advantage** of the IRR method is that the information it provides may be more easily understood by managers, especially non-financial managers.

It is sometimes said that IRR is difficult to calculate, but **both** NPV and IRR are actually **very easy to calculate** with a **spreadsheet**.

Weaknesses

However, it might be tempting for some managers to **confuse IRR** and **accounting return** on capital employed (ROCE). The accounting ROCE and the IRR are two completely different measures. If managers were given information about both ROCE (or ROI) and IRR, it might be easy to get their relative meaning and significance mixed up.

The IRR method also ignores the **relative size of investments**: for example a project with an annual return of \$50 on an initial investment of \$100 would have the same IRR as a project with an annual return of \$5,000 on an initial investment of \$10,000, although the latter is clearly preferable.

IRR **favours projects that are less sensitive to increases in the discount rate** and therefore the IRR method may sometimes indicate that a project that yields a smaller increase in shareholder wealth should be preferred to one that yields a larger increase, whereas the opposite is the case. NPV should therefore be used to **decide** between **mutually exclusive projects**.

5 Dinard

Top tips. (a) allows you to demonstrate that you understand the topic of real and nominal returns by explaining the difference between them.

(b) introduces the complication of what you should do if you are told what current (or year 1) prices are but are also given information about price increases over the period of investment. Because the costs are increasing at different rates, the nominal rate (which you are given) has to be used, and the revenues and costs inflated each year. If the rate of increase for everything had been the same, you could either have used the nominal rate (and inflated costs and revenues), or calculated the real rate (and used uninflated costs and revenues). Since calculating the real rate only involves one calculation, you should really have chosen that option.

Again don't forget to exclude depreciation as it is not a cash flow. Development costs of \$480,000 are sunk costs and should also be excluded from the calculation. Because you are told to confine your answer to the information given, you should not discuss any wider issues that might be involved in the investment.

- (a) The **real rate of return** is the rate of return which an investment would show in the **absence of inflation**. For example, if a company invests \$100, inflation is 0%, and the investment at the end of the year is worth \$110, then the real rate of return is 10%.

In reality however, there is likely to be an element of inflation in the returns due to the change in the purchasing power of money over the period. In the example above, if inflation was running at 5%, then to show a real rate of return of 10%, the investment would need to be worth \$115.50 at the end of the year. In this case the nominal rate of return is 15.5% which is made up of the real return of 10% and inflation at 5%.

The relationship between the nominal ('money') rate of return and the real rate of return can be expressed as follows:

$$(1 + \text{nominal rate}) = (1 + \text{real rate}) \times (1 + \text{inflation rate})$$

The rate to be used in discounting cash flows for capital project appraisal will depend on the **way** in which the **expected cash flows** are calculated. If the cash flows are expressed in terms of the **actual number of dollars** that will be received or paid on the various future dates, then the **nominal rate** must be used. If, however, they are expressed in **terms of the value of the dollars at year 0**, then the **real rate must be used**.

- (b) *Workings*

	Year 1	Year 2	Year 3	Year 4
Sales volume	25,000	25,000	25,000	25,000
Unit price (\$)	80	84	88	93
Variable material cost (\$)	8.00	8.32	8.65	9.00
Variable labour cost (\$)	12.00	13.20	14.52	15.97
Variable overhead (\$)	12.00	12.48	12.98	13.50

Notes. Evaluation of investment

(All figures \$'000)

	Year 0	Year 1	Year 2	Year 3	Year 4
Capital outlay	(2,400)				
Sales		2,000	2,100	2,205	2,315
Direct costs					
Materials		(200)	(208)	(216)	(225)
Labour		(300)	(330)	(363)	(399)
Overhead		(300)	(312)	(324)	(337)
Fixed overheads		(200)	(210)	(221)	(232)
Gross cash flow	<u>(2,400)</u>	<u>1,000</u>	<u>1,040</u>	<u>1,081</u>	<u>1,122</u>
Discount at 15%	1.000	0.870	0.756	0.658	0.572
Present value	(2,400)	870	786	711	642
Cumulative PV	(2,400)	(1,530)	(744)	(33)	608

The investment yields a net present value at the end of four years of \$608,000. In the absence of other factors such as a capital rationing situation, production of the Rance should be undertaken.

6 Flocks

Top tips. This question splits clearly the investment decision ((a)) and the finance decision ((b)).

(a) requires careful planning of layout. Having separate columns for the items of income and expenditure and including a net cash flow column means you only have to do one net present value calculation per year. This is clearer and more economical than listing in one column all the year 0 figures, then all the year 1 figures, and having to do a net present value calculation for each figure.

The layout of the main calculations can also be simplified by just including the net tax payable figure rather than separate figures for tax on profits and tax saved on tax allowable depreciation.

The cumulative cash flow column enables you to work out the payback period easily.

You should not have calculated a writing down allowance for the years of disposal (4 and 6), but a balancing allowance.

In (b) the relevant items are the lease/buy costs and the tax savings.

An exam question on this area might well include a written part asking you to discuss other implications of the choice between leasing and buying.

(a) *Workings*

(i) Tax allowable depreciation

Year	Machine X depreciation \$	Year	Machine Y depreciation \$
(25% of \$63,000)	15,750	1	(25% of \$110,000)
(75% of \$15,750)	11,813	2	(75% of \$27,500)
(75% of \$11,813)	8,859	3	(75% of \$20,625)
	<u>36,422</u>	4	(75% of \$15,469)
(\$63,000 – \$36,422)	26,578	5	(75% of \$11,602)
			<u>8,702</u>
			<u>83,898</u>
		6	(\$110,000 – \$83,898)
			26,102

(ii) *Taxable profits and tax liabilities**Machine X*

Year	Tax depreciation \$	Tax saved at 30% (one year later) \$
1	15,750	4725
2	11,813	3543
3	8,859	2658
4	26,578	7973

Machine Y

Year	Tax depreciation \$	Tax saved at 30% (one year later) \$
1	27,500	8,250
2	20,625	6,188
3	15,469	4,641
4	11,602	3,481
5	8,702	2,611
6	26,102	7,831

*NPV and payback calculations**Machine X*

Year	Capital \$	Cash profits \$	Tax paid \$	Tax saved \$	Net cash flow \$	Discount factor 13%	Present value \$	Cumulative cash flow \$
0	(75,500)				(75,500)	1.000	(75,500)	(75,500)
1		25,900			25,900	0.885	22,922	(49,600)
2		28,800	(7,770)	4725	25,755	0.783	20,166	(23,845)
3		30,500	(8,640)	3543	25,404	0.693	17,605	1,559
4	12,500	29,500	(9,150)	2658	35,508	0.613	21,766	
5			(8,850)	7973	(877)	0.543	(476)	
							NPV = <u>6,483</u>	

The NPV for machine X is + \$6,483, and the payback period is about three years.

Machine Y

Year	Capital cost \$	Cash profits \$	Tax paid \$	Tax saved \$	Net cash flow \$	Discount factor 15%	Present value \$	Cumulative cash flow \$
0	(122,500)				(122,500)	1.000	(122,500)	(122,500)
1		40,300			40,300	0.870	35,061	(82,200)
2		32,900	(12,090)	8,250	29,060	0.756	21,969	(53,140)
3		32,000	(9,870)	6,188	28,317	0.658	18,633	(24,823)
4		32,700	(9,600)	4,641	27,741	0.572	15,868	2,972
5		48,500	(9,810)	3,481	42,171	0.497	20,959	
6	12,500	44,200	(14,550)	2,611	44,761	0.432	19,337	
7			(13,260)	7,831	(5,429)	0.376	(2,041)	
							NPV = <u>7,286</u>	

The NPV for machine Y is + \$7,286 and the payback period is about four years.

Machine X would appear to be the preferable option.

- (b) The financing decision will be appraised by discounting the relevant cash flows at the after-tax cost of borrowing, which is $10\% \times 70\% = 7\%$.

(i) *Purchase option*

Year	Item	Cash flow \$	Discount factor 7%	Present value \$
0	Cost of machine	(63,000)	1.000	(63,000)
	Tax saved from tax depreciation			
2	30% × \$15,750	4,725	0.873	4,125
3	30% × \$11,813	3,544	0.816	2,892
4	30% × \$8,859	2,658	0.763	2,028
5	30% × \$26,578	7,973	0.713	5,685
				<u>(48,270)</u>

(ii) *Leasing option*

Years	Item	Cash flow \$	Discount factor 7%	Present value \$
1–4	Lease costs	(20,000)	3.387	(67,740)
2–5	Tax savings on lease costs (× 30%)	6,000	3.165	18,990
				<u>(48,750)</u>

The purchase option is marginally cheaper, using a cost of capital based on the after-tax cost of borrowing.

On the assumption that investors would regard borrowing and leasing as equally risky finance options, the purchase option is recommended.

7 CRY

Top tips. (a) demonstrates the complications that may occur in weighted average cost of capital calculations. When you calculate the cost of equity, you will need to do more than just plug the figures into the formula. Don't forget to check whether shares are quoted **cum or ex div**.

With debentures, the most serious mistake you can make is to treat redeemable debentures as irredeemable. Because the debentures are redeemable, you need to carry out an IRR analysis. Remember this calculation is done from the viewpoint of the investor. The investor pays the market price for the debentures at time 0, and then receives the interest and the conversion value in subsequent years. You must bring tax into your calculation, although you could have assumed that tax was paid with a one year time delay.

Lastly don't forget that the weightings in the WACC calculation are based on **market values, not book values**.

(b) demonstrates that the calculation of the weighted average cost of capital is not a purely mechanical process. It makes assumptions about the shareholders, the proposed investment and the company's capital structure and future dividend prospects. Given all the assumptions involved, the result of the calculations may need to be taken with a large pinch of salt!

(a) The post-tax weighted average cost of capital should first be calculated.

(i) **Ordinary shares**

Market value of shares cum div.	\$
	3.27
Less dividend per share (810 ÷ 3,000)	<u>0.27</u>
Market value of shares ex div.	<u>3.00</u>

The formula for calculating the cost of equity when there is dividend growth is:

$$k_e = \frac{D_0(1+g)}{P_0} + g$$

where k_e = cost of equity
 D_0 = current dividend
 g = rate of growth
 P_0 = current ex div market value.

In this case we shall estimate the future rate of growth (g) from the average growth in dividends over the past four years.

$$810 = 620(1+g)^4$$

$$(1+g)^4 = \frac{810}{620}$$

$$= 1.3065$$

$$(1+g) = 1.069$$

$$g = 0.069 = 6.9\%$$

$$k_e = \frac{0.27 \times 1.069}{3} + 0.069 = 16.5\%$$

(ii) **7% Debentures**

In order to find the post-tax cost of the debentures, which are redeemable in ten years' time, it is necessary to find the discount rate (IRR) which will give the future post-tax cash flows a present value of \$77.10.

The relevant cash flows are:

- (1) Annual interest payments, net of tax, which are $\$1,300 \times 7\% \times 70\% = \63.70 (for ten years)
- (2) A capital repayment of \$1,300 (in ten years time)

It is assumed that tax relief on the debenture interest arises at the same time as the interest payment. In practice, the cash flow effect is unlikely to be felt for about a year, but this will have no significant effect on the calculations.

Try 8%

	<i>Present value \$'000</i>
Current market value of debentures (1,300 at \$77.10 per cent)	(1,002.3)
Annual interest payments net of tax $\$63.70 \times 6.710$ (8% for ten years)	427.4
Capital repayment $\$1,300 \times 0.463$ (8% in ten years' time)	<u>601.9</u>
NPV	<u><u>27.0</u></u>

Try 9%

	<i>\$'000</i>
Current market value of debentures	(1,002.3)
Annual interest payments net of tax 63.70×6.418	408.8
Capital repayment $1,300 \times 0.422$	<u>548.6</u>
NPV	<u><u>(44.9)</u></u>

$$IRR = 8\% + \left[\frac{27.0}{27.0 - 44.9} \times (9 - 8) \right] \% = 8.38\%$$

(iii) **The weighted average cost of capital**

	<i>Market value</i> \$'000	<i>Cost</i> %	<i>Product</i> \$'000
Equity	9,000	16.50	1,485
7% Debentures	1,002	8.38	84
	<u>10,002</u>		<u>1,569</u>

$$\frac{1,569}{10,002} \times 100 = 15.7\%$$

The above calculations suggest that a discount rate in the region of 16% might be appropriate for the appraisal of new investment opportunities.

(b) Difficulties and uncertainties in the above estimates arise in a number of areas.

- (i) **The cost of equity.** The above calculation assumes that all shareholders have the same marginal cost of capital and the same dividend expectations, which is unrealistic. In addition, it is assumed that dividend growth has been and will be at a constant rate of 6.9%. In fact, actual growth in the years 20X5/6 and 20X8/9 was in excess of 9%, while in the year 20X7/8 there was no dividend growth. 6.9% is merely the average rate of growth for the past four years. The rate of future growth will depend more on the return from future projects undertaken than on the past dividend record.
- (ii) **The use of the weighted average cost of capital.** Use of the weighted average cost of capital as a discount rate is only justified where the company in question has achieved what it believes to be the **optimal capital structure** (the mix of debt and equity) and where it intends to maintain this structure in the long term.
- (iii) **The projects themselves.** The weighted average cost of capital makes **no allowance** for the **business risk of individual projects**. In practice, some companies, having calculated the WACC, then add a premium for risk. In this case, for example, if one used a risk premium of 5% the final discount rate would be 21%. Ideally the risk premium should vary from project to project, since not all projects are equally risky. In general, the riskier the project the higher the discount rate which should be used.

8 Bases of valuation

- (a) (i) Balance sheet value = \$454,100.
- (ii) Replacement cost value = \$454,100 + \$(725,000 – 651,600) + \$(550,000 – 515,900) = \$561,600.
- (iii) Realisable value = \$454,100 + \$(450,000 – 651,600) + (570,000-515,900)-\$14,900 = \$291,700.

Bad debts are 2% × \$745,000 = \$14,900. Bad debts are assumed not to be relevant to balance sheet and replacement cost values.

- (iv) The dividend growth model value depends on an estimate of growth, which is far from clear given the wide variations in earnings over the five years.

1 The lowest possible value, assuming zero growth, is as follows.

$$\text{Value cum div} = \frac{\$25,000}{0.12} + \$25,000 = \$233,333$$

It is not likely that this will be the basis taken.

2 Looking at dividend growth over the past five years we have:

$$20X4 \text{ dividend} = \$25,000$$

20X0 dividend = \$20,500.

If the annual growth rate in dividends is g

$$(1 + g)^4 = \frac{(25,000)}{20,500} = 1.2195$$

$$1 + g = 1.0508$$

$$g = 0.0508, \text{ say } 5\%$$

$$\begin{aligned} \text{Then, MV cum div} &= \frac{\text{Dividend in 1 year}}{0.12 - g} + \text{current div} \\ &= \frac{25,000(1.05)}{0.07} + \$25,000 \\ &= \$400,000. \end{aligned}$$

3 Using the rb model, we have:

Average proportion retained =

$$\frac{12,800 + 44,200 + 18,300 + 13,400 + 27,000}{33,300 + 66,800 + 43,300 + 38,400 + 52,200} = 0.495 \text{ (say } b = 0.5)$$

$$\begin{aligned} \text{Return on investment this year} &= \frac{53,200}{\text{average investment}} \\ &= \frac{53,200}{(454,100 + (454,100 - 27,200))} \\ &= 0.1208 \text{ (say } r = 12\%). \end{aligned}$$

Then $g = 0.5 \times 12\% = 6\%$

$$\text{so MV cum div} = \frac{\$25,000(1.06)}{0.06} + \$25,000 = \$466,667$$

(v) P/E ratio model

Comparable quoted companies to Manon have P/E ratios of about 10. Manon is much smaller and being unquoted its P/E ratio would be less than 10, but how much less?

If we take a P/E ratio of 5, we have $MV = \$53,200 \times 5 = \$266,000$.

If we take a P/E ratio of $10 \times 2/3$, we have $MV = \$53,200 \times 10 \times 2/3 = \$354,667$.

If we take a P/E ratio of 10, we have $MV = \$532,000$.

(b) (i) *The balance sheet value*

The balance sheet value should not play a part in the negotiation process. Historical costs are not relevant to a decision on the future value of the company.

(ii) *The replacement cost*

This gives the cost of setting up a similar business. Since this gives a higher figure than any other valuation in this case, it could show the maximum price for Carmen to offer. There is clearly no goodwill to value.

(iii) *The realisable value*

This shows the cash which the shareholders in Manon could get by liquidating the business. It is therefore the minimum price which they would accept.

All the methods (i) to (iii) suffer from the limitation that they do not look at the going concern value of the business as a whole. Methods (iv) and (v) do consider this value. However, the realisable value is of use in assessing the risk attached to the business as a going concern, as it gives the base value if things go wrong and the business has to be abandoned.

(iv) *The dividend model*

The figures have been calculated using Manon's K_e (12%). If (2) or (3) were followed, the value would be the minimum that Manon's shareholders would accept, as the value in use exceeds scrap value in (iii). The relevance of a dividend valuation to Carmen will depend on whether the current retention and reinvestment policies would be continued. Certainly the value to Carmen should be based on 9% rather than 12%. Both companies are ungeared and in the same risk class so the different required returns must be due to their relative sizes and the fact that Carmen's shares are more marketable.

One of the main limitations on the dividend growth model is the problem of estimating the future value of g .

(v) *The P/E ratio model*

The P/E ratio model is an attempt to get at the value which the market would put on a company like Manon. It does provide an external yardstick, but is a very crude measure. As already stated, the P/E ratio which applies to larger quoted companies must be lowered to allow for the size of Manon and the non-marketability of its shares. Another limitation of P/E ratios is that the ratio is very dependent on the expected future growth of the firm. It is therefore not easy to find a P/E ratio of a 'similar firm'. However, in practice the P/E model may well feature in the negotiations over price simply because it is an easily understood yardstick.

- (c) The range within which the purchase price is likely to be agreed will be the minimum price which the shareholders of Manon will accept and the maximum price which the directors of Carmen will pay.

Examining the figures in part (a), the range is \$291,700 (realisable value) to \$561,600 (replacement cost).

END OF QUESTION AND ANSWER BANK

Formulae and ratios



Formulae & ratios that you need to learn

Profitability ratios include:

$$\text{ROCE} = \frac{\text{Profit from operations}}{\text{Capital employed}} \%$$

$$\text{ROCE} = \frac{\text{Profit from operations}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Capital employed}}$$

$$\text{Profit margin} \times \text{Asset turnover}$$

Debt ratios include:

$$\text{Gearing} = \frac{\text{Book value of debt}}{\text{Book value of equity}}$$

$$\text{Interest cover} = \frac{\text{Profit from operations}}{\text{Interest}}$$

Liquidity ratios include:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Acid Test ratio} = \frac{\text{Current assets}}{\text{Current liabilities (less inventory)}}$$

Shareholder investor ratios include:

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100$$

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

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

$$\text{Av. collection period} = \frac{\text{Receivables}}{\text{(credit) sales}} \times 365 = \text{days}$$

Inventory days

$$(a) \text{ Finished goods} = \frac{\text{Finished goods}}{\text{Cost of sales}} \times 365 = \text{days}$$

$$(b) \text{ W.I.P} = \frac{\text{WIP}}{\text{Cost of production}} \times 365 = \text{days}$$

$$(c) \text{ Raw material} = \frac{\text{Raw material}}{\text{Raw material purchases}} \times 365 = \text{days}$$

$$\text{Av. payables period} = \frac{\text{Payables}}{\text{(credit) purchases}} \times 365 = \text{(days)}$$

$$\text{IRR} = a + \frac{\text{NPVa}}{\text{NPVa} - \text{NPVb}} (b-a)$$

$$\text{EAC} = \frac{\text{NPV of costs}}{\text{annuity factor for the life of the project}}$$

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

$$K_d = \frac{i(1-t)}{P_0}$$

$$K_{\text{pref}} = \frac{\text{Preference Dividend}}{\text{Market Value}_{(\text{ex div})}} = \frac{d}{P_0}$$

$$\text{Profitability index} = \frac{\text{NPV of cash inflows}}{\text{Cash outflow}}$$

END OF FORMULAE AND RATIOS

Appendix A: Pilot paper questions



24: APPENDIX A: PILOT PAPER QUESTIONS

ALL FOUR questions are compulsory and MUST be attempted

- 1 Droxfol Co is a listed company that plans to spend \$10m on expanding its existing business. It has been suggested that the money could be raised by issuing 9% loan notes redeemable in ten years' time. Current financial information on Droxfol Co is as follows.

Income statement information for the last year

	\$000
Profit before interest and tax	7,000
Interest	(500)
Profit before tax	<u>6,500</u>
Tax	(1,950)
Profit for the period	<u>4,550</u>

Balance sheet for the last year

	\$000	\$000
Non-current assets		20,000
Current assets		<u>20,000</u>
Total assets		<u>40,000</u>
Equity and liabilities		
Ordinary shares, par value \$1	5,000	
Retained earnings	<u>22,500</u>	
Total equity		27,500
10% loan notes	5,000	
9% preference shares, par value \$1	<u>2,500</u>	
Total non-current liabilities		7,500
Current liabilities		<u>5,000</u>
Total equity and liabilities		<u>40,000</u>

The current ex div ordinary share price is \$4.50 per share. An ordinary dividend of 35 cents per share has just been paid and dividends are expected to increase by 4% per year for the foreseeable future. The current ex div preference share price is 76.2 cents. The loan notes are secured on the existing non-current assets of Droxfol Co and are redeemable at par in eight years' time. They have a current ex interest market price of \$105 per \$100 loan note. Droxfol Co pays tax on profits at an annual rate of 30%.

The expansion of business is expected to increase profit before interest and tax by 12% in the first year. Droxfol Co has no overdraft.

Average sector ratios:

Financial gearing: 45% (prior charge capital divided by equity share capital on a book value basis)
Interest coverage ratio: 12 times

Required:

- (a) Calculate the current weighted average cost of capital of Droxfol Co. (9 marks)
- (b) Discuss whether financial management theory suggests that Droxfol Co can reduce its weighted average cost of capital to a minimum level. (8 marks)
- (c) Evaluate and comment on the effects, after one year, of the loan note issue and the expansion of business on the following ratios:
- interest coverage ratio;
 - financial gearing;
 - earnings per share.

Assume that the dividend growth rate of 4% is unchanged. (8 marks)

(25 marks)

- 2 Nedwen Co is a UK-based company which has the following expected transactions..

One month: Expected receipt of \$240,000
 One month: Expected payment of \$140,000
 Three months: Expected receipts of \$300,000

The finance manager has collected the following information:

Spot rate (\$ per £): 1.7820 ± 0.0002
 One month forward rate (\$ per £): 1.7829 ± 0.0003
 Three months forward rate (\$ per £): 1.7846 ± 0.0004

Money market rates for Nedwen Co:

	Borrowing	Deposit
One year sterling interest rate:	4.9%	4.6
One year dollar interest rate:	5.4%	5.1

Assume that it is now 1 April.

Required:

- (a) Discuss the differences between transaction risk, translation risk and economic risk. (6 marks)
- (b) Explain how inflation rates can be used to forecast exchange rates. (6 marks)
- (c) Calculate the expected sterling receipts in one month and in three months using the forward market. (3 marks)
- (d) Calculate the expected sterling receipts in three months using a money-market hedge and recommend whether a forward market hedge or a money market hedge should be used. (5 marks)
- (e) Discuss how sterling currency futures contracts could be used to hedge the three-month dollar receipt. (5 marks)

(25 marks)

- 3 Ulnad Co has annual sales revenue of \$6 million and all sales are on 30 days' credit, although customers on average take ten days more than this to pay. Contribution represents 60% of sales and the company currently has no bad debts. Accounts receivable are financed by an overdraft at an annual interest rate of 7%.

Ulnad Co plans to offer an early settlement discount of 1.5% for payment within 15 days and to extend the maximum credit offered to 60 days. The company expects that these changes will increase annual credit sales by 5%, while also leading to additional incremental costs equal to 0.5% of turnover. The discount is expected to be taken by 30% of customers, with the remaining customers taking an average of 60 days to pay.

Required:

- (a) Evaluate whether the proposed changes in credit policy will increase the profitability of Ulnad Co. (6 marks)
- (b) Renpec Co, a subsidiary of Ulnad Co, has set a minimum cash account balance of \$7,500. The average cost to the company of making deposits or selling investments is \$18 per transaction and the standard deviation of its cash flows was \$1,000 per day during the last year. The average interest rate on investments is 5.11%.

Determine the spread, the upper limit and the return point for the cash account of Renpec Co using the Miller-Orr model and explain the relevance of these values for the cash management of the company. (6 marks)
- (c) Identify and explain the key areas of accounts receivable management. (6 marks)
- (d) Discuss the key factors to be considered when formulating a working capital funding policy. (7 marks)

(25 marks)

24: APPENDIX A: PILOT PAPER QUESTIONS

- 4 Trecor Co plans to buy a new machine to meet expected demand for a new product, Product T. This machine will cost \$250,000 and last for four years, at the end of which time it will be sold for \$5,000. Trecor Co expects demand for Product T to be as follows:

Year	1	2	3	4
Demand (units)	35,000	40,000	50,000	25,000

The selling price for Product T is expected to be \$12.00 per unit and the variable cost of production is expected to be \$7.80 per unit. Incremental annual fixed production overheads of \$25,000 per year will be incurred. Selling price and costs are all in current price terms.

Selling price and costs are expected to increase as follows:

	Increase
Selling price of Product T:	3% per year
Variable cost of production:	4% per year
Fixed production overheads:	6% per year

Other information

Trecor Co has a real cost of capital of 5.7% and pays tax at an annual rate of 30% one year in arrears. It can claim capital allowances on a 25% reducing balance basis. General inflation is expected to be 5% per year.

Trecor Co has a target return on capital employed of 20%. Depreciation is charged on a straight-line basis over the life of an asset.

Required:

- (a) Calculate the net present value of buying the new machine and comment on your findings (work to the nearest \$1,000). (13 marks)
- (b) Calculate the before-tax return on capital employed (accounting rate of return) based on the average investment and comment on your findings. (5 marks)
- (c) Discuss the strengths and weaknesses of internal rate of return in appraising capital investments. (7 marks)

(25 marks)

Formula Sheet

Economic order quantity

$$= \sqrt{\frac{2C_n D}{C_H}}$$

Miller – Orr ModelReturn point = Lower limit + $\left(\frac{1}{3} \times \text{spread}\right)$

$$\text{Spread} = 3 \left[\frac{\frac{3}{4} \times \text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate}} \right]^{\frac{1}{3}}$$

The Capital Asset Pricing Model

$$E(r_f) = R_f + \beta_f (E(r_m) - R_f)$$

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

$$g = b r_e$$

The weighted average cost of capital

$$\text{WACC} = \left[\frac{V_e}{V_e + V_d} \right] k_e + \left[\frac{V_d}{V_e + V_d} \right] k_d (1-T)$$

The Fisher formula

$$(1+i) = (1+r)(1+h)$$

Purchasing power parity and interest rate parity

$$s_1 = S_o \times \frac{(1+h_c)}{(1+h_b)} \qquad f_b = s_o \times \frac{(1+i_c)}{(1+i_b)}$$

END OF APPENDIX A

Appendix B: Mathematical tables



Present Value Table

Present value of 1 i.e. $(1 + r)^{-n}$

Where r = discount rate
 n = number of periods until payment

Periods (n)	Discount rate (r)										
	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	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15
(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	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

Annuity Table

Present value of an annuity of 1 i.e. $\frac{1 - (1 + r)^{-n}}{r}$

Where r = discount rate
n = number of periods

Periods (n)	Discount rate (r)										
	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	1
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	2
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	3
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	4
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	5
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	6
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	7
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	8
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	9
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	10
11	10.37	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	11
12	11.26	10.58	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	12
13	12.13	11.35	10.63	9.986	9.394	8.853	8.358	7.904	7.487	7.103	13
14	13.00	12.11	11.30	10.56	9.899	9.295	8.745	8.244	7.786	7.367	14
15	13.87	12.85	11.94	11.12	10.38	9.712	9.108	8.559	8.061	7.606	15
(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	1
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	2
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	3
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	4
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	5
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	6
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	7
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	8
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	9
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	10
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	11
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	12
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	13
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	14
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	15

Formula Sheet**Economic Order Quantity**

$$= \sqrt{\frac{2C_0D}{C_H}}$$

Miller-Orr Model

$$\text{Return point} = \text{Lower limit} + \left(\frac{1}{3} \times \text{spread}\right)$$

$$\text{Spread} = 3 \left[\frac{\frac{3}{4} \times \text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate}} \right]^{\frac{1}{3}}$$

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

$$P_0 = \frac{D_0(1+g)}{(K_e - g)}$$

Gordon's Growth Approximation

$$g = br$$

The weighted average cost of capital

$$\text{WACC} = \left[\frac{V_e}{V_e + V_d} \right] k_e + \left[\frac{V_d}{V_e + V_d} \right] k_d (1-T)$$

The Fisher formula

$$(1+i) = (1+r)(1+h)$$

Purchasing Power Parity and Interest Rate Parity

$$S_1 = S_0 \times \frac{(1+h_c)}{(1+h_b)} \quad F_0 = S_0 \times \frac{(1+i_c)}{(1+i_b)}$$

END OF APPENDIX B