ACCA

Financial Management

Contents

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Practical Experience Requirements

What is ACCA's Practical Experience Requirement (PER)?

You are required to achieve nine performance objectives in total – all five Essentials performance objectives and any four Technical performance objectives.

Performance objectives are divided into 10 areas which are closely linked to the exam syllabus – reinforcing that any knowledge developed through the exams process will have a clear application in the workplace.

The performance objectives are made up of a description, elements which describe the skills and experience you must demonstrate, and a statement where you summarise and reflect on the work activities you have undertaken to meet the performance objective description.

You will need to claim five elements and complete a statement for each performance objective. You can claim elements individually as you achieve them.

You must plan with your practical experience supervisor which performance objectives you aim to achieve. This process will help both to identify which performance objectives you can realistically achieve in your current role.

You should consider:

- your role and responsibilities
- opportunities for gaining experience
- which exams you have passed or are currently studying.

Once you and your practical experience supervisor have identified which performance objectives you are going to achieve, you will need to complete a period of work where you are gaining experience and developing your skills.

Using My Experience you will need to claim the elements and write a statement that relates to the performance objective you are working towards achieving.

Practical experience supervisors will need to review and sign-off the performance objective if you have achieved or alternatively, provide further guidance on what future activity needs to be completed.

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ESSENTIALS – complete all five

1 Ethics and professionalism
2 Stakeholder relationship management
3 Strategy and innovation
4 Governance, risk and control
5 Leadership and management

TECHNICAL – choose any four

Corporate and business reporting

6 Record and process transactions and events
7 Prepare external financial reports
8 Analyse and interpret financial reports

Financial management

9 Evaluate investment and financing decisions
10 Manage and control working capital
11 Identify and manage financial risk

Management accounting

12 Evaluate management accounting systems
13 Plan and control performance
14 Monitor performance

Taxation

15 Tax computations and assessments
16 Tax compliance and verification
17 Tax planning and advice

Audit and assurance

18 Prepare for and plan the audit and assurance process
19 Collect and evaluate evidence for an audit or assurance engagement
20 Review and report on the findings of an audit or assurance engagement

Advisory and consultancy

21 Business advisory

Data, digital and technology

22 Data analysis and decision support

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PO1 – ETHICS AND PROFESSIONALISM

Description

The fundamental principles of ethical behaviour mean you should always act in the wider public interest. You need to take into account all relevant information and use professional judgement, your personal values and scepticism to evaluate data and make decisions. You should identify right from wrong and escalate anything of concern. You also need to make sure that your skills, knowledge and behaviour are up-to-date and allow you to be effective in your role.

Elements

- Act diligently and honestly, following codes of conduct, taking into account – and keeping up-to-date with – legislation.
- Act with integrity, objectivity, professional competence and due care and confidentiality. You should raise concerns about non-compliance.
- Develop a commitment to your personal and professional knowledge and development. You should become a life-long learner and continuous improver, seeking feedback and reflect on your contribution and skills.
- Identify, extract, interrogate and evaluate complex data to make reliable, informed decisions.
- Interrogate, critically analyse and assess data and other information with professional scepticism. You should challenge opinion and facts through corroboration and robust testing.

Example activities

- Applying legislation appropriately to client needs.
- Continually reviewing legislation and regulation that affects your working environment.
- Briefing a team on a new standard and how to apply it.
- Keeping sensitive information confidential and disclosing only to those who need it or when disclosure is legally required.
- Recognising unethical behaviour and telling your line manager about what you have seen.
- Avoiding situations where there may be any threat to your professional independence
- Deciding what information is important and reliable, using it to support your decision making.
- Completing all the code of conduct and/or professional ethics training provided by your organisation.
- Checking transactions and supporting documents to verify the accuracy of accounting records.
- Use digital technology responsibly to analyse and evaluate data from a variety of sources, ensuring the integrity and security of this data.

Linked exams

Links to all exams.

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PO9 – EVALUATE INVESTMENT AND FINANCING DECISIONS

Description
You advise on alternative sources of finance. And you evaluate and review the financial viability of investment decisions.

Elements

- Advise on the appropriateness and cost of different sources of finance.
- Identify and raise an appropriate source of finance for a specific business need.
- Review the financial and strategic consequences of undertaking a particular investment decision.
- Select investment or merger and acquisition opportunities using appropriate appraisal techniques.
- Evaluate projects, financial securities and instruments – and advise on your costs and benefits to the organisation.

Linked exams

- Financial Management
- Strategic Business Leader
- Advanced Financial Management.

PO10 – MANAGE AND CONTROL WORKING CAPITAL

Description
You manage cash and working capital effectively using appropriate technology, planning for any shortfall or surplus including receivables, payables and inventories.

Elements

- Source short-term finance to improve organisational liquidity.
- Analyse and plan appropriate levels of cash and working capital.
- Prepare and monitor organisational cash flow, credit facilities and advise on appropriate actions.
- Contribute to the way current systems for managing cash, short-term liquidity and working capital operate.
- Operate and comply with controls and safeguards over working capital management.

Linked exams

- Advanced Financial Management.

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PO11 – IDENTIFY AND MANAGE FINANCIAL RISK

Description
You identify, measure, and advise on the financial risks to the organisation.
Elements

- Identify key sources of financial risk to the organisation and how you might arise.
- Assess the likelihood and impact of financial risks to specific business activities.
- Assess whether to transfer, avoid, reduce or accept financial risk.
- Advise on using instruments or techniques to manage financial risk.
- Monitor financial risks, reviewing your status and advising on how you should be managed.

Linked exams

- Financial Management
- Strategic Business Leader
- Advanced Financial Management.
- Management Accounting

Data, Digital and Technology

PO22 – DATA ANALYSIS AND DECISION SUPPORT

Description
You use commercial acumen to articulate business questions to resolve problems, exploit opportunities and identify and manipulate relevant data requirements; deeply analysing data by applying appropriate techniques. You draw clear conclusions and present your findings to enable relevant stakeholders to make sound business decisions.
Elements

- Identify any relevant financial and non-financial data and use it to provide insights to answer important business questions and provide solutions for your organisation.
- Use appropriate analytical tools to process, manipulate and analyse data. These tools could include spreadsheet applications or more technical statistical analysis software.
- Apply modelling techniques to deliver specific types of analysis, which may include: scenario analysis, forecasting, optimisation problems or cost-benefit analysis.
- Use data and resulting information ethically and responsibly, analysing and interpreting data sceptically to draw appropriate conclusions and make recommendations to support effective decision-making.
- Communicate the recommendations to relevant stakeholders in a way you can easily visualise and understand, to exploit business opportunities, manage risk and evaluate performance.

Linked exams

- Accountant in Business
- Management Accounting
- Financial Management
- Performance Management
- Strategic Business Leader
- Advanced Financial Management
- Advanced Performance Management.

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Chapter 1 – Financial Management Function

Objectives:

- *Explain the nature and purpose of financial management.*
- *Explain the relationship between financial management and financial and management accounting.*
- *Discuss the relationship between financial objectives, corporate objectives and corporate strategy.*
- *Identify and describe a variety of financial objectives, including:*
    1. *shareholder wealth maximisation*
    2. *profit maximisation*
    3. *earnings per share growth*

1. Relationships

Management accounting is about producing information to aid short-term objectives – usually within 12 months. The information is based on historic, and current data as well as future short-term predictions. It can be used to aid short-term decision-making.

Financial accounting concerns the historic reporting, usually to shareholders. It is not generally used for internal decision-making, although some of the information is the same as management accounting.

2. Financial Management

The financial management function is critical to the success of any organisation.

It attempts to ensure that resources are available and being used, so that the organisation can meet its strategic objectives.

The steps for the financial manager are to obtain resources and then use those resources for the best purpose.

Resources can be generated internally from operations or externally from markets. The financial manager has to ensure that resources generated match the uses they will be put to e.g. an overdraft would not usually be used to finance a 10-year project.

Once the funds have been raised, they must be allocated correctly. The financial manager will review the needs and the risk/return profile before determining where to allocate resources, and what type of resource to allocate.

Once the resources have been allocated control must be maintained.

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3. Financial Objectives – Private Sector

Every organisation (private or not-for-profit) must determine its own corporate objectives. This will determine corporate strategy.

Such objectives could include maximising market share, market worth of the company, increasing shareholder wealth etc.

Once these are known the financial objectives can be determined which will allow the financial manager to determine financial strategy. Note how the financial strategy automatically fits into the overall corporate strategy and will always be driving towards the corporate objectives.

Include

- Maximising shareholder wealth
- High dividends
- Increased share price
- Bottom line profit

4. Non-Financial Objectives – Private Sector

There are also non-financial objectives, which need to be taken into account such as diversification and quality issues (although it could be said that these non-financial objectives will lead to financial objectives being attained).

- Quality
- Customer satisfaction
- Low environmental impact
- Market or product diversification
- Increased market share

5. Problems of Multiple Stakeholders

An easily identifiable financial objective is the maximisation of shareholder wealth, either through increased dividends or through increased market value of shares.

However, shareholders are not the only stakeholders. Other stakeholders could include groups such as employees and every group's needs to be balanced.

For instance, maximising employees' needs could include raising wages to a level that dividends could not be paid.

This makes it very difficult to maximise the objectives of any single group and financial managers tend to satisfice every group instead of maximising benefits to one/few groups.

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Maximising – obtaining the best possible outcome

Satisficing – obtaining an adequate outcome

Managers will have their set of objectives, which may not tie in with the objectives of every other group. The difference here is that it is the managers who are making the decisions.

The obvious example is the threat of a takeover. This may come about due to poor management decisions leading to low shares prices or a weak market position.

Studies have shown that shareholders of companies that have been taken over generally enjoy very good returns – however management tend to block such takeovers (is it a coincidence that management usually get changed after such an action!)

6. Nature and Scope of Financial Objectives – Not-for-Profit

A key difference between profit making and non-profit making organisations is the focus of objectives.

Profit making companies will usually focus more heavily on financial objectives such as efficiency gains.

Not-for-profit organisations will usually have more focus on non-financial goals such as effectiveness.

Financial objectives could include generating funding for other purposes

7. Non-Financial Objectives – Not-for-Profit

If organisations are not being run for a profit they must have another core objective. That objective could be servicing the public interest eg such as a hospital. If this is the case the hospital should maximise the benefits to its patients to the detriment of other groups e.g. satisfice other groups.

Other non-financial objectives could include providing a quality product or delivering a service to society which could not be provided by a profit making organisation.

8. The nature and purpose of financial management

Financial management is concerned with the administration of the finances of an organisation in order to achieve its financial objectives. The financial manager should review the needs of the business and the risk/return profile required, before ensuring that funds are made available and then used to meet those financial objectives.

Resources may be internally generated or raised externally from the capital markets and money markets. The resources becoming available must match the uses to which they are put e.g. a project with a ten-year life should not be financed by a bank overdraft.

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Thereafter, financial control must be maintained by comparing actual performance with forecasts.

The normal assumption used in private sector financial management is the maximisation of shareholder wealth, however since the needs of other stakeholders should be respected; a satisficing objective is typically employed.

In contrast, management accounting produces information for internal purposes to assist in short-term decision making, whilst the financial accounting function provides historical information for external purposes. Financial management is the effective management of the finances of a business.

9. Financial objectives and the relationship with corporate strategy

Every organisation (whether profit-seeking or a not-for-profit organisation) must determine its own corporate objectives. These will determine corporate strategy. Strategy is a course of action, including the specification of resources required, to achieve a stated objective.

Corporate objectives are relevant for the organisation as a whole and define what the organisation is trying to achieve, while strategy considers how to achieve these objectives. Once these are known, financial objectives can be determined, which allow the financial manager to determine financial strategy. Financial strategy automatically fits into the overall corporate strategy and will always be driving towards the corporate objectives.

Financial objectives include:

- Maximisation of shareholder wealth
- Profit maximisation
- Growth in dividends per share and in earnings per share
- Increasing share price
- Increase in market share

Non-financial objectives, which often lead to the attainment of financial objectives, include:

- Product quality
- Customer satisfaction and levels of service
- Employee welfare
- Welfare of society (e.g. green issues)
- Market or product diversification

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Chapter 2 – Stakeholders and impact on corporate objectives

Objectives:

- *Identify the range of stakeholders and their objectives*
- *Discuss the possible conflict between stakeholder objectives*
- *Discuss the role of management in meeting stakeholder objectives, including the application of agency theory.*
- *Describe and apply ways of measuring achievement of corporate objectives including:*
  - *ratio analysis, using appropriate ratios such as return on capital employed, return on equity, earnings per share and dividend per share*
  - *changes in dividends and share prices as part of total shareholder return*
- *Explain ways to encourage the achievement of stakeholder objectives, including:*
  - *managerial reward schemes such as share options and performance-related pay*
  - *regulatory requirements such as corporate governance codes of best practice and stock exchange listing regulations*
- *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 in not-for-profit organisations.*
- *Discuss ways of measuring the achievement of objectives in not-for-profit organisations.*

1. Agency relationships

Whilst ordinary shareholders are technically the owners of a company, except in owner-managed companies, the day-to-day running of the business is undertaken by management, with the ultimate responsibility resting with the directors.

Despite the fact that shareholders can attend the AGM of the company, and vote on resolutions, they generally rely on annual reports, daily newspapers and investment magazines to obtain knowledge of the current situation and future prospects of companies in which they hold shares.

The connection between company directors/managers and shareholders is referred to as an “agency relationship” i.e. the theory that directors/managers act as agents for shareholders, using delegated authority to conduct the affairs of the company in the best interests of shareholders.

Whilst shareholders possess the right to remove directors from office, it would be an extremely rare event for them to act with such unity for this to occur in practice.

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2. Agency Issues

The greatest potential conflict is between shareholders as owners and managers.

Management behaviour may not always be in the best interest of the company as a whole and may be seen to be only furthering their own ends.

Such behaviour can include;

- **Excessive executive remuneration**

  This can include the use of golden hellos and large parachute payments even when the company has under performed.

- **Empire building**

  Acquiring companies for no specific strategic purpose other than expanding the management's power base.

  Note how members of acquired companies tend to receive more than market value for their investment, but the members of parent s companies will not always receive additional returns post acquisition.

- **Unusual uses of accounting policies**

  Directors decide the accounting policies to be adopted by the company. It is possible to "adjust" the apparent financial performance of a company by amending accounting policies and estimation techniques e.g. depreciation rates

- **Off balance sheet financing**

  This would allow for increased reported performance without the associated reported increase in assets required to achieve that performance.
  Such instances include the use of quasi-subsidiaries (note impact of reporting the substance of transactions and the definition of an asset focussing on control rather than legal ownership).

- **Unethical activities**

  This can include increasing returns in a way not seen as right and proper by the current culture and its beliefs e.g. the destruction of the environment to make large returns (think about Mr Burns and blinky the fish)

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3. Managerial Reward

To encourage management to behave in the best interests of shareholders, some companies have introduced performance-related remuneration schemes as described in the Combined Code on Corporate Governance.

Share option schemes and Long-term incentive plans (LTIPs) are examples of fixing directors and executives pay to levels of profit, dividends and share price performance.

LTIPs are normally based upon “Total Shareholder Return” (i.e. the aggregate of dividend levels and share price growth achieved during the accounting period).
LTIPs compare the performance of the company in question with that of other “comparator companies” in order to determine the performance related pay levels of executive directors.

In addition to compliance with the Combined Code, companies listed on the London Stock Exchange need to comply with “The Listing Rules”, which set out regulations that stock market participants act fairly and efficiently in the interests of all parties involved. A board of directors, when applying for a listing, are required to comply with the terms and conditions of the “The Listing Rules”, including the acceptance of rather onerous “Continuing Obligations”.

Care needs to be taken when setting specific managerial performance criteria to achieve additional rewards. This will encourage management to focus on those specific goals – potentially to the detriment of other activities that may be in the best interest of the company.

These goals would need to ensure short term growth and long term survival.

4. Corporate Governance

Clearly the executive directors of a listed company are both decision-makers and major stakeholders. They are therefore open to the accusation of making key decisions for their own benefit. Following a number of notable financial scandals in the UK during the late 20th century (e.g. the Maxwell affair and the collapse of the BCCI) the Cadbury Committee was set up to investigate procedures for appropriate corporate governance.

The Cadbury Code (1992) defined corporate governance as "the system by which companies are directed and controlled". This initial document has been subject to subsequent amendments by the Greenbury, Hampel and Higgs Reports. The Financial Services Authority requires listed companies to confirm that they have complied with the Code provisions or - in the event of non-compliance - to provide an explanation of their reasons for departure.

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5. Ratio analysis

The general "health" of a company is often evaluated by reference to the various proportions which are highlighted by its financial statements. Performance evaluation depends to a large extent upon healthy financial proportions rather than upon the absolute amounts involved. Consequently analysis is directed almost exclusively towards proportions expressed in the form of ratios.

Ratio analysis requires both sound financial judgement and a large proportion of common sense, since there are no "ideal" ratios in existence.

No single ratio is meaningful in isolation. All ratios must be compared with something in order to place them in their context. The following may be suitable "standards of comparison":

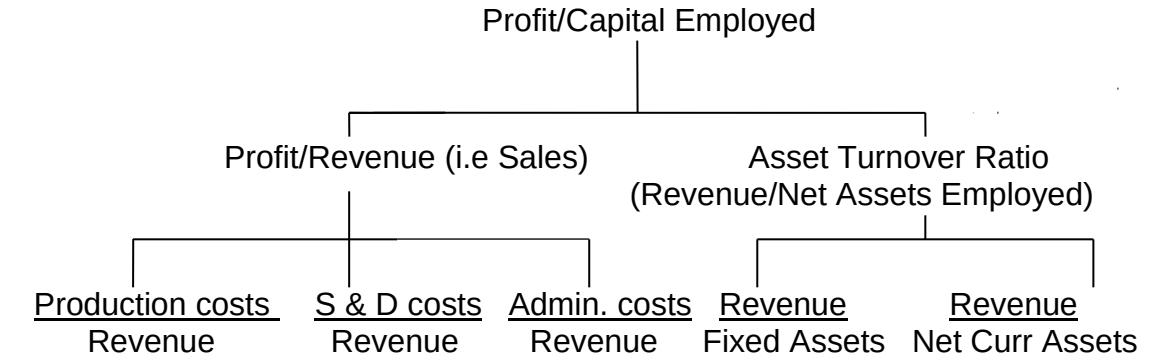
- Own past performance
- Other divisions of the business
- Own budgeted performance
- The ratios of other enterprises in the same sector

Over half a century ago, the DuPont Corporation devised a "Pyramid of Ratios" to assist in the comparison of the performance of its various divisions.

The pyramid can be used to provide inter-company comparisons by the provision of yardsticks to facilitate the systematic comparison of each important aspect of one business with that of other similar enterprises.

The illustration below deals with a manufacturing company.

Specimen Pyramid of Ratios



CONTINUE ANALYSIS OVER TYPES OF COST

E.g. Direct Materials, Direct Wages etc.

CONTINUE ANALYSIS OVER TYPES OF ASSET

e.g. Plant & equipment, Inventories, Receivables etc.

N.B. Ratios on the right hand side of the pyramid are often inverted

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As the ratio of Profit/ Capital Employed (or "Return on Capital") can be analysed as follows:

$$\frac{\text{Profit}}{\text{Capital Employed}} = \frac{\text{Profit}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Net Assets Employed}}$$

E.g 15% = 10% x 1.5

there are a number of ways to improve the Primary Ratio to (say) 20%

- 20% = 10% x 2.0 , or
- 20% = 13.3% x 1.5

I.e. improve the Profit Mark-up or increase the rate of Asset Turnover, or a mixture of these courses of action

If in an individual company, the overall return on capital is insufficient, this may be due to either of the supporting ratios. If Profit/Revenue is the culprit, further investigation may reveal that direct labour costs/Revenue is the offending area.

Therefore the use of the pyramid provides a systematic method of tracing the causes of inefficiencies and furthermore enables participators to see just where they are inferior or superior to their competitors (or to the other divisions of their own group of companies).

Particularly note the ratio between Revenue and Net Current Assets, since trends may reveal that operations are being expanded at too fast a rate without a corresponding increase in the working capital of the enterprise.

Profitability ratios

An unfavourable trend in one or more of the following may act as an early warning of a problem:

- Return on capital employed i.e.ROCE (expressed as a percentage) e.g.

$$\frac{\text{Earnings before Interest and Tax (EBIT)}}{\text{Fixed assets + Current assets – Current liabilities}} \quad \textbf{or} \quad \frac{\text{EBIT}}{\text{Fixed assets + Current assets}}$$

These appraise performance from the perspective of the company's management.

- Return on equity (expressed as a percentage) e.g.

$$\frac{\text{Profit after Tax}}{\text{Ordinary share capital + Reserves}}$$

This appraises performance from the perspective of the equity shareholders

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Alternatively Earnings per share (EPS) may be calculated i.e.

Profit **after** tax, minority interests, preference dividends and extraordinary items, **divided by** the number of called-up equity shares (IAS 33 provides a fuller definition).

- Measures of Return expressed as a percentage of Sales e.g.

$$\frac{\text{Operating Profit}}{\text{Revenue}} \quad \textbf{or} \quad \frac{\text{Profit before Tax}}{\text{Revenue}}$$

- Dividend per share

$$\frac{\text{Dividends paid and proposed for the accounting period}}{\text{Number of ordinary shares on issue during period}}$$

6. Not-for-profit organisations

The key difference between profit-seeking and non profit-seeking organisations is the focus of objectives. A not-for-profit organisation (NFPs) is a body whose attainment of its ultimate goal is not assessed by economic measures.

However, in pursuit of its primary goal it may involve itself in profit-seeking activities.

NFPs include charities, sports associations, trade unions and health services. The core objective could be serving the public interest e.g. hospitals and wildlife trusts. In the case of a hospital, the organisation should maximise the benefits to patients, whilst attempting to satisfice the needs of other groups.

Other non-financial objectives could include the provision of a quality product or the delivery to society of a service, which would not normally be provided by a profit-seeking entity.

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7. Value for money

Value for money (VFM) is an essential measure for NFPs. VFM may be described as achieving the desired level and quality of service at the lowest possible cost.

This involves the application of "*the 3 Es*" i.e. efficiency, effectiveness and economy.

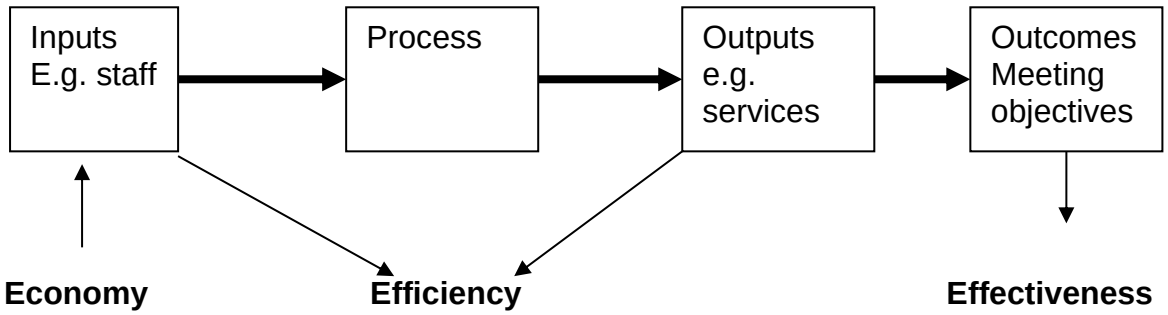
- ***Efficiency***: This is the relationship between inputs and outputs. It may be *input-driven* i.e. achieving a high level of output in relation to the resources used. Alternatively, it may be *output-driven* i.e. providing a particular level of service at reasonable input costs. For example, the efficiency in using a lecture theatre at a Business School might be measured in terms of the number of hours in the week in which it is used.

- ***Effectiveness***: This is the extent to which the outputs achieved meet the declared objectives. For example, the effectiveness of a Business School's objective to produce high quality education may be measured by external examination results achieved. Alternatively, it may be judged on Alumni career progress and related measures as is used in the Financial Times Masters in Management league tables of the top 40 worldwide Management programmes, which is published in September of each year.

- ***Economy***: This is the attainment of the appropriate quality and quantity of inputs at the lowest cost to achieve a defined level of outputs. For example, the economy with which the capital expenditure of a Business School can be measured is by comparing actual expenditure incurred with budgets or with prior year expenditure or with the expenditure incurred by similar Business Schools.

8. VFM and Systems

Each part of a NFP's system can be separately assessed from a VFM perspective. The focus on each part of the system i.e. which of the 3E's is more important will depend upon which part of the system is being looked at.



VFM Focus

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VFM presupposes the existence of a yardstick against which to measure performance. This may be very difficult to determine, since non profit-seeking organisations may have multiple objectives.

Additionally outputs can seldom be measured in a meaningful manner! For instance, are good examination results alone a suitable measure for the quality of teaching? A 90% pass rate among a group of high quality students may be unsatisfactory, whereas a 20% pass rate in a less gifted class can be a remarkable achievement!

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Chapter 3 – The Economic environment for business

Objectives:

- Identify and explain the main macroeconomic policy targets.
- Define and 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:
    - competition policy
    - government assistance for business
    - green policies
    - corporate governance regulation.

1. The main macroeconomic policy targets

Economics focuses on the use of scarce resources. The four scarce factors of production have been identified as:

- Land
- Labour
- Capital
- Enterprise (or entrepreneurship)

Macroeconomic policy is the management of the economy by the government in order to influence the performance and behaviour of the economy as a whole. The principal objectives of macroeconomic policy have been:

- Full employment
- Price stability
- Economic growth
- Balance of payments equilibrium
- An equitable distribution of income and wealth

To achieve all five objectives is difficult, if not impossible. For instance, full employment leads to greater purchasing power, which would cause “demand pull inflation”. Furthermore, entrepreneurs would have difficulty establishing new businesses due to high employment costs. The increase in money supply may lead to greater demand for imports, creating balance of payments deficits.

Therefore if government policy focuses exclusively on full employment, this could increase wage rates and other input prices (i.e. “cost push inflation”), thus deterring entrepreneurs – perhaps encouraging them to invest abroad. Thus government policy could affect levels of demand and the costs of materials.

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2. Monetary policy

There is a general belief that inflation must be kept in check and this can be influenced by controlling either:

- The volume of money in circulation (i.e. money supply), or
- The price of money (i.e. interest rates)

3. Money supply

To successfully implement control of money supply, the authorities must:

- Be able to measure the volume of money in circulation (money supply). The choice of measures is either:
    - M0 i.e. narrow money, which includes notes and coins in circulation (held by the general public, by banks and by building societies) together with operational balances held by commercial banks at the Bank of England, or
    - M4 i.e. broad money, which includes notes and coins in circulation (as above) together with all deposits held by the private sector at banks and building societies.
- Have a range of policy instruments, which can be used to control the money supply

4. Interest rates

The government normally focuses on controlling interest rates, since this is considered easier than the control of money supply. The rate of interest is the price of money (i.e. the income which is foregone as a result of spending cash). If the government targets interest rates, this will influence the amount of money held in the economy and the demand for credit i.e. it may affect both investment and consumption decisions (in which case the purchase of both consumer durables and day-to-day spending may be affected).

A rise in interest rates will attract foreign investment, thus influencing exchange rates. In the UK, the control of short-term interest rates is undertaken by the Bank of England setting lending rates to the commercial banks, which in turn pass on the effect of rate changes to customers.

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5. Fiscal policy

Fiscal policy is the manipulation of the government budget (public expenditure and taxation) in order to influence the level of activity in the economy. All government expenditure must be financed by either taxation or by government borrowing. The problem of changes in fiscal policy is the effect that government borrowing has on private investors.

As regards taxation policies, there is the question as to who should be taxed and whether direct taxation levels (e.g. income tax) should be changed or whether indirect taxation levels (e.g. VAT) should be varied. High taxation levels act as a discouragement to businesses, to foreign investment and are a disincentive to work – thereby reducing the government's income. However, low taxation levels may also lead in a reduction in the government's income. The correct level of taxation is an extremely difficult balance to determine.

Taxes can also be used to assist other objectives of government e.g. high duties on cigarettes to dissuade people from smoking. Increases in taxation can lead to lower employment and lower levels of output. This could in turn lead to higher workforce costs (as employees wish to maximise net pay) and to a reduction in demand. Higher taxes on businesses (e.g. employer's national insurance rates) may lead to a reduction in entrepreneurship and lower employment levels, creating a smaller supply of goods and services.

Any difference between the levels of government spending and the level of taxation levied has to be met through government borrowing i.e. the Public Sector Borrowing Requirement (PSBR). The government can borrow from the general public through National Savings Certificates and Premium Bonds or through the banking system (borrowing short-term through Treasury Bills or long-term through Gilts).

6. Exchange rate policy

An exchange rate is the price level at which one country's currency can be traded in return for the currency of another country. Exchange rates are largely determined by the supply and demand for currencies. Governments can intervene to influence exchange rates by changing the levels of interest rates. Government policies may be:

- **Fixed exchange rates**: A government may try to keep exchange rates at a fixed level, but since it may be unable to control inflation, the real value of its currency may change. If one country's inflation level exceeds that of others, export prices may become uncompetitive abroad and the trade deficits of the country would grow. A devaluation of the currency would be necessary for recovery. Conversely, if inflation levels were lower than that of other countries, a revaluation of the currency may be necessary.

- **Floating exchange rates**: Whereby exchange rates are allowed to fluctuate according to the supply and demand for currencies in the foreign exchange markets.

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Exchange rates are therefore exposed to market forces with no official intervention, thus supply and demand determines the ruling rate of exchange.

- **Managed (or dirty) floats**: In practice, many countries have a system whereby exchange rates are allowed to float, but from time to time the government will intervene by using foreign currency reserves to buy their own domestic currency or to sell their domestic currency to increase foreign currency reserves. These approaches influence the exchange rate of their domestic currency.

7. Government Intervention and Regulation

Monopoly is a situation where an entity has such a sufficiently large share of the market that it is able to restrict output and raise prices. Economic theory concludes that, other things being equal, economic welfare is maximised when markets are competitive. Problems arising from monopoly power may be tackled by measures such as nationalisation, or the regulation and control of monopolies and restrictive practices. There are two models describing the level of government intervention in economic affairs:

Command economy

Whereby the government dictates where resources can be used, the pricing of outputs and where they can be made available. This leads to a lack of enterprise and a waste of scarce resources. It creates a system of bureaucracy, which is slow to react to new opportunities, but at least ensures that everyone enjoys the basic necessities of life.

Laissez faire (free to do) economy

Whereby the government has no interaction with the economy, thus leaving the market to its own devices. This encourages entrepreneurship, but allows for the exploitation of less economically powerful groups. It leads to a widening of the gap between the “haves” and the “have-nots”.

The current situation in the majority of developed economies is a mixture of the two models i.e. there is some intervention in the form of regulation and aid, but for the most part the market determines its own destiny.

Competition policy

If there are many competitors in a market the overall mechanics of supply and demand will determine the price of goods and services. Where this is not the case, a monopoly could exist which would artificially set prices. This may not be in the best interests of the economy and the government would therefore attempt to regulate monopolies.

Regulation also attempts to prevent anti-competitive agreements such as cartels (e.g. OPEC) and the abuses of market dominance.

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The government's competition policy would aim to reduce a company's market domination, to control prices or profit levels and to investigate mergers or restrictive practices.

8. Government assistance for business

The freedom of European governments to offer assistance to businesses is regulated by EU policies designed to prevent distortion of free competition. Government assistance may be in the form of cash grants and other incentives which may be offered to economically depressed areas of a country or to industries whose development the State wishes to encourage.

The UK government introduced the "Enterprise Initiative" as a package of measures which includes selective regional grants. A network of "Business Links" has been set up to offer local business advice. Regional selective assistance is also available for investment projects undertaken by companies in Assisted Areas.

9. Green policies

When a company appraises a project it should not only take account of the revenues to be enjoyed and the costs to be incurred, but external costs (e.g. pollution and damage to wildlife) should also to be taken into account.

This has lead to green legislation, the heavy taxation of damaging practices and a consideration of the possible negative impact of potential projects. One government solution would be to levy tax on polluters equal to the cost of removing the effect of the "externality" i.e. the principle of "polluter pays".

"Externalities" are costs (benefits) which are not paid (received) by the producers or consumers of the product, but by other members of society. Externalities may be external social costs (e.g. pollution), or external social benefits (e.g. training schemes).

Green policies are in place to ensure that the costs of production and consumption include an amount to cover damage to the environment. This can include lower duties on unleaded petrol, subsidies to encourage lower pollution levels or legislation to control waste disposal.

10. Corporate Governance Regulation

This is another example of how the government is attempting to regulate how entities behave. The reason behind corporate governance regulation is the protection of investors. If investors were not comfortable investing in publicly traded companies, they would find it very difficult to raise capital to operate or expand. Refer to The Combined Code.

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Chapter 4 – The nature and role of financial markets and institutions

Objectives:

- *Identify the nature and role of money and capital markets, both nationally and internationally.*
- *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.*
- *Describe the role of the money markets in:*
  - *i) Providing short-term liquidity to industry and the public sector*
  - *ii) Providing short-term trade finance*
  - *iii) Allowing an organisation to manage its exposure to foreign currency risk and interest rate risk.*
- *Explain the role of banks and other financial institutions in the operation of the money markets.*
- *Explain the characteristics and role of the principal money market instruments:*
  - *i) Interest-bearing instruments*
  - *ii) Discount instruments*
  - *iii) Derivative products.*

1. Financial intermediaries

Intermediation refers to the process whereby potential borrowers are brought together with potential lenders by a third party, the intermediary. Financial institutions, which act as intermediaries include clearing banks, merchant banks, building societies, insurance companies, pension funds, leasing companies, unit trusts and investment trust companies.

The financial markets (both capital and money markets) are devices where those requiring funds are linked by a financial intermediary to those with surplus funds to invest. Providers of funds often wish to invest in the short-term to minimise risk, whereas users often require longer-term funds. This mismatch is resolved by the intermediaries. Financial markets provide both a primary market and a secondary market.

- **Capital markets**: These are markets for long-term capital; generally regarded as the market for the purchase and sale of securities, which have more than one year to maturity. They deal in company securities, public sector stocks, foreign stocks and Eurobonds i.e. debt denominated in a currency other than the domestic currency of the issuer;

- **Money markets**: These are markets for short-term capital; generally regarded as the market for securities which have less than one year to maturity. They are operated by financial institutions to provide a means of borrowing, lending and trading in the short-term;

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- **Primary markets**: These enable governments, corporations and other organisations to raise new finance by issuing new shares or loan notes or the issue of new money market securities;

- **Secondary markets**: These enable existing investors to sell their securities and new investors to buy those securities, should they so wish. The existence of the secondary (i.e. second-hand) market is vital to the success of the primary market, since investors are more willing to subscribe for new issues if they are assured that they can resell if necessary.

2. The functions of a stock market and corporate bond market

Some countries operate more than one stock market. In the UK, there are three such markets i.e.

- **The London Stock Exchange**: The main market, which provides companies with a full stock exchange listing, in return for which they need to comply with rather onerous "Listing Rules";

- **The Alternative Investment Market (AIM)**: This is the more loosely regulated second tier market intended for smaller companies e.g. Celtic FC and Millwall FC;

- **PLUS:** This is a London-based independent equity trading facility operated by PLUS Markets Group plc (formerly Ofex). Its trading platform supports trading in over 800 smaller companies e.g. Arsenal FC and Rangers FC. PLUS has operated as a fully competitive stock exchange since the end of 2007.

Stock markets and corporate bond markets facilitate the smooth trading of shares, corporate bonds, government securities and local authority bonds. The markets allow investments to be traded and they also provide liquidity – that is a company does not have to be liquidated for an investor to realise their investment.

There are two types of stock exchange member, i.e. broker-dealers and market makers:

- **Broker-dealers**: An investor will contact a broker to act as their agent in buying and selling securities from or to a market-maker. The broker may however act as principal (if he deals in those shares on his own behalf), in which event he would be referred to as a broker-dealer;

- **Market-makers**: These organisations maintain inventories of securities in a number of publicly traded companies. They continually quote bid and offer prices for the securities in which they deal and their income is generated by the "spread" between those buying and selling prices;

It is important to recall that the vast majority of UK securities are owned by institutional investors i.e. pension funds, insurance companies, investment trust companies, unit trusts and venture capitalists.

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3. International money and capital markets

Larger (but not smaller) companies may raise funds on the eurocurrency markets or on the eurobond markets.

Eurocurrency markets

These are international money markets. Eurocurrency is a currency held by investors outside the country in which that currency is issued. Therefore, if a UK company wishes to borrow US dollars from its bank, that would represent a eurodollar loan.

The eurocurrency markets involve the deposit of funds with a bank outside the country of origin of that currency and the lending of these funds for a typical term of about three months. Most Eurocurrency transactions take place between banks of different countries and take the form of certificates of deposit (i.e. negotiable instruments acknowledging those deposits).

Eurobond markets

These are international capital markets. A eurobond is debt denominated in a currency, which often differs from the currency of the country of origin. Eurobonds are long-term loans raised by international companies (having a high credit rating) or by institutions. They are sold simultaneously to investors in several countries. A typical duration of borrowing is between 5-20 years.

Eurobonds are ideal for large capital expansion when borrowing is required that is not subject to the national exchange controls of any government. The borrower must however consider exchange rate risk if the revenues generated from the investment are denominated in a currency different to that of the bond issue.

The investor enjoys security because of the borrower's excellent credit rating and has the benefit of marketability, as the bonds are readily negotiable. Since the instruments are bearer bonds, anonymity is assured and an additional benefit is that interest is received without deduction of tax at source.

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4. Risk and Return

The following forms of investment are given in descending order of risk:

- Corporate equity shares ;
- Corporate preference shares;
- Corporate bonds;
- Government bonds.

The reverse yield gap

Since bonds involve lower risk than equities, one might expect the yield on debt to be lower than the yield on equities. However, this is not usually the case, since the yield on equities is normally lower than the yield on low-risk bonds. This phenomenon is referred to as "the reverse yield gap" which can occur where shareholders may be willing to accept lower short-term returns on their equity investment, since they anticipate substantial future capital gains.

Risk and portfolio diversification

Investment risk arises because the variability of actual returns may be above or below the expected return. For instance:

- An investment in equities would carry more risk and should therefore generate higher returns than an investment in National Savings and Investments;

- An investment in pharmaceuticals would carry more risk and should therefore generate higher returns than an investment in a food producer.

As explained in the lecture note dealing with the Capital Asset Pricing Model, an investor can reduce risk by holding a portfolio of shares in companies in different industries, which will to some degree offer different risk/return profiles over time. For instance an investor holding shares in both BP and British Airways should find that if oil prices increase the share price of BP should rise, whereas the share price of BA would probably fall. Obviously an oil price decrease would cause an opposite effect on the share prices of the two companies.

The investor should find substantial risk reduction as additional investments are added to the portfolio. However as the shares of more and more companies (in different sectors) are added to the portfolio, the risk reduction will eventually slow down and once the portfolio increases up to about 16 to 20 companies (again in different market sectors) the risk reduction will eventually cease. In other words, the unsystematic risk will gradually disappear, until the portfolio is left to bear the remaining systematic risk only.

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5. Term Structure of Interest Rates

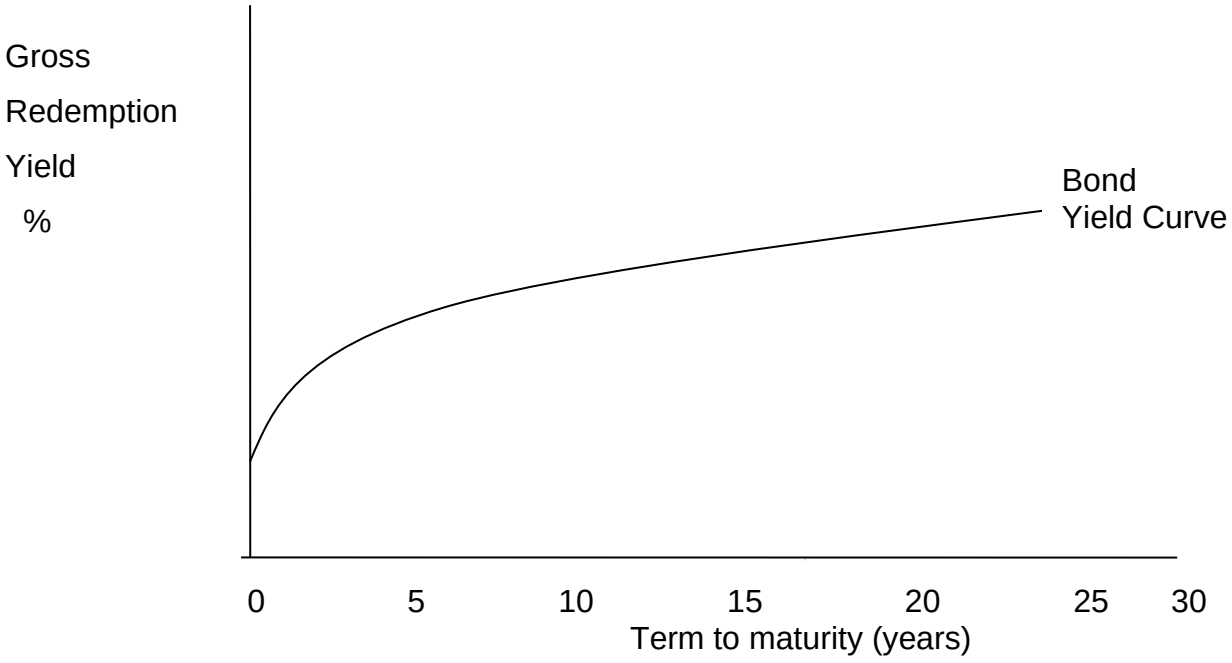
The "term structure of interest rates" reflects the manner in which the gross redemption yield on government bonds varies with the term to maturity i.e. the period of time before the stock is to be redeemed. For example, government bonds may be short-dated (e.g. repayment within 5 years), medium-dated (repayment between 5 and 20 years) or long-dated (redemption in excess of 20 years). Of course, some government bonds e.g. 2½% Consols are undated (i.e. irredeemable).

This data is often presented in the form of a graph to illustrate the "bond yield curve", which is created by plotting the gross redemption yield of the bond against the term to maturity. In normal circumstances the yield curve is upward sloping.

The gross redemption yield reflects the internal rate of return on the cash flows associated with the bond i.e. it incorporates the effect of the current market value of the bond, the gross interest payments and the redemption value of the bond – in other words it measures not only the gross interest yield but also the capital gain or loss to maturity. The calculation of the gross redemption yield is very similar to the calculation of the cost of redeemable debt for the company – the notable difference is that interest payments are included gross (as opposed to net of corporation tax as is used in arriving at Kd)

6. The normal yield curve

The general shape of the normal upward sloping yield curve appears as follows:



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A normal yield curve slopes upwards because the yield on longer dated bonds is normally higher than the yield on shorter dated bonds. If you are confused by this point, remember that your mortgage is only cheaper than your overdraft because the mortgage is secured on the property, whereas the overdraft is unsecured. The reason for the upward sloping shape of the yield curve is thought to be based on the following theories:

- liquidity preference theory
- expectations theory
- market segmentation theory

Liquidity preference theory

Lenders have a natural preference for holding cash rather than securities – even low risk government securities. They therefore need to be compensated for being deprived of their cash for a longer period of time – hence the higher yield on long-dated securities and the lower yield on short-dated securities. There is a greater risk in lending long-term than in lending short-term. To compensate lenders for this risk they would require a higher return on longer dated investments.

Expectations theory

This theory states that the shape of the yield curve will vary dependent upon a lender's expectations of future interest rates (and therefore inflation levels). A curve that rises from left to right indicates that rates of interest are expected to increase in the future to reflect the investors fear of rising inflation rates.

Market segmentation theory

The slope of the yield curve is thought to reflect conditions in different segments of the market. In other words lenders and borrowers tend to confine themselves to a particular segment of the market and thus it is probably futile to compare short-term with long-term lending and borrowing. Thus, companies typically finance working capital with short-term funds and non-current assets with long-term funds. This leads to different factors affecting short-term and long-term interest rates leading to irregularities which cause humps, dips or wiggles in the shape of the yield curve.

7. The inverse yield curve

A yield curve may occasionally slope downwards, since short-term yields may be higher than long-term yields for the following reasons:

- Expectations i.e. if interest rates are currently high, but the market anticipates a steep fall in the near future, the resultant yield curve will be downward sloping.

- Government intervention i.e. a policy of keeping interest rates relatively high might have the effect of forcing short-term yields higher than long-term yields.

An inverse yield curve is downwards sloping and its general shape is as follows:

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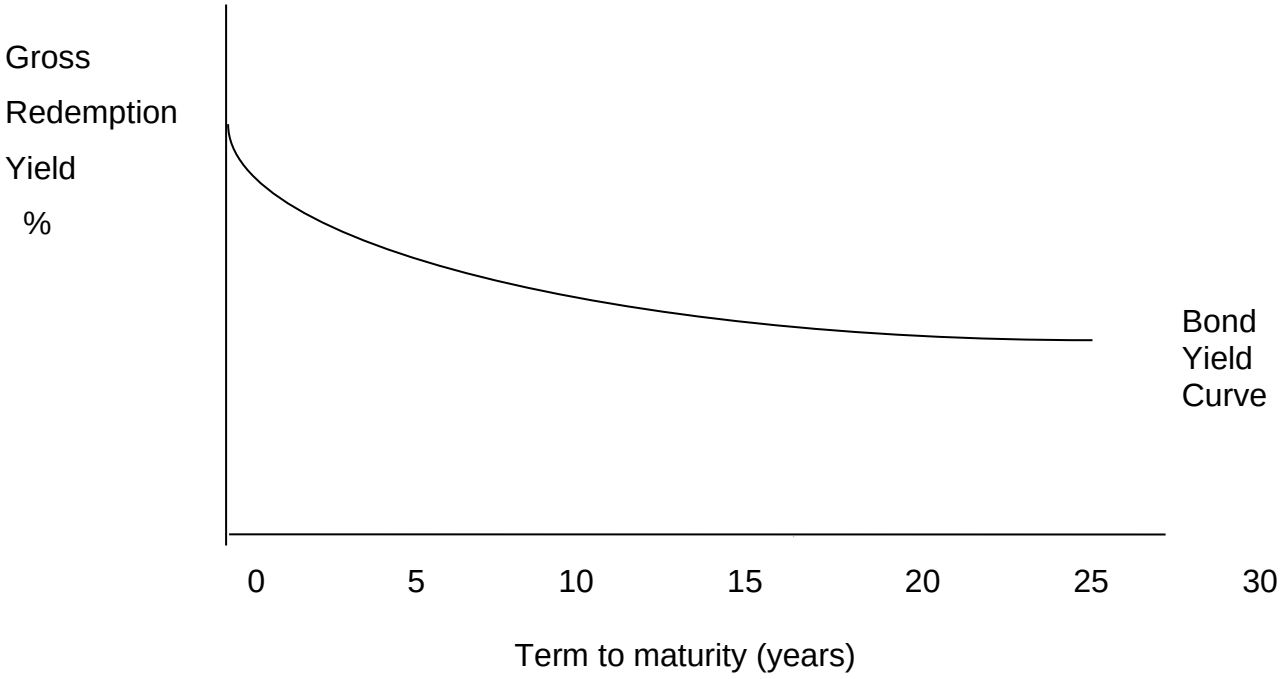

8. Money Markets

The money market is key component of any country's financial system. In reality it is not just one single market but a vast collection of a number of smaller yet interrelated wholesale markets where governments, financial institutions and other key participants (central banks, domestic, overseas banks and large companies) trade very liquid, short-term, low-risk debt instruments and securities with each other.

Money markets may be considered as mechanisms by which these key participants can move around large amounts of money from those institutions with cash surpluses to those institutions requiring short-term funds.

Usually, Money Market Instruments (MMI's) have maturities of less than one year, although they may be for longer periods. The important points to note are the short-term nature of the market and the vast size of the trades.

Returns on MMIs generally tend to be low as they are considered to be very safe and hence the degree of risk is also deemed to be low. They are shown as cash on a lender's statement of financial position.

As MMIs tend to be traded in very high denominations, they are used by institutional rather than individual investors. The participants may be either lenders or borrowers or both. Those participants providing the finance for the instruments require securities that are low-risk and liquid.

It is important to understand the relationships of the participants. Issuers of MMIs are borrowers whereas purchasers are lenders.

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The key participants in the money markets include

- governments
- central banks
- commercial banks
- large companies including insurance companies (and pension funds)
- local authorities

Returns

MMIs fall into two broad categories: those with coupons (those that pay interest) and those without coupons (those that do not pay interest). Instead, they are issued at a discount to their par value, which means that any purchaser will pay less than the par value of the instrument.

Deposits

Interbank deposits are the simplest and most liquid of all MMIs, and are available for varying maturities with the majority being for three months' maturity or less. They are unsecured and are usually for a minimum amount of $500,000.

Interest on such deposits is calculated on a simple-interest rather than compound-interest basis.

In the case of sterling (and domestic Japanese yen), interest rates are based on a 365-day year (366 days in the case of a leap year), whereas for many currencies (including the US dollar) interest rates are calculated using 360 days. This is known as bank basis (also referred to as cash basis and money-market basis).

Treasury bills (T-bills)

Treasury bills (T-bills) are registered, unconditional short-term (less than one year) money-market debt instruments issued at a discount to face value.

They are used to finance governments' short-term borrowing requirements and are used by most governments including those of the UK, the US and Japan.

In the UK, T-bills are obligations of the government, issued by the DMO on its.

T-bills neither pay interest nor have any coupons, as they are issued at a discount to their face value (or par value). They are fully marketable instruments. Their 'reward' is the difference between their face value (receivable at maturity) by the final holder and the price paid in either the primary or secondary market.

T-bills have as their reference point a maturity date. Subsequent issues with the same maturity date will be seen as as a further issue of the original bills for that date. At redemption, the government pays the final holder the full face value.

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Essentially, their interest is their face value minus the discounted price paid by the purchaser.
In the UK the minimum purchase is $500,000 which then goes up in amounts of $50,000. T-bills are purchased by commercial banks, corporations and mutual funds rather than individuals, although they can be purchased by individuals through primary participants. Primary participants (not to be confused with key participants) are banks that have agreed to bid at T-bill tenders on behalf of investors.

For instance, you might pay $980,000 now for $1m nominal of three month T-bills (that is, purchased at a discount to the face amount). The bills will be redeemed at maturity for $1m in, say, 91 days' time. This represents 2% discount over 91 days.

Annualised, this is:
($1m – $980,000)/$1m x 365/91 x 100% = 8.02% pa.

Commercial paper

Commercial paper (CP), often nicknamed 'corporate IOUs', is used by large companies as a cheaper alternative to bank borrowing. It is issued as a method of raising short-term unsecured finance. CP is in fact an integral component of short-term finance used to fund daily operations such as the payment of wages and the purchasing of stock. However, it would not be used to purchase fixed assets, such as plant and machinery, nor to provide finance for long-term capital projects.

Maturities range from one to 270 days; however, in practice, maturities tend to be for only one or two months. CP is usually held to maturity as there is virtually no secondary market.

Certificates of Deposit

Certificates of deposit (CDs) are fully negotiable short-term MMIs which are in effect acknowledgements of indebtedness issued by banks and other financial organisations to other institutional investors. CDs have specific maturity dates ranging from three months to one year. Theoretically, certificates with longer maturities could be issued, but none has to date.

In the UK, CDs can only be issued by those institutions which are authorised to accept deposits in possession of a Part-IV permission under the Financial Services and Markets Act 2000. Unlike T-bills and CP, CDs are not issued at a discount; instead they carry coupons.

The issuer will acknowledge that, in relation to the value of certificates issued, a sum has been deposited with it on terms that the principal amount is repayable, together with interest, on the maturity date payable at the rate and under the terms and conditions set out.

At the end of the fixed term, the deposit is returned with interest. Although the term is fixed, the coupon can be either fixed or floating.

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In the UK, CDs are issued with a minimum denomination of $100,000.

Because of the higher risk, interest rates tend to be higher on CDs than on T-bills.

REPO's

A repurchase agreement (repo) is an agreement between two counterparties under which one counterparty agrees to sell an instrument to the other on an agreed date for an agreed price, and simultaneously agrees to buy back the instrument from the counterparty at a later date for an agreed price.

A repo is a loan secured by a marketable instrument, usually a treasury bill or a bond. The typical term is 1-180 days. A repo is an attractive instrument because it can accommodate a wide spectrum of maturities.

A repo is in effect a cash transaction combined with a forward contract.

Repos can be:

- Overnight (one-day maturity transactions)
- Term (specified end date)
- Open (no end date)

A reverse repurchase agreement (reverse repo) is an agreement for the purchase of an instrument with the simultaneous agreement to resell the instrument at an agreed future date and agreed price.

In a reverse repo, the dealer purchases the security initially and then sells it on maturity. Because the two parties in a repo agreement act as a buyer and a seller of the security, a repo to one party is a reverse repo to the other.

Use of repos

Repos give buyers the chance to invest cash for a limited period of time, on a transaction where they receive collateral as security. Market liquidity and rates are generally good. Traders use repos to cover their positions and benefit from lower funding costs.

9. Treasury management

Treasury management in a modern enterprise covers a number of areas including liquidity management, funding management, currency management and corporate finance.

- Centralising the treasury management function allows businesses to employ experts, deal in bulk cash flows and hence take advantage of lower bank charges and avoid a mix of surpluses and deficits. Decentralised cash management can be more responsive to local needs however.

- The treasury department is usually run as a cost centre if its main focus is to keep costs within budgeted spending targets. It may be run as a profit centre if there is a

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high level of foreign exchange transactions, or the business wishes to make speculative profits.

10. Treasury policy

All treasury departments should have a formal statement of treasury policy and detailed guidance on treasury procedures. The aims of a treasury policy are to enable managers to establish direction, specify parameters and exercise control, and also provide a clear framework and guidelines for decisions.

The guidance needs to cover the roles and responsibilities of the treasury function, the risks requiring management, authorisation and dealing limits.

Guidance on risks should cover:

- Identification and assessment methodology
- Criteria including tolerable and unacceptable levels of risk
- Management guidelines, covering risk elimination, risk control, risk retention and risk transfer
- Reporting guidelines

11. Advantages of a separate treasury department

Advantages of having a treasury function which is separate from the financial control function are as follows.

- Centralised liquidity management avoids mixing cash surpluses and overdrafts in different localised bank accounts.
- Bulk cash flows allow lower bank charges to be negotiated.
- Larger volumes of cash can be invested, giving better short-term investment opportunities.
- Borrowing can be agreed in bulk, probably at lower interest rates than for smaller borrowings.
- Currency risk management should be improved, through matching of cash flows in different subsidiaries. There should be less need to use expensive hedging instruments such as option contracts.
- A specialist department can employ staff with a greater level of expertise than would be possible in a local, more broadly based, finance department.

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- The company will be able to benefit from the use of specialised cash management software.

- Access to treasury expertise should improve the quality of strategic planning and decision making.

Because of the specialist nature of treasury management, a number of businesses **outsource the function** to specialist institutions.

The company receives the benefit of the expertise of the staff of the institution, which may be able to fill resource or skills gaps from which the internal team is suffering.

Outsourcing operational functions may enable the internal team to concentrate on strategic functions. It may also give the organisation access to better systems solutions. The specialists can deal on a large scale and pass some of the benefit on in the form of fees that are lower than the cost of setting up an internal function would be.

However, whether the same level of service could be guaranteed from the external institution as from an internal department is perhaps questionable. The external institution may not have as much knowledge of the needs of the business as an internal department.

Advantages of a specialist centralised treasury department

- Centralised liquidity management avoids having a mix of cash surpluses and overdrafts in different local bank accounts and facilitates bulk cash flows, so that lower bank charges can be negotiated.

- Larger volumes of cash are available to invest, giving better short-term investment opportunities (for example, money market deposits, high interest accounts and Certificates of Deposit).

- Any borrowing can be arranged in bulk, at lower interest rates than for smaller borrowings, and perhaps on the eurocurrency or eurobond markets.

- Foreign currency risk management is likely to be improved in a group of companies. A central treasury department can match foreign currency income earned by one subsidiary with expenditure in the same currency by another subsidiary. In this way, the risk of losses on adverse exchange rate changes can be avoided without the expense of forward exchange contracts or other 'hedging' (risk-reducing) methods.

- A specialist treasury department will employ experts with knowledge of dealing in futures, eurocurrency markets, taxation, transfer prices and so on. Localised departments would not have such expertise.

- The centralised pool of funds required for precautionary purposes will be smaller than the sum of separate precautionary balances which would need to be held under decentralised treasury arrangements.

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- Through having a separate profit centre, attention will be focused on the contribution to group profit performance that can be achieved by good cash, funding, investment and foreign currency management.

- Centralisation provides a means of exercising better control through use of standardised procedures and risk monitoring. Standardised practices and performance measures can also create productivity benefits.

Advantages of decentralised cash management

- Sources of finance can be diversified and can be matched with local assets.

- Greater autonomy can be given to subsidiaries and divisions because of the closer relationships they will have with the decentralised cash management function.

- The decentralised treasury function may be able to be more responsive to the needs of individual operating units.

However, since cash balances will not be aggregated at group level, there will be more limited opportunities to invest such balances on a short-term basis.

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Chapter 5 – The nature, elements and importance of working capital

Objectives:

- *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.*
- *Describe and discuss the key factors in determining working capital funding strategies, including:*
  - *the distinction between permanent and fluctuating current assets*
  - *the relative cost and risk of short-term and long-term finance*
  - *the matching principle*
  - *the relative costs and benefits of aggressive, conservative and matching funding policies*
  - *management attitudes to risk, previous funding decisions and organisation size*

1. Working Capital Management Strategies

Working capital is defined as the capital available for conducting the day-to-day operations of an organisation; normally, the excess of current assets over current liabilities.

Net working capital comprises inventories + accounts receivable + cash – accounts payable

The efficient management of working capital is important from the points of view of both liquidity and profitability. Poor management of working capital means that funds are unnecessarily tied up in idle assets, hence reducing liquidity, and also reducing the ability to invest in productive assets such as plant and machinery, so affecting profitability. A company's working capital policy is a function of two decisions:

- the appropriate level of investment in, and mix of current assets to be decided upon, for a set level of activity – this is the *investment decision*;
- the methods of financing this investment – the *financing decision*.

2. Liquidity and profitability

The company faces a trade-off

An important aspect of the risk associated with various options is the effect it has on the company's liquidity position. Here liquidity may be defined as the ability to pay debts as and when they fall due. Liquidity is obviously of crucial importance to the financial stability of a business; mis-management of a company's liquidity position may result in it being unable to pay its debts which, in turn, may result in corporate bankruptcy. A

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company's liquidity determines its ability to survive. This can be illustrated by looking at each component of working capital in turn.

Cash: A company requires a particular level of cash (or overdraft facility) in order to pay creditors when they fall due, and particularly to take advantage of any generous discounts offered for prompt payment. However, it is likely that a better return could be earned by investing any cash surplus in some higher-yielding fixed asset and that, by ensuring that it has sufficient liquid assets (cash), a company is reducing its chance of owning more profitable assets.

Accounts receivable: A company may decide that it does not want to offer credit to customers, because this delay in payment jeopardises the company's liquidity position. If many types of organisation tried to adopt this policy, customers would be driven away, sales would fall and profits would fall.

Inventories: In order to satisfy customer demand when it arises, manufacturing and retailing companies need to maintain finished goods inventories; to keep production runs moving without disruption, raw materials inventories need to be maintained.

This means that an entity will have money tied up in stocks that, again, it might feel it could more profitably use elsewhere.

However, if inventories were not available when required, a potential sale might be lost; the cost of a broken production run may be higher than the cost of holding stock.

Accounts payable: To improve its cash position an enterprise might decide not to pay creditors for two or three months, rather than after the normal one month. Apart from the obvious cost of lost discount opportunities, the company runs the risk of alienating its suppliers and even losing sources of supply.

In each of the above instances an entity must weigh up the two aspects of profitability versus liquidity. Since ultimately a company aims to maximise profits, it is necessary to establish the financial costs and benefits of different liquidity positions.

An optimum level of working capital must be maintained. Inevitably all working capital decisions reduce to decisions over cash levels, since current assets eventually should be turned into cash.

It is also worth remembering that profit and cash flows are not the same. It is perfectly possible to make accounting profits while suffering a dramatic decline in the cash balance, and vice versa.

However, the important point is that it is possible to report accounting profits (e.g. by capitalising development costs or interest charges) while running out of money.

History is littered with examples of companies which have gone bankrupt whilst reporting profits. Since the consequences of compulsory liquidations are invariably catastrophic for all concerned, it is crucial for a business to maintain a sound liquidity position.

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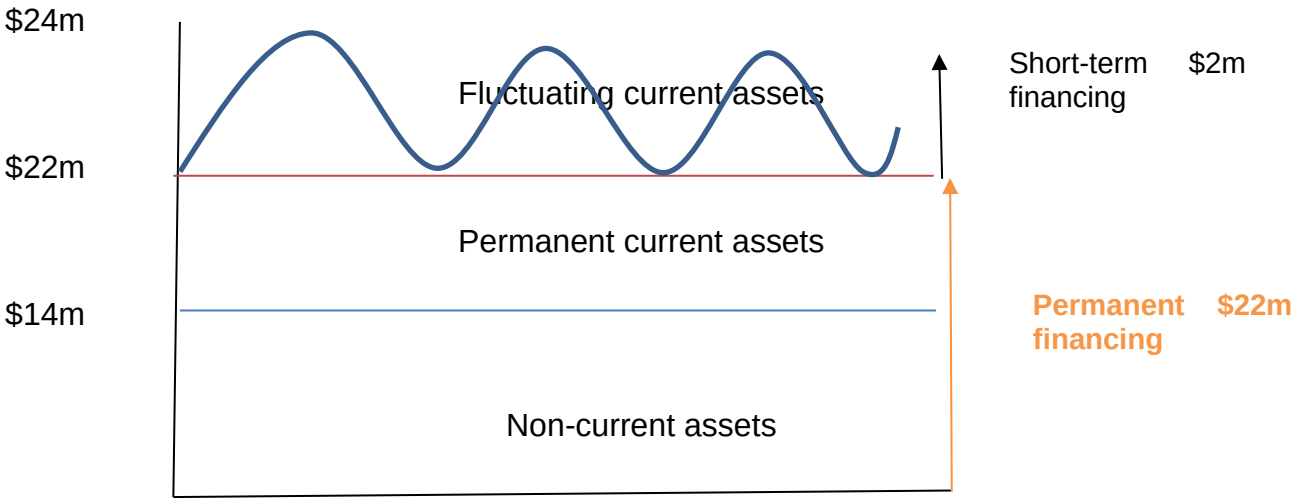
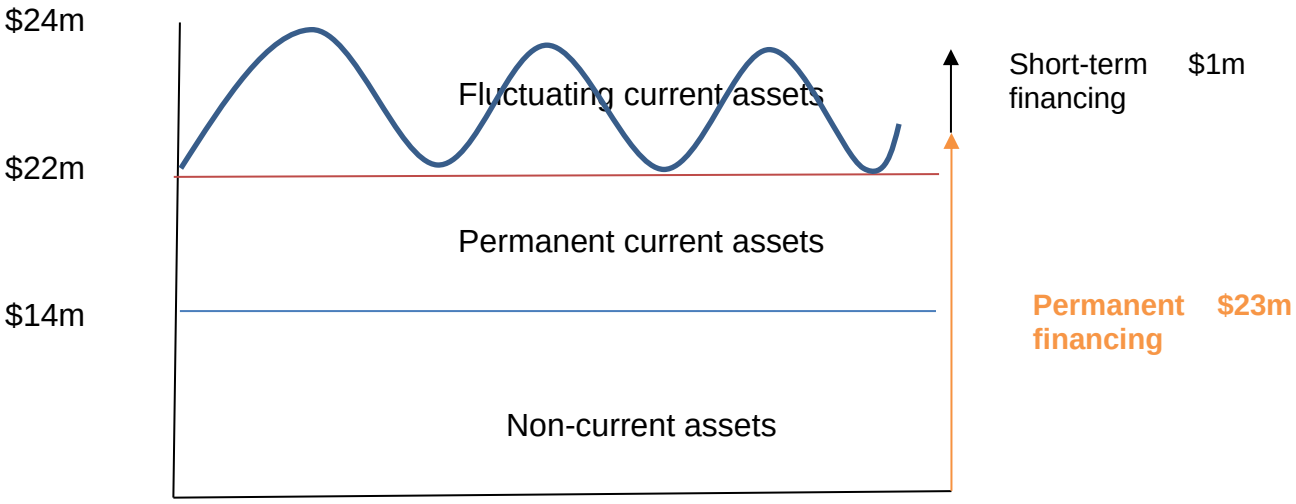
Cash budgeting and ratio analysis are key techniques in monitoring and controlling that position.

The choice of approach is a matter for managerial judgement, but the trade off between relative *cheapness* of short-term debt v. *the risks* of such short-term debt should be considered

Three possible policies exist, and these are shown below



A moderate policy matches the short-term finance to the fluctuating current assets, and the long-term finance to the permanent part of current assets plus non-current assets.



A conservative policy is where all of the permanent assets – both non-current assets and the permanent part of the current assets (i.e. the core level of investment in inventories and accounts receivable, etc.) – are financed by long-term funding, as well as part of the fluctuating current assets. Short-term financing is used only for part of the fluctuating current assets.

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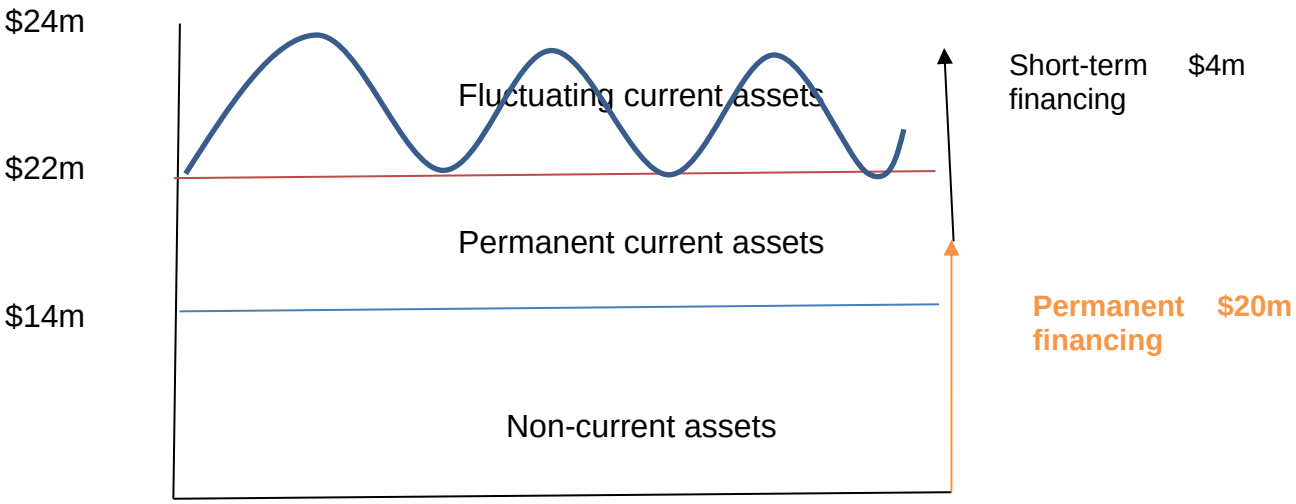

An aggressive policy for financing working capital uses short-term financing to fund all the fluctuating current assets as well as some of the permanent part of the current assets. This policy carries the greatest risk of loss of liquidity, but provides the greatest returns.

3. The risks of short-term finance

It was noted above that short-term financing is generally the cheaper option. However, the price paid for this reduced cost is an increase in risk.

a) Renewal problems

Being short-term it has to be continually renegotiated as the various facilities expire. In some situations, either because of economic conditions (e.g. a credit squeeze) or because of the financial situation of the company, such renewal may be difficult to obtain.

b) Interest rate risk

If the company constantly has to renew its funding arrangements, it will be at the mercy of fluctuations in short-term interest rates.

Illustration

The following three companies have current asset financing structures which may be considered as conservative, aggressive and moderate:

Balance sheet

	Conservative	Aggressive	Moderate
	$000	$000	$000
Non-current assets	50	50	50
Current assets	50	50	50
	100	100	100

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Equity (50,000 $1 shares)	50	50	50
Long-term debt (average cost 10% pa)	40	-	25
Current liabilities (average cost 3% pa)	10	50	25
	100	100	100
Current ratio	**5:1**	**1:1**	**2:1**

Profit and loss account

	Conservative $	Aggressive $	Moderate $
EBIT	15,000	15,000	15,000
Less Interest (10% x long-term, 3% x current)	(4,300)	(1,500)	(3,250)
Earnings before tax	10,700	13,500	11,750
Corporation tax @ 30%	(3,210)	(4,050)	(3,525)
Earnings available to equity	7,490	9,450	8,225
Earnings per share (Available earnings ÷ 50,000 shares)	**14.98c**	**18.9c**	**16.45c**

It can be seen that the aggressive company returns a higher profit but at the cost of greater risk. It is interesting to note that this higher risk is revealed in its relatively poor current ratio.

Essentially the final choice must be made by the management of the individual company, bearing in mind the willingness of creditors to lend and the risk of its industrial sector.

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Chapter 6 – Management of inventories, accounts receivable, accounts payable and cash

Objectives:

- Explain the cash operating cycle and the role of accounts payable and accounts receivable.
- Explain and apply relevant accounting ratios, including:
  - current ratio and quick ratio
  - inventory turnover ratio, average collection period and average payable period
  - sales revenue/net working capital ratio
- Discuss, apply and evaluate the use of relevant techniques in managing inventory, including the Economic Order Quantity model and Just-in-Time techniques.
- Discuss, apply and evaluate the use of relevant techniques in managing accounts receivable, including:
  - assessing creditworthiness
  - managing accounts receivable
  - collecting amounts owing
  - offering early settlement discounts
  - using factoring and invoice discounting
  - managing foreign accounts receivable
- Discuss and apply the use of relevant techniques in managing accounts payable, including:
  - using trade credit effectively
  - evaluating the benefits of discounts for early settlement and bulk purchase
  - managing foreign accounts payable
- Explain the various reasons for holding cash, and discuss and apply the use of relevant techniques in managing cash, including:
  - preparing cash flow forecasts to determine
  - future cash flows and cash balances
  - assessing the benefits of centralised
  - treasury management and cash control
  - cash management models, such as the
  - Baumol model and the Miller-Orr model
  - investing short-term
- Calculate the level of working capital investment in current assets and discuss the key factors determining this level, including:
  - the length of the working capital cycle and terms of trade
  - an organisation's policy on the level of investment in current assets
  - the industry in which the organisation operates

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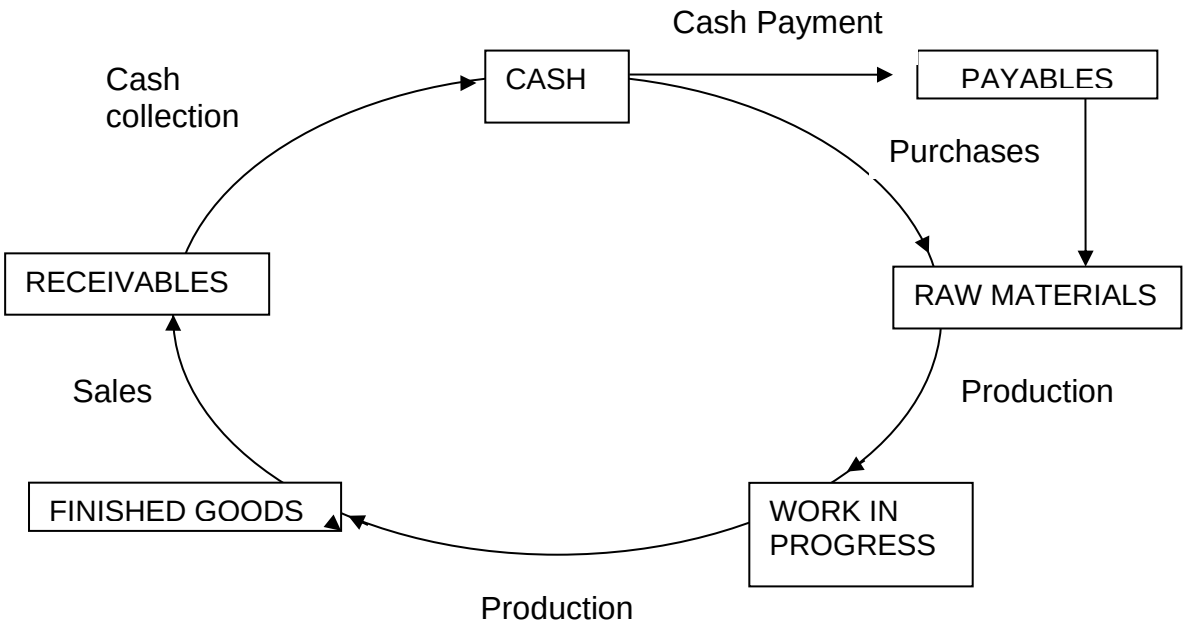
1. The Cash Operating Cycle

The investment made in working capital is largely a function of sales and, therefore, it is useful to consider the problem in terms of the firm's cash operating cycle, (otherwise referred to as the working capital cycle). This focuses on the length of time between a company paying out cash for inputs and receiving cash from the sale of goods. The cycle is normally measured in days and is depicted in the following diagram:



The cash operating cycle reflects the company's investment in working capital as it moves through the production process towards sales.

The investment in working capital gradually increases firstly being only in raw materials, but then in labour and overhead as production progresses.

This investment must be maintained throughout the production process, the finished goods holding period and up to the final collection of cash from trade receivables. Note that the net investment is reduced by taking trade credit from suppliers.

The more an entity can reduce the operating cycle, the lower its investment in working capital will be. However, too little investment in working capital can lose sales since customers will generally prefer to buy from suppliers who are prepared to extend trade credit, and if items are not in stock when required by customers, sales may be lost.

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The duration of the cycle (and therefore the amount invested in working capital) is affected by a number of variables, including:

- Type of industry, e.g. retailing where the cycle is short (or even negative) v. construction where the cycle is far longer;
- Liquidity v. profitability trade-off;
- Efficiency of management, e.g. receivables' and payables' control;
- Inflation i.e. increases in the prices of inputs can cause problems in sales growth and the company must finance an increased working capital investment for the length of the cash operating cycle;
- Growth i.e. rapid sales growth will cause a large increase in working capital investment and care must be taken as an increase in current assets that is not supported by adequate funds can lead to "overtrading".

The cash cycle can be further illustrated as follows:

The length of the cash cycle equals:

Raw material stock period	***less***	Creditor payment period	***plus***	Work in progress period	***plus***	Finished goods stock period	***plus***	Debtor payment period

If the components of the cycle are considered carefully, improvements can be made, i.e. the cycle can be reduced in time by either:

- improving production efficiency ('WIP stock-holding period')
- improving finished goods and/or raw material stock turnover
- improving debtor and creditor payment periods, i.e. minimisation of the former (subject to not affecting trading volumes) and maximising the latter (subject to not jeopardising supplies)

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2. Calculating the length of the cash operating cycle

		Days
Raw materials holding period	$\frac{\text{average stock of raw materials}}{\text{annual usage}} \times 365$	= x
Average credit period taken	$\frac{\text{average trade payables}}{\text{annual purchases}} \times 365$	= (x)
Average production period	$\frac{\text{average stock of work in progress}}{\text{annual cost of sales}} \times 365$	= x
Average stock-holding period	$\frac{\text{average stock of finished goods}}{\text{annual cost of sales}} \times 365$	= x
Average debt collection period	$\frac{\text{average trade receivables}}{\text{annual credit sales}} \times 365$	= x
Length of cycle (number of days between payment and receipt)		x

Example 1

Ellington plc has the following estimated figures for the coming year:

Sales (all on credit)	$3,600,000
Average receivables	$306,000
Gross profit margin	25% on sales
Average inventories	
Finished goods	$200,000
Work in progress	$350,000
Raw materials	$150,000
Average payables	$130,000

Raw materials represent 60% of total production cost, whilst stock levels remain constant.

Requirement:

Calculate the cash operating cycle in days.

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3. Working Capital Ratios

a) **Current ratio** i.e. Current Assets : Current Liabilities

b) **Quick ratio** (alternatively called "Acid Test") i.e.

Cash + Marketable Investments + Collectable Debtors : Current Liabilities

Declining ratios may indicate a potential threat to the continuation of the business, but these ratios have to be interpreted in the light of ratios c) to f) below and the company's plans for capital expenditure, the raising of finance and overdraft limits.

c) **Stock (or Inventory) turnover ratio** i.e.

$$\frac{\text{Closing (or average) inventory}}{\text{Cost of Sales}} \times 365 \quad \textbf{or} \quad \frac{\text{Cost of Sales}}{\text{Closing (or average) inventory}}$$

The lower the stock holding period, the lower the cost of holding inventory. However, there are other costs associated with stock, e.g. ordering costs and the costs of stock-outs i.e. the consequences of lost sales due to a shortage of stock

d) **Debtor (or Accounts receivable) turnover ratio** i.e.

$$\frac{\text{Closing receivables}}{\text{Sales}} \times 365 \quad \textbf{or} \quad \frac{\text{Sales}}{\text{Closing receivables}}$$

A low level of debtor days is good from a liquidity perspective, but it would probably have a detrimental effect on sales levels (i.e. the liquidity v. profitability debate).

e) **Creditor (or Accounts payable) turnover ratio** i.e.

$$\frac{\text{Closing payables}}{\text{Credit Purchases or Cost of Sales}} \times 365 \quad \textbf{or} \quad \frac{\text{Credit Purchases or Cost of Sales}}{\text{Closing payables}}$$

A business with a low level of creditor days will not be taking advantage of the credit periods offered by suppliers. However the business must be careful not to exceed the credit periods on offer.

In the formulae shown in c), d) and e) above, if these ratios are to be expressed in terms of weeks, multiply by 52 and if they are to be expressed in terms of months, multiply by 12. Furthermore, as regards the above three ratios, if you wish to express the ratio in terms of days, use the ratio shown on the left-hand side, but if the ratios need to be expressed in times per annum, use the ratio shown on the right-hand side.

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f) **Turnover/net working capital ratio** i.e.

$$\frac{\text{Sales revenue for the period}}{\text{Current assets } \textit{less} \text{ current liabilities}}$$

To avoid liquidity problems, working capital should increase in line with sales. This ratio measures the efficiency in which working capital is used in generating sales.

4. The Management of Inventories

The **objective** of inventory management is to ensure the availability of sufficient levels of inventory to avoid interruptions to production caused by stock-outs, whilst minimising the associated holding and administrative costs.

The **objectives of holding inventories** include:

- To meet demand, therefore preventing stock-outs and breaks in production;
- To take advantage of quantity discounts or current price reductions;
- To minimise the cost of placing orders.

The **costs** of holding inventories include:

- Purchase cost (including finance costs);
- Holding costs e.g. insurance and warehousing;
- Ordering costs e.g. administration and clerical costs;
- Costs incurred if shortages arise;
- Costs of operating the inventory management system.

Systems of inventory control

1. *The two bin system*. An optimum reorder level and optimum reorder quantity (often determined by the EOQ model) must be established. Not surprisingly, two bins are used. When the first bin is empty new inventory is ordered (the optimum reorder quantity). The quantity of inventory in the second bin will reflect the optimum reorder level (i.e. sufficient stock to meet the needs of the business during the delivery lead-time). When the new order is delivered, the second bin is 'topped up' to the optimum reorder level. The balance of the delivery is then placed in the first bin.

2. *The one bin system*. As before optimum reorder levels and reorder quantities must be established. When inventory levels fall to the optimum reorder level (a red line in the bin?), an order is placed of the optimum reorder quantity to replenish stock levels.

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3. *Periodic (cyclical) review system*. A review period cycle (say every two months) is determined. A maximum inventory level is also set. At the close of each review period an order is placed to replenish stock to the predetermined maximum level. Unlike systems 1 and 2 above, which use order quantities for a fixed amount, under this system quantities ordered are likely to vary each time an order is placed.

4. *Just-in-time (JIT) system*. The objective of this system aims to reduce the total costs of manufacture by only producing goods as and when customers require them. JIT systems allow stockholding costs to be minimised, since no (or very low) inventory levels are held. However, it will increase order costs. Delivery costs tend to be higher as more frequent (but smaller) raw material orders are placed. Purchase prices may also be higher, since top quality materials are often stipulated (and only the bare minimum quantity is ordered, since no waste is permitted). Problems include:

   - The reliance on dedicated suppliers who will deliver defect-free raw materials of high quality (maybe as often as two or three times a day);
   - A close business relationship must be established with that reliable supplier, who must ideally be geographically located close to our own production facilities;
   - The supply contract would normally impose harsh penalties for delays in delivery.

5. *ABC system*. Stocks are classified as A, B or C depending upon their importance. The top 10% in terms of annual purchase cost are normally classified as A items, the next 20% as B items and the final 70% as C items. A suitable inventory control system is used for each category, the intention being to use a system appropriate to the nature of each stock item and thereby avoid unnecessary costs.

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5. Economic order quantity (EOQ)

The EOQ model is a formula intended to minimise the total costs associated with holding and ordering stock. It determines how much of each stock item should be ordered i.e.

Economic order quantity (Q) = $\sqrt{\frac{2CoD}{C_H}}$

Where: Co = cost of placing an order
D = expected annual demand (in units)
C_H = cost of holding one unit in stock for one year (often based on cost of capital)

Example 2

A company experiences an annual demand for 40,000 units. The fixed cost per order placed is $2. The purchase price per unit is $9 and the holding cost is $1 per unit held for one year.

You are required to calculate the EOQ for this item of inventory.

Discounts

To encourage larger orders, suppliers sometimes offer quantity discounts. Where discounts are on offer, calculate the EOQ (as above), then determine the total purchase cost ignoring the discount.

The total purchase cost is then recalculated net of the discount and whichever provides the lower total cost will indicate whether or not the discount should be accepted.

Example 3

A company experiences an annual demand for 20,000 units. The fixed cost per order placed is $25. The purchase price per unit is $40 and the holding cost is 10% pa on purchase price.

a) What is the current EOQ and the total cost associated with stock?

b) The supplier now offers the company a 2% discount on orders placed of 1,000 units or more. Should the discount be accepted? What is the new EOQ?

Since the total costs of inventories under b) i.e. with acceptance of the discount is lower than the total costs under a), accept the discount and the new EOQ will be 1,000 units.

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Example 4

The following data relates to an item of inventory:

Annual demand	=	5,000 units
Holding cost per unit	=	$7.50
Reorder cost per order	=	$30
Purchase price per unit	=	$1.10

The supplier has promised a discount of 3% on orders placed of 300 units or more. Should the discount be accepted?

Reorder levels

An order should be timed to ensure that stock-outs never occur. If lead times and demand during that lead time are known with certainty, the stock levels at which a replenishment order should be issued can be calculated precisely.

However, if there is any uncertainty surrounding lead time or demand, a buffer stock may be required. The optimum quantity of buffer stock will be determined by the combined effect of holding costs, stock-out costs and the uncertainty surrounding demand.

Example 5

A domestic appliance retailer with multiple outlets, stocks a washing machine, for which the following information is available:

Average sales	75 machines per day
Maximum sales	95 machines per day
Minimum sales	50 machines per day
Lead time	between 12 & 18 days
Reorder quantity	1,750 machines

Based upon the above data and assuming that no stock-outs are permitted, at what level of stocks should a replenishment order be issued (i.e., what is the optimum reorder level)?

Additionally, what is the maximum stock level?

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6. The Management of Accounts Receivable

The management of debtors is a fine balance between an increase in profitability due to increased sales and reduced liquidity due to resources being tied up as working capital. To encourage the swift settlement of accounts payable a cash discount may be offered, however such a course of action would clearly reduce profitability.

The credit policy of a business will normally be determined by market forces, such as the credit terms offered by competitors and the elasticity of demand for our products. There are however other costs which need to be considered such as administration costs, financing costs and the risk of bad debts.

The credit policy implemented may form part of a wider corporate objective e.g. to increase market share.

Creditworthiness

Each customer should be individually assessed to determine the credit terms to offer (if indeed credit is offered at all – sub-prime lending should be avoided!!). This assessment could include obtaining references from banks and other credit institutions as well as trade references, salesmen's reports and the analysis of published financial reports.

The credit terms for each customer may include credit limits, credit periods, settlement discounts and interest charges.

Credit ratings will be used e.g. a company could have a number of credit risk categories for its customers – these could be used to decide individual credit limits and the frequency of credit review.

The impact of offering credit (i.e. increased turnover and thus increased contribution) needs to be compared with increased costs (i.e. the cost of capital tied up in the debtor and the potential for bad debts). If credit is given to customers there must be a credit control system in place, which whilst generating additional costs will help reduce bad debts.

An efficient collection policy should be established e.g. prompt invoicing and statements, a system of reminder letters, telephone collection, the use of collection agencies, the withholding of future supplies and the ultimate legal action.

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7. Use of factors or invoice discounting

Factoring involves transferring the responsibility for accounts receivable to a specialist third- party institution. Factors offer a range of services:

- Sales ledger administration and credit control services;
- Credit insurance (non-recourse factoring), whereby the factor offers credit protection, effectively insuring the company against the risk of bad debts;
- The provision of short-term finance. The factor may advance up to (say) 80% of the value of the debts secured on outstanding debtors. Interest is charged on the debts, but this is a useful way of generating short-term finance.

The company must weigh up the benefits of factoring (speedy collection, administrative savings, avoidance of bad debt risk etc) against the costs of factoring (the factoring fee, lower cash receipts and perhaps a loss of customers, who may object to the factoring arrangement, since the factor – not the company – may control the granting of credit).

Invoice discounting is the sale of specific debts at a discount to a specialist third-party institution, in return for the prompt receipt of cash.

Example 6

The normal terms of trade of a company are the receipt of cash within 45 days of the invoice. The company offers a discount of 1.5% if the customer pays within 15 days of the invoice.

What is the annual effective cost of the discount?

Example 7

A company is considering the offer of a cash discount to customers. Without the discount scheme, the company expects the following:

Annual credit sales	2,000,000
Average credit period taken by customers	90 days
Contribution margin (i.e. P/V) ratio	40%
Bad debts	5% of sales
Finance costs	10% p.a.

The terms of the cash discount would be 2.5% if payment is received with 30 days. The marketing director believes that the scheme would cause a 5% increase in sales. He believes that 50% of customers will take advantage of the discount, that the average credit period taken would fall to 75 days and that bad debts would reduce to 4% of sales.

Based upon these predictions, should the cash discount be offered?

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Example 8

Sarah Ltd has annual sales of $100,000, but is in need of additional cash. The company approaches a factor which is prepared to offer two services:

a) The factor will charge 3% of turnover to administer the sales ledger, which will result in an annual saving in administration costs of $5,000.

b) The factor has also undertaken to pay all amounts over to Sarah Ltd after 30 days. The factors charge will be 1.25% of turnover. The average collection period from customers is currently 80 days and the cost of borrowing for the company is 10% p.a. No bad debts are anticipated.

Should Sarah Ltd accept either or both of these services?

Example 9

Milano Ltd has receivables of $6,000,000 and sales of $30,000,000.

a) Calculate the receivables days and the cost to the company if an overdraft at a rate of 12% p.a. is used to fund receivables.

Milano Ltd offers a 1% cash discount to receivables who pay within 15 days

b) Should Milano Ltd offer this discount if only 30% of receivables will take up the facility?

A factor offers to collect the receivables of Milano Ltd for a fee of 1.5% of turnover. This will save Milano Ltd $300,000 in administration costs and reduce receivables days to 50.

c) Should Milano Ltd accept the factor's offer?

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Example 10

Turino Ltd has annual sales of $500,000 and an average receivables collection period of 60 days.

The company currently has an overdraft at an interest rate of 17% p.a. Turino Ltd has been approached by two factoring companies, who have offered the following terms:

Factor A

For a service fee of 2% of turnover, the factor will guarantee a collection period of 50 days.

Administrative savings to Turino Ltd will amount to $8,000.

Factor B

For a service fee of 2% of turnover, the factor will guarantee a collection period of 45 days.

Immediate funds equal to 80% of sales will be provided at an interest rate of 18% p.a.

Administrative savings to the company will again amount to $8,000.

Which (if either) of the factors should be used?

8. The Management of Accounts Payable

Trade credit can be a useful source of short-term finance as there are few formalities involved in obtaining it. Trade credit can be used even when other sources are unavailable.

The terms that are offered by suppliers for the payment for raw materials or services vary between industries and businesses. The purchasing company should take advantage of the credit terms on offer, so as to maximise the period of time in which they hold cash.

However, if too much advantage is taken of credit terms by consistently paying late, supplier goodwill would be destroyed and they may even increase the prices that they charge to reflect the customer's poor payment record or credit terms may sometimes even be withdrawn.

Some suppliers may offer discounts for early settlement. It is important that the cost of refusing a discount should be evaluated. Remember that the cost of refusing the discount as a customer is *equal to* the cost of offering the discount as a supplier. If sufficient liquid resources are available, these discounts should be investigated. The benefit will be the payment of a smaller amount, but the cost will be the loss of that cash for a period of time.

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Example 11

Mark Ltd owes $1,000 to a supplier. The supplier offers to Mark Ltd a discount of 2% for immediate cash payment, as an alternative to the normal credit terms of 30 days. The cost of capital of Mark Ltd is 20% p.a. Should the discount be accepted?

9. The Management of Cash

Four principal business motives for holding cash balances

Cash management must balance each of the following motives to enable the most effective use of resources.

1. *Transactions motive*

To meet current financial obligations incurred in the normal course of business (e.g. payroll, purchase of raw materials).

2. *Finance motive*

To repay loans and finance the acquisition of additional assets

3. *Precautionary motive*

To provide a cushion on liquidity to meet unplanned spending

4. *Investment (speculative) motive*

To take advantage of market opportunities (e.g. to purchase inventories at advantageous prices or to acquire another organisation).

10. The dangers of over-trading

In small businesses with few controls, or in business start-ups, there is a danger of over-trading (i.e. exhausting liquid resources).

This is one of the most common reasons for business failure; accordingly it is an important signal of impending insolvency.

During their early stages, businesses:

- find it difficult to obtain credit;
- are often forced to grant extended credit to customers to attract new business;
- this causes a drain on funds unless another source of cash (e.g. equity funding) can be found.

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Once the problem has been identified, remedial action could include:

- Do not tie up cash in:
  - accounts receivable;
  - inventories; and
  - non-current assets
- Discontinue stock lines that require constant investment to maintain them.
- Look for a cash injection from alternative sources.

11. Optimal cash balances

Idle cash balances earn little or nothing and should therefore be minimised. However, when an opportunity arises, cash is normally needed to exploit it. Cash budgets are a method of determining and anticipating cash requirements over time. They identify any surpluses (which may be invested) or deficits (which need to be funded).

It is important to be aware that increases or decreases in sales and profits are not necessarily reflected in increases or decreases in cash balances, as the following extremely simple cash budget exercise illustrates.

12. Cash management models

There are two cash management models that need to be known. They both assume that businesses need to hold a certain amount of cash for everyday use (e.g. in a current account) and that other funds are held as readily liquid investments (e.g. in deposit accounts). There will normally be transaction costs (usually in the form of bank charges) for the switching of funds between accounts. The objective is to maximise returns, whilst ensuring that sufficient cash is readily available to meet day-to-day needs.

The Baumol model

This model is based on the EOQ model used for inventory control. It calculates the optimal amount of funds to be transferred between short-term investments and the bank current account (and vice versa) i.e.

$$\text{Economic transfer} = \sqrt{\frac{2C_oD}{C_H}}$$

Where: C_o = transaction costs of switching cash (brokerage and commissions etc)
D = annual demand for cash (cash needs for the period)
C_H = Cost of holding cash (usually interest foregone on cash deposits)

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Example 12

Readies Ltd has annual cash disbursements amounting to $500,000. The cost of buying or selling gilts to reduce or replenish readily available cash balances is $22.50 per transaction. The current interest rate earned on gilts is 10% p.a.

What is the optimal amount of cash to be transferred?

Example 13

What is the optimal amount of cash to be transferred if interest rates fall to 5% p.a.?

The weaknesses of this model are that it does not incorporate the effect of uncertainty, but this is not a major problem, since lead times tend to be extremely short. Furthermore, it is an extremely mechanical exercise e.g. why sell the predetermined amount of securities if a large cheque has just been received from a customer?

The Miller-Orr model

This model controls erratic and irregular cash movements by setting an upper and lower control limit on cash balances held. Accordingly, cash balances are not allowed to exceed the upper limit nor fall below the lower limit.

The lower limit is set by the management of the enterprise and the model calculates the "*spread"* between the upper and lower limit. If cash balances fall below the minimum amount they will need to be replenished; if they rise above the maximum amount, the surplus cash needs to be invested.

The *"upper limit"* and the *"return point"* are calculated by equations, which take account of holding costs, transaction costs and the variance (volatility) of cash flows.

Spread between upper and lower cash balance limits

$$= 3 \times \left[\frac{\frac{3}{4} \times \text{transaction cost} \times \text{variance of cash flows}}{\text{interest rate per day}} \right]^{1/3}$$

Return point = lower limit + ($^1/_3$ x spread)

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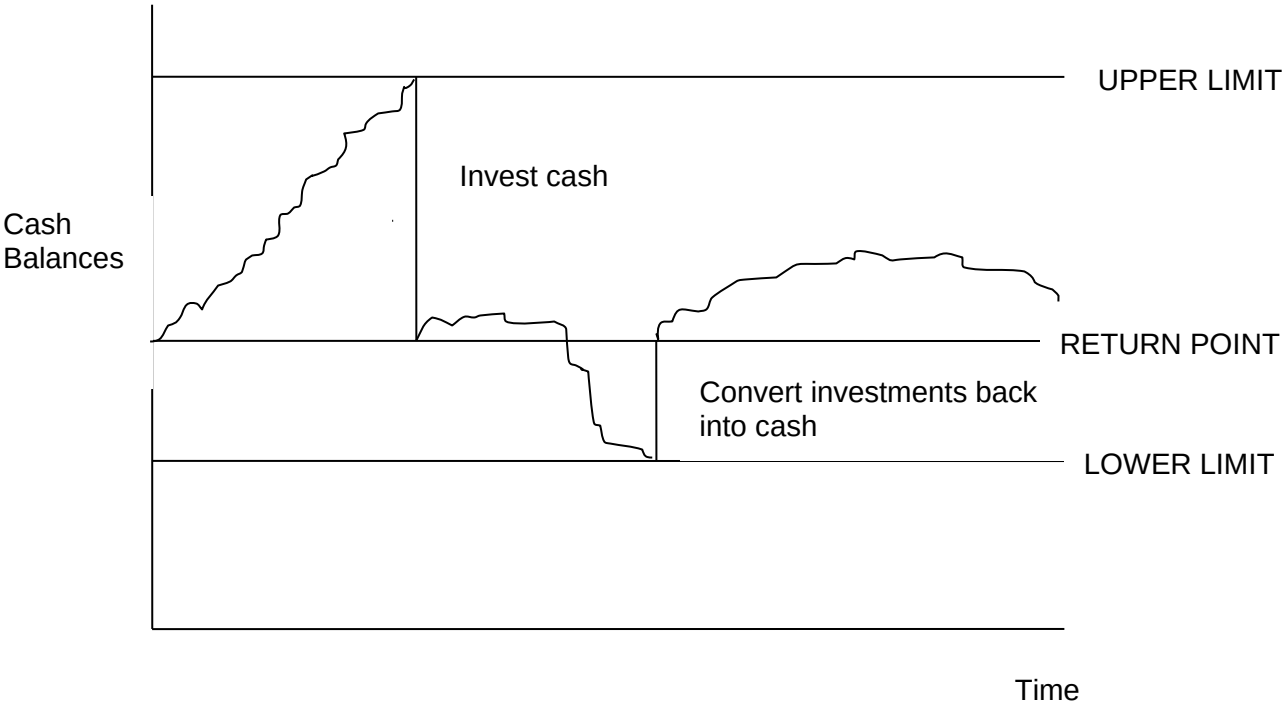
Upper limit (**not given on ACCA FM formula sheet**) = lower limit + spread



Example 14

Standard deviation of daily cash flows = $2,500

Annual interest rate = 9.125%

Transaction cost for sale or purchase of securities = $20 per transaction

Minimum cash balance = $10,000

You are required to calculate the amount of the spread, the upper limit and the return point under the Miller-Orr model

13. The treasury function

This involves the management and control of cash and short-term investments as well as the raising of finance. Treasury departments have become popular as large multi-nationals have attempted to maximise the return on all of their assets.

Treasury functions are often centralised so that enterprises can generate better returns on investments. Finance charges should be reduced as the need for external finance is minimised, since if one division of the business has surplus cash it can be used to fund a cash deficit in another location.

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Chapter 7 – Investment Appraisal Techniques

Objectives:

- *Identify and calculate relevant cash flows for investment projects.*
- *Calculate 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.*

1. The payback method

The payback period is simply the time taken to recoup the initial investment.

Example 1

X plc is considering a project with the following estimated cash flows.

	t_0	t_1	t_2	t_3	t_4
	$	$	$	$	$
Net cash flow	(10,000)	3,000	4,000	4,000	3,000

Calculate the payback period.

A problem with payback is to establish a hurdle period to give us an accept/reject criterion. As payback is a non–theoretical investment appraisal technique, the selection of an appropriate hurdle is arbitrary and will vary from company to company, largely due to the decision–makers differing attitudes to risk. Thus one company may accept and another reject the same project owing to differing payback hurdles.

Advantages of payback include

- Payback is simple to compute and understand.
- Payback concentrates on the importance of liquidity, and the need to recoup cash flows quickly.

Disadvantages of payback include:

- Payback uses an arbitrary hurdle for the accept/reject decision.
- Payback ignores the cost of capital (but discounted payback overcomes this).
- Payback ignores all cash flows after the payback period has been reached.
- Payback will not give advice consistent with the superior NPV technique.

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2. The Accounting Rate of Return (ARR)

The accounting rate of return is the only technique that uses accounting profits rather than cash flows as the main measure.

The first problem with ARR is to determine which formula to use as there are many ways of calculating it. Typical versions include the following.

$$\frac{\text{Average profit}}{\text{Initial Investment}} \times 100\%$$

$$\frac{\text{Average profit}}{\text{Average investment}} \times 100\%$$

Example 2

X plc has the following cash flow estimates for a new project it is appraising.

	t_0 $	t_1	t_2	t_3 $
Plant and machinery	(200)			20
Net trading cash flows		80	120	100

Calculate the two versions of ARR from the above information.

Once the method for calculating ARR has been determined the company has to select a hurdle percentage to give an accept/reject decision. As with payback this is fairly arbitrary and different companies may select different hurdles.

Advantages of ARR

- It is relatively simple to calculate and understand.
- It uses profit rather than cash flows, which accountants normally prefer.
- It will have an impact on the overall company ROCE, a measure often viewed in the stock market as an indicator of profitability.

Disadvantages of ARR

- It does not use cash – profit figures are easy to manipulate.
- It has no logical hurdle for accept/reject decisions.
- As it is non-theoretical it will not give consistent advice with the NPV criterion.
- There are many versions of ARR which can become confusing.

Selection of those projects which will maximise the wealth of the owners (or shareholders) of the enterprise involves a consideration of FUTURE events, not PAST performance.

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Chapter 8 – Discounted cash flow (DCF)

Objectives:

- *Calculate net present value and discuss its usefulness as an investment appraisal method.*
- *Calculate 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.*
- *Calculate discounted payback and discuss its usefulness as an investment appraisal method.*

1. Discounted Cash Flow

DCF is a method of capital investment appraisal which takes account of:

1. The overall cash flows arising from projects, and
2. The timing of those cash flows.

Only relevant cash flows are considered (i.e. those future cash flows which arise as a result of those projects) and the timing effect is incorporated by means of the discounting technique.

Both the Accounting Rate of Return and the Payback approaches are surpassed by the DCF methods. The basic arguments are:

a) it is better to consider cash rather than profits. Cash is how investors eventually see their rewards (i.e. dividends, interest, or the proceeds from the sale of the shares or debentures).

b) the timing of the cash flows is important because early cash receipts can be reinvested to earn interest.

c) it is important to consider the cash flows arising over the entire life of a project.

The technique of discounting reduces all future cash flows to current equivalent values (present values) by allowing for the interest which could have been earned if the cash had been received immediately.

There are two common techniques, net present value and internal rate of return, but net terminal value can be used.

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2. Net Present Value

The NPV of a project is the net value of a project's cash flows after discounting (i.e. allowing for reinvestment) at the company's cost of capital. Projects with a negative NPV should be rejected.

N.B. Cost of capital is the average required return which is set by the market for the company in view of the risk associated with its operations.
Provided that:

- The project under consideration is of average risk for the company, and
- There is no restriction on access to capital,

A positive NPV provides the best theoretical estimate of the total absolute increase in wealth which accrues to an enterprise as a result of accepting that project.

However in the short run the use of the NPV rule may not lead to good profits being reported in the published accounts of the enterprise - although in the long term cash flows and reported profits should move in tandem.

The NPV rule has a sound theoretical basis and is likely to produce investment decision advice of consistently good quality.

Example 1

Congo Ltd is considering the selection of one of a pair of mutually exclusive investment projects. Both would involve purchase of machinery with a life of five years

Project 1 would generate annual cash flows (receipts less payments) of $200,000; the machinery would cost $556,000 and have a scrap value of $56,000.

Project 2 would generate annual cash flows of $500,000; the machinery would cost $1,616,000 and have a scrap value of $301,000.

Congo uses the straight-line method for providing depreciation.

Its cost of capital is 15 per cent per annum. Assume that annual cash flows arise on the anniversaries of the initial outlay, that there will be no price changes over the project lives and that acceptance of one of the projects will not alter the required amount of working capital.

Requirements

Calculate for each project

a) the accounting rate of return (ratio, over project life, of average accounting profit to average book value of investment) to the nearest 1%.
b) net present value
c) the payback period to one decimal place
d) the discounted payback period

Ignore taxation.

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3. Internal Rate of Return

The IRR of a project is that discount rate which when applied to a projects cash flows provides an NPV of zero. The IRR is therefore the expected "earning rate" of an investment. If the IRR of a project exceeds the cost of capital of that enterprise, that project is acceptable.

When considering a single project in isolation IRR will give the same decision as NPV (i.e. if the NPV of a project is positive, its IRR will exceed the cost of capital).

However, when choosing between mutually exclusive projects, the two techniques may conflict and (subject to the provisos set out in F) above NPV always provides the correct solution.

Disadvantages of IRR

1. IRR provides a relative (as opposed to an absolute) result, and may give incorrect decision advice if mutually exclusive projects:

   a) Are of different size, or
   b) Have unequal lives

2. May be multiple IRRs or no IRR. For example, a two year project having an initial outlay of $42m, followed by a net inflow of $90m at time1 and a net outflow of $50m at time 2, has no IRR

3. Cannot adapt to expected changes in cost of capital during the life of a project.

4. Makes an inconsistent assumption about the rate at which cash surpluses can be reinvested; it assumes they are reinvested at whatever the IRR happens to be. The company's cost of capital is a more appropriate reinvestment rate i.e. the assumption underlying NPV.

5. More difficult to calculate than the theoretically sounder NPV approach.

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Example 2

In respect of the following competing capital projects A and B, you are required to use discounted cash flow techniques to:

a) Calculate the IRR
c) State for what range of capital costs project A is to be preferred to project B and suggest reasons for this.

The following information is given:

	Project A	Project B
	$	$
Initial cost (Year 0)	(100,000)	(100,000)
Net annual savings		
Year		
1	5,000	60,000
2	20,000	40,000
3	100,000	20,000
4	10,000	5,000

Example 3

Tantalus Ltd is considering the selection of one of a pair of mutually exclusive investment projects. Both would involve purchase of machinery with a life of five years. Details of the projects are summarised below:

	Years	Project 1	Project 2
		$	$
Machinery – Cost	0	14,000	31,320
– Residual value	5	300	6,020
Annual net cash inflows	1 to 5	4,000	8,000

The cost of capital is 15 per cent per annum.

Requirements

a) Calculate the net present value of each project

b) Calculate the internal rate of return of each project to the nearest one per cent

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4. Calculation of Internal Rate of Return

Generally speaking, internal rate of return (IRR) can only be estimated by trial and error, using different discount factors, followed by linear interpolation. There are, however, two instances where IRR can be established more accurately i.e.

Single year project

The IRR of a single year project can be calculated by mental arithmetic e.g.

Year	$m
0	(100)
1	125

The IRR of this project is: $\frac{\$125m - \$100m}{\$100m} = 25\%$

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Chapter 9 – Allowing for inflation and taxation in DCF

Objectives:

- *Apply and discuss the real-terms and nominal-terms approaches to investment appraisal.*
- *Calculate the taxation 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.*

1. Inflation and Discounted Cash Flow

The mechanics of allowing for inflation are basically easy to handle in DCF calculations. The real difficulty is one of predicting what the rate will be. At this point we will discuss the mechanics.

There are two possible techniques:

1) Discount 'money' (nominal) cash flows at the 'money' (nominal) discount rate.

2) Discount 'real' cash flows at the 'real' discount rate

'Money' cash flows are the predictions of the actual sums of money which will be received and paid taking into account predicted inflation levels. The 'money' rate of interest is the interest rate which is normally quoted and contains an allowance for inflation (for example, a 20% discount rate may contain an allowance for expected inflation of 5%).

'Real' cash flows are cash flows expressed in today's prices. A 'real' discount rate is the real required rate of return after adjusting the money discount rate for the inflation allowance.

2. Relationship between money interest rates and real interest rates

Suppose we can invest money in a bank to earn 7% per annum interest. However, we expect inflation to be 4% per annum next year.

If I invest $1 this must grow to $1.04 to keep pace with inflation. So, if I have $1.07 cash in the bank after one year, the real interest I have received is $1.07 - $1.04 = 3p. When compared with the capital required to keep pace with inflation ($1.04), this shows a return of 0.03/1.04 = 2.9%.

The formula which relates real and money interest rates is as follows:

$$1 + r = \frac{1 + m}{1 + i}$$

Where r is the real interest rate, m is the money interest rate and i is the rate of inflation.

Thus 1 + r = 1.07/1.04 in the above example, giving r = 0.029 or 2.9%.

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Example 1

A project requires an outlay of $1.5m in year 0 and will repay cash flows in real terms (today's prices) as follows:

Year	$'000
1	670
2	500
3	1,200

The company's money cost of capital is 15½%. Appraise the project if inflation is estimated to remain at 5% per annum.

3. Taxation and Investment Appraisal

Example 2

A company buys a fixed asset for $10,000 at the **beginning** of an accounting period (1 January 2001) to undertake a two year project. Its year end is 31 December.

Net trading revenues at t_1 and t_2 are $5,000 per annum.

The company sells the fixed asset on the last day of the second year for $6,000.

Corporation tax = 33% Writing down allowance = 25% reducing balance
Tax is paid 1 year in arrears

Calculate the net cashflows for the project.

Example 3

A company buys a fixed asset for $10,000 at the **end** of the previous accounting period (31 December 2000) to undertake a two year project.

Net trading revenues at t_1 and t_2 are $5,000 per annum.

The fixed asset has zero scrap value when it is disposed of at the end of year 2.

Corporation tax = 33% Writing down allowance = 25% reducing balance

Calculate the net cashflows for the project.

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Chapter 10 – Adjusting for risk and uncertainty in investment appraisal

Objectives:

- *Describe and discuss the difference between risk and 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 and discuss other techniques of adjusting for risk and uncertainty in investment appraisal, including:*
  - *simulation*
  - *adjusted payback*
  - *risk-adjusted discount rates*
- *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:*
  - *the calculation of profitability indexes for divisible investment projects*
  - *the calculation of the NPV of combinations of non-divisible investment projects*
  - *a discussion of the reasons for capital rationing*

1. Risk and Uncertainty

Risk occurs where there are several possible outcomes for each component of a decision and probabilities *can* be assigned for each possible outcome. This allows for the calculation of an expected value based upon the probability of each outcome.

Uncertainty occurs where there are several possible outcomes, but the probability attaching to each *cannot* be established.

2. Sensitivity analysis

A technique which assesses the effect on an overall decision if a single constituent variable were to change i.e. how sensitive is the investment decision to a change in a single aspect (e.g. sales revenue, material price, project life, etc). This allows for the consideration of a range of possible outcomes. Sadly the technique does not take into account the interdependence of the variables i.e. the technique ignores the interaction of the constituent variables.

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Procedure

Firstly, calculate the expected NPV, using the best estimates available;

Then, calculate for each input factor (e.g. initial investment, sales price, wage rate, discount rate, residual value, etc) the necessary percentage change which would cause the NPV to become zero.

To find the percentage change required to achieve an NPV of zero, the calculation is as follows:

$$\% \text{ change} = \frac{\text{NPV of project}}{\text{PV of cash flows affected by the variable}} \times 100$$

Illustration

An expected NPV has already been calculated for the following project

	t = 0	1	2	3
Cash flows	(1,500)	670	500	1,200
Disc factor 10%	1.000	0.909	0.826	0.751
	(1,500)	609	413	901

NPV 423.2

% change = NPV of project / NPV of cash flows

initial investment		423.2 / 1,500 x 100% =		28%
t= 1	PV	609	423.2/ 609 x 100% =	69%
t = 2	PV	413	423.2 / 413 x 100% =	102%
t = 3	PV	901	423.2/901 x 100% =	47%

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3. Probability and Expected Values

A probability distribution of expected cash flows could be estimated and used to calculate the expected value of the NPV and measure risk (normally the standard deviation of that NPV). This aspect will be demonstrated during the lectures dealing with the capital asset pricing model.

This expected value is unlikely to be the same amount as one of the specific outcomes, since it is based upon a weighted average calculation. Whilst the expected value is simple to calculate and easy to understand, it does suffer from the following limitations:

- Probabilities usually have to be estimated and therefore may be inaccurate or unreliable;
- Expected values are long-term averages, which assume repetition of the task and may clearly be inappropriate for one off projects;
- Does not take into account the decision maker's attitude to risk – think of a gambler!

- May not take into account the time value of money.

4. Simulation

A mathematical model which will include all combinations of the potential variables associated with a project. It results in the creation of a distribution curve of all possible cash flows which could arise from the investment and allows for the probability of the different outcomes to be calculated. The steps involved are as follows:

1. Specify all major variables
2. Specify the relationship between those variables
3. Using a probability distribution, simulate each environment.

The advantage of this technique is that it includes all foreseeable outcomes. The disadvantages are the difficulty in formulating the probability distribution and the mathematical model can become extremely complex.

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5. Capital Rationing

Where the finance available for capital expenditure is limited to an amount which prevents acceptance of all new projects with a positive NPV, the company is said to experience "capital rationing". There are two types of capital rationing i.e.

a) **Hard capital rationing** – This applies when a company is restricted from undertaking all worthwhile investment opportunities due to external factors over which it has no control. These factors may include government monetary restrictions and the general economic and financial climate (e.g. a depressed stock market, which precludes a rights issue of ordinary shares).

b) **Soft capital rationing** – This applies when a company decides to limit the amount of capital expenditure which it is prepared to authorise. Segments of divisionalised companies often have their capital budgets imposed by the main board of directors.

A company may purposely curtail its capital expenditure for a number of reasons:

i) It may consider that it has insufficient depth of management expertise to exploit all available opportunities without jeopardising the success of both new and ongoing operations.

ii) It may be deliberate board policy to restrict the capital budget to concentrate managerial attention on generating only the very best and most carefully analysed proposals. In this regard, self-inflicted capital rationing may impose rigid quality control.

iii) Many companies adopt the policy of restraining capital expenditure to the amounts which can be generated by internal resources. This reluctance to use the external capital markets may be due to a risk-averse attitude to financial gearing. Alternatively, it may be due to reluctance to issue equity for fear of diluting earnings. In the case of an unlisted company, there may be a reluctance to seek a quotation owing to the time and expense involved and also the dilution of ownership.

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Capital rationing may exist in a:

a) **Single period** i.e. available finance is only in short supply during the current period, but will become freely available in subsequent periods. Projects may be:

   i) **Divisible** – An entire project or any fraction of that project may be undertaken. In this event projects may be ranked by means of a **profitability index**, which can be calculated by dividing the present value (or NPV) of each project by the capital outlay required during the period of restriction.

   Projects displaying the highest profitability indices will be preferred. Use of the profitability index assumes that project returns increase in direct proportion to the amount invested in each project.

   ii) **Indivisible** – An entire project must be undertaken, since it is impossible to accept part of a project only. In this event the NPV of all available projects must be calculated. These projects must then be combined on a trial and error basis in order to select that combination which provides the highest total NPV within the constraints of the capital available. This approach will sometimes result in some funds being unused.

b) **Multi-period** i.e. available finance is limited not only during the current period, but also during subsequent periods. Projects may be:

   i) **Divisible** - In this event linear programming would be used to determine the optimal combination of projects.

   ii) **Indivisible** - In this event integer programming would be required to determine the optimal combination of investments.

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Example 1

A highly geared company wishes to expand its operations. Six possible capital investments have been identified, but the company only has access to a total of $620,000. The projects are not divisible and may not be postponed until a future period. After the projects end, it is unlikely that similar investment opportunities will occur.

Expected net cash inflows (including salvage value)

	Year 1	2	3	4	5	Initial outlay
A	70,000	70,000	70,000	70,000	70,000	246,000
B	75,000	87,000	64,000			180,000
C	48,000	48,000	63,000	73,000		175,000
D	62,000	62,000	62,000	62,000		180,000
E	40,000	50,000	60,000	70,000	40,000	180,000
F	35,000	82,000	82,000			150,000

Projects A and E are mutually exclusive. All projects are believed to be of similar risk to the company's existing capital investments.

Any surplus funds may be invested in the money market to earn a return of 9% per year. The money market may be assumed to be an efficient market. Banden's cost of capital is 12% per year.

a) Calculate:

i) The net present value of each project;

ii) The NPV per $1 invested to give an expected profitability index associated with each of the six projects;

Rank the projects according to both of these investment appraisal methods and explain briefly why these rankings differ;

b) Give reasoned advice recommending which projects should be selected.

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6. Lease and Buy Decisions

The Lease v. Buy decision is a contentious area, but the approach described below should be acceptable. Two decisions are involved i.e.

- Is the asset worth acquiring? (the investment decision)
- Should it be bought or leased? (the financing decision)

It is probably convenient to make the **financing decision** first. As leasing carries financial risk which is equivalent to borrowing and buying, the cash flows which are specific to each alternative should be discounted at the **after tax cost of borrowing.** The cheapest alternative should be selected.

- Borrow and buy cash flows include the purchase price of the fixed asset, tax relief on capital allowances, disposal value and maintenance costs specific to the asset purchased;

- Leasing cash flows include lease rentals (which are commonly annually in advance), tax relief thereon and specific maintenance costs incurred by the lessee.

Having made the financing decision, the cost of the cheapest financing alternative can be included as a time 0 cash outflow relevant to the **investment decision**. The investment decision will be made by computing the NPV of the project's cash flows at the company's **weighted average cost of capital.** This is effectively a normal NPV calculation.

Example 2

A company is considering the acquisition of a new machine with an economic life of five years. The machine will reduce operating cash flows by $2,100,000 p.a. for five years. Decide whether the company should lease or buy the machine, taking account of the following details:

Lease
A payment in advance of $1,500,000 p.a. for 5 years.

Buy
Cost of outright purchase is $6,400,000. Capital allowances of 25% p.a. on a straight line basis are available.

The appropriate cost of capital for the operating cash flows is 20% p.a., whilst the after tax cost of debt has been calculated at 12% p.a. Corporation tax is payable at 35% p.a., one year in arrears.

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7. Asset Replacement Decisions

The asset replacement problem is concerned with the decision to replace existing operating assets.

The two questions to be evaluated are:

- When should the existing equipment be replaced?
- What should be the replacement policy thereafter (i.e. the future replacement cycle)?

There are three possible methods to deal with the different timescales involved in comparing alternative replacement cycles:

- Finite time horizon
- Lowest common multiple (LCM) of periods
- Equivalent annual cost (EAC) using annuity factors (the most sophisticated method)

Example 3

A machine cost $1,000. It may be replaced every 2 or every 3 years. The residual value will be $300 at the end of the second year or $100 at the end of the third year. If kept for 3 years an overhaul costing $100 will occur at the end of the second year.

The appropriate cost of capital is 10% p.a.

Example 4

Let us now assume that the above asset will replace an existing machine, which has a current disposal value of $240. Alternatively this existing asset could be kept for a further year, in which case there would be additional maintenance costs of $300 and the disposal value at the year end is expected to be just $30. Using this information we can decide whether to replace the existing asset immediately or in one year's time.

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Example 5

A machine which could be used in production for two more years at most originally cost $45,000 five years ago. Its realisable value is currently $8,000 (because a special opportunity for sale has arisen), but it would be zero at all subsequent times.

A new model of the machine is now being marketed. It costs $40,000 and has a maximum life of 10 years provided that special maintenance is undertaken at a cost of $10,000 after five years and at a cost of $20,000 after eight years. The new model would have no realisable value at any time.

Assume that no other models are expected to become available in the foreseeable future, and that no changes are expected in costs or demand for output of the machine. Demeter's cost of capital is 15 per cent per annum.

Ignoring taxation, prepare calculations to show whether the existing machine should be replaced now or after five, 8 or 10 years

8. Use of profitability index in investment appraisal

We can identify three types of decision environment in investment appraisal:

1) Plenty of funds, plenty of projects
2) Plenty of funds, shortage of projects
3) Shortage of funds, plenty of projects

1) In this situation, we can use a simple accept/reject mechanism in our decision making. If the NPV of a project is positive, we accept the project. If the NPV is negative, we reject the project.

2) In this situation, we have a scarcity of projects, often due to lack of space or lack of manpower. In such cases we wish to maximise the absolute returns from the available projects, irrespective of how much capital they use.

3) This sort of problem is known as a capital rationing situation. Project selection involves not only determining whether the NPV is positive or negative, but also ranking the projects with positive NPV's. The use of a profitability index is only relevant for single period capital rationing, where projects are divisible. It will indicate the efficiency with which each competing project uses the scarce capital. Project selection can then be made to the best advantage of the company according to this ranking.

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Chapter 11 – Sources of and raising short-term finance

Objectives:

- *Identify and discuss the range of short-term sources of finance available to businesses, including:*
  - *overdraft*
  - *short-term loan*
  - *trade credit*
  - *lease finance*
- *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.*

1. Sources of short-term finance

Bank overdrafts

If cash outflows from a bank current account exceed inflows for a temporary period, a clearing bank may provide an overdraft. Overdrafts may be arranged speedily, but are subject to review by the bank, may be renewable and offer a level of flexibility, whilst interest is only paid on the overdrawn amount.

Overdrafts are technically repayable on demand and may require some form of security or guarantee. Interest is often payable at a variable rate (i.e. base rate plus a premium) and an arrangement fee is normally payable upon the initial grant of the facility.

Short-term loans

Bank loans are an agreement for the provision of a specific fixed sum for a predetermined period at an agreed interest rate. A term loan is provided in full at the start of the loan period and is repaid at a specified time or in instalments over a period of agreed dates.

Bank loans are only repayable on the agreed dates, but are more expensive and less flexible than overdrafts. The terms of the loan must be adhered to and the bank may impose loan covenants with which the borrower must comply.

Trade credit

This topic is dealt with in detail in your lecture note on Working Capital Management. Raw materials are normally purchased on credit and this effectively represents an interest free short-term loan. It is important to remember that payment delays would worsen the credit rating of the company and that additional credit may then be difficult to obtain. The loss of settlement discounts that suppliers may offer for early payment must be considered.

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Lease finance – operating lease

Instead of the outright purchase of a non current asset, a company may choose to obtain the temporary use of that asset by means of an operating lease, whereby the risks and rewards of ownership are retained by the lessor (i.e. the legal owner).

An operating lease contract between a lessor and lessee is for the hire of a specific asset, whereby the lessee has possession and use of equipment for a period which is shorter than the economic useful life of the asset, but the lessee is committed to pay specified rentals during the period of the lease. The lessor is normally responsible for repairs and maintenance and the lease can sometimes be cancelled at short notice.

Lease finance – finance lease

A long-term leasing arrangement is likely to be finance lease, i.e. a lease that transfers substantially all the risks and rewards incidental to the ownership of an asset to the lessee. Legal title may or may not eventually be transferred.

The lessor is likely to be a bank or other financial institution, which does not normally trade in the type of asset concerned. The lessee normally becomes responsible for the cost of repairs and maintenance.

The substance of a finance lease arrangement is that the lessee is effectively borrowing in order to have use of a non-current asset for substantially the whole of its useful economic life and thereby becomes liable for all lease payments. In contrast, an operating lease is equivalent to the short-term rental of an asset from an organisation which normally trades in that type of asset.

Venture capital

Venture capital is the provision of risk bearing capital, normally provided in return for an equity stake in companies with high growth potential.

The 3i Group (a member of the FTSE 100 Index) is one of the world's oldest venture capital organisations and is involved in schemes in Europe, the USA and the Far East. The 3i Group is prepared to invest in companies with a highly motivated management team, having a well defined strategy and target market, which are committed to innovation and a proven ability to outperform competitors.

Venture capitalists may provide finance for business start-ups, the development of existing businesses, management buyouts and the realisation of the investments of existing owners who wish to exit their companies.

Where company directors seek assistance from a venture capitalist they must expect that the institution will require an equity stake in the company, need convincing that the business will be successful, seek representation on the company's board of directors,

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demand exceptional returns on their investment and expect an obvious ultimate exit route.

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2. Small and medium-sized entities (SMEs)

The funding gap

SMEs normally have difficulty obtaining equity finance from third parties. They normally rely on finance from retentions, bank borrowings and rights issues. Such companies are often considered risky, since they may not have an established track record, lack the necessary assets to offer as security, have inexperienced management and inadequate financial control systems.

The funding (or equity) gap becomes crucial when they wish to expand beyond their limited sources of finance, but are not yet mature enough for a stock market quotation.

A major problem for SMEs in obtaining equity finance is their inability to offer an easy exit route for any investors wishing to dispose of their shares. The company could, of course, purchase its own shares back from shareholders, but this uses cash that could be more profitably employed elsewhere in the business of the company.

The maturity gap

This presents a further problem for SMEs, who may ideally wish to obtain medium-term loans. This arises due to the mismatching of the maturity of assets and liabilities. Since the SME can secure long-term loans with mortgages against their property assets, they find that longer term borrowing is much easier to obtain than the medium term loans that they require.

Investors

Due to lack of security and a risk-averse attitude, banks have been reluctant to make large investments in SMEs. However, investment has become more readily available from:

- Venture capitalists (as above)
- Business Angels – These are wealthy private individuals prepared to invest in start-up or expanding companies. Business Angels provide more modest sums than venture capitalists. They normally wish to obtain an equity holding and this will permit the company to gain access to the Angel's network of contacts and accumulated business experience.

Government initiatives – equity investment

Governments have been keen for these types of businesses to grow and develop. To assist them in obtaining external equity finance, the government has offered tax incentives:

- The Enterprise Investment Scheme (EIS) – Tax incentives are given to individuals prepared to make equity investments in unquoted trading companies;

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- Venture Capital Trusts (VCT) – Listed investment trust companies which invest in a portfolio of small unquoted trading companies. Tax reliefs are granted to individuals investing in VCTs.

Market initiatives

Most companies would find the cost of obtaining a full stock market listing to be too high for the potential benefits they would receive. To combat this, the Alternative Investment Market (AIM) was developed. This allows companies to have a quotation, but the requirements are not as onerous as for a main market listing.

Debt finance

When borrowing from banks or other financial institutions, the directors of SMEs would normally be required to provide a personal guarantee or additional personal security to the lender. This type of restriction hampers the full development of viable companies and may even encourage entrepreneurs to set up their business in other jurisdictions

Government initiatives – debt finance

There are various central and local government driven initiatives to assist small businesses.
The levels of assistance and restrictions have generally meant that SMEs still require other sources to fund their activities. Government initiatives take the form of:

- Business links – A service providing advice and information to those wishing to start-up or to expand their business;
- Financial assistance – Loan guarantees, grants and loans. Whilst a detailed knowledge of these is not required, examples of government assistance include:

    - Small Firms Loan Guarantee Scheme (SFLGS)
    - Regional Selective Assistance (RSA)
    - Enterprise grants
    - Regional innovation grants
    - Small firms training loans
    - European Investment Bank (EIB) and European Investment Fund (EIF) schemes

The above forms of government assistance are set out in some detail in the Kaplan Study Text.

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Chapter 12 – Sources of and raising, long-term finance

Objectives:

- Identify and discuss the range of long-term sources of finance available to businesses, including:
  - equity finance
  - debt finance
  - lease finance
  - venture capital
- Identify and discuss methods of raising equity finance, including:
  - rights issue
  - placing
  - public offer
  - stock exchange listing

1. Stocks and shares

These are the two main types of security dealt in on the London Stock Exchange. Their features are as follows:

Stocks

Historically, stock was the universal unit for all investment. Today it remains the normal unit only for government securities, water undertakings, and company debentures and loan stock. N.B. the securities issued for loans raised by the U.K. government are termed "gilt-edged".

The price of all stock is quoted per $100 nominal of stock (the unit in which it is commonly traded), thus a quotation of (say) $62.50 is the cost of $100 worth of stock. However, purchases and sales of government securities can be made in fractions as small as one cent e.g. $594.81 of stock.

Shares

Shares have a fixed par (or nominal) value which is the unit in which these are traded. Commonly shares have par values of 5c, 10c, 20c, 25c or 50c, and dealings are always in quantities of shares (never in fractions). Some companies have followed the American example and renamed their shares as "stock", but for practical purposes there is no difference between the terms.

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2. Types of Security Issued By Companies

The London Stock Exchange is the third biggest in the world (after New York and Tokyo). It deals in thousands of securities.

Included are many enterprises – banks, beverages, general retailers, leisure and hotels, mining, support services etc, etc. Their securities can be broadly divided according to the clearly defined priorities as to the payment of interest or dividends and the repayment of capital. The order of priorities is:

1. Fixed interest debentures or loan stock (the safest)
2. Preference share capital
3. Equity share capital (the riskiest)

3. Fixed Interest Capital

Fixed interest capital raised by companies is sometimes referred to as "bonds" or as "debt".

This falls into two categories, the nature and rights of which are:

1. Debenture stocks

These are first in the priority ranking. Like a mortgage, they are secured on the company's assets. Interest at a fixed rate is normally payable half-yearly on specified dates. The interest is due whether profits are earned or not. Should the company fail to pay interest (because of losses or lack of cash) or be unable to meet repayment of capital when due, debenture-holders have powers to put in a receiver to take action to protect their interest. It is usual for responsible financial bodies such as banks to be trustees for the debenture stock; they can take the necessary steps to see that the debenture terms are followed. Debentures may be:

a) **Irredeemable**, which means that only the company has the power of repayment so long as the issue terms are met. Such repayment does not normally happen until the company goes into liquidation; it merges with another company; or there is a takeover.

b) **Redeemable**, at par or at a premium on a specified date or dates, or over a period of years. Repayment options over a period of years may provide for redemption at premium rates. In this event, the terms might be, say: 2009 at 105; 2010 at 104; 2011 at 103; 2012 at 102; 2013 at 101; and 2014 at 100.

2. Loan stocks

While many issues are **secured** like a debenture, the majority are **unsecured** and in a liquidation rank with other unsecured creditors after any secured debenture stock. Interest is almost always a fixed rate payable half-yearly. The life is a fixed number of

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years or is spread over several years. Trustees have similar powers to those generally applying to debentures. Loan stocks may be:

a) **Convertible**, which is a useful way to raise capital on cheaper initial terms than an ordinary loan stock or, when issued on a takeover, it is desired to give shareholders in the victim company the attraction of a continuing but deferred equity interest. The basis of a convertible is to give holders the benefit of a fixed income plus the option to switch into ordinary shares if the issuing company prospers. Conversion may be at one fixed date or be spread over a number of years at increasing prices per ordinary share.

b) **Deep discount (or zero coupon) stocks** are an American innovation, which have yet to become popular in the U.K. Broadly, the interest rate is nil or well below normal rates; the issue price is far below that for a conventional stock; and repayment is at par of $100 per cent. Borrowers benefit from not having to pay interest during, say, a period when money is needed to develop a project which will not be revenue-producing for some time ahead. Lenders can benefit from the deferral of a high-rate income tax liability by partially deferring assessments until the time, such as retirement, when their top tax rates may have fallen or be no longer applicable to their reduced incomes.

c) **Warrants**, which are, in effect, an alternative form of conversion right attached to a loan stock. They give the right on detachment to subscribe for ordinary shares at a stated price or prices on a specific date or series of dates. A holder thus has a fixed interest stock plus an option to become an equity shareholder. Detachable warrants are dealt in separately from the loan stock

4. Preference Share Capital

These were not a popular form of finance for some years. A change however, began in 1978. A growing number of companies then started to use preference shares as a means to increase the income of ordinary shareholders suffering under dividend limitation by making scrip issues in the form of preference shares. Others made high-yielding rights offers of preference shares to raise new capital. Whatever their nature, the position of preference shares in the capital hierarchy of a company is that they come after debenture and loan stocks but before equity shares for their dividends and commonly have priority for repayment in liquidation.

Most issues have a fixed rate of dividend, payment of which depends on the earning of sufficient profits. Most issues are also **cumulative**, which means that if there are insufficient profits to pay the fixed dividend in one year the arrears are carried forward for payment out of any future profits. A few issues are, however, **non-cumulative**, which means that an unpaid dividend is lost.

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Categories of preference shares (sometimes called preferred shares) include:

a) **Redeemable preference shares** are part of the capital of some companies. Redemption may be at par or at a premium at a specified date or dates, or may come into force on a merger or takeover.

b) **Participating preference shares**, of which there are a very few issues. After paying a fixed minimum dividend extra payments are made which may be related to dividends on the equity shares or be a proportion of surplus profits.

c) **Convertible preference shares** are issued by some companies on terms which are akin to those of convertible loan stocks.

Although preference shareholders are part-owners of a company, they have normally little to say in its operations. Only a relatively small proportion have voting rights. Votes normally arise only in specified circumstances such as changes in a company's constitution e.g. failure to pay dividends, increases in the company's borrowing powers etc.

5. Equity Share Capital

Equity shares, which are commonly called ordinary shares, rank last in the company capital structure. They take what is left of profits and assets after all the demands of security-holders with priority rights have been satisfied. As risk capital, they come out best if a company prospers, just as they shoulder all or most of the losses if things go wrong.

Companies are capitalised in different ways. They may have one or more issues of debentures, loan stock and/or preference shares, but with major risk ventures such as oil exploration (whose success depends on finding one profitable commodity) the entire capital would be in ordinary shares.

Whilst profits are allocated in order of priority of capital, this does not mean that all available profits are necessarily paid in dividends. In fact prudence would dictate that part of the profits are ploughed back to help finance expansion or act as a buffer against future losses. In normal times, the average company puts up to one-half or more of its surplus to reserves. And, as happened many years ago, governments may impose restrictions which limit dividend increases to (say) 10% p.a.

Equity shares come in two main classes:

a) **Ordinary shares** whose distinction is that they carry full voting rights. Their owners (in theory) control the business.

b) **Voteless shares** (or those which have only limited voting rights like one vote per five or ten shares). They are often described as 'A' ordinary or non-voting ordinary. The 'A' distinction has no legal definition and is simply the outcome of custom. The institutional shareholders (e.g. pension funds) have shown strong opposition to these types of shares. The result is that the few remaining

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companies with 'A' shares are tending to enfranchise them. The only advantage of such shares is that they get the same dividend as the ordinary shares, but can usually be bought at lower prices to give somewhat bigger yields.

Two variations on the theme of equity shares are:

- **Deferred shares** (of which there are very few issues) are in effect the reverse of the 'A' shares, the objective being to give them greater voting rights than the ordinary shares and/or a bigger share of profits remaining after paying a minimum dividend on the latter. Deferred shares are often taken up by the founders of the company, who wish to retain substantial voting rights following a flotation (i.e. an initial public offering).

- **Common stock** is the American term for equity. They may have a par value of $1 or some other amount. Or they may have no par value, which means that they can be written into balance sheets at amounts decided by the directors.

An important development in the early 1980's was that companies incorporated in the U.K. can take powers under certain conditions to buy-back or redeem their own equity shares. This means that although the powers are not so wide or flexible as those practiced in the United States, U.K. companies taking them can use excess cash balances to reduce the share capital on which dividends are payable.

6. Share Issues

A company seeking to obtain additional equity funds may be:

a) an unquoted company wishing to issue new shares, but without obtaining a stock market quotation;

b) a company which is already listed on the Stock Exchange wishing to issue new shares;

c) an unquoted company wishing to obtain a stock market quotation i.e. a flotation or initial public offering (IPO).

Methods by which an unquoted company can obtain a quotation on the Stock Exchange are:

- an offer for sale;
- an offer for sale by tender;
- an offer for subscription;
- a placing;
- an introduction.

The Stock Exchange ground rules for "going public" are that the company must be valued at a minimum size and normally 25% of the share capital must be made available to the public. In addition to the size qualification, a company must have a satisfactory trading

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record for a period of at least three years preceding the application for listing and be in a financially stable position.
When an application for listing is made, the board of directors must adopt as a resolution the terms and conditions of "The Listing Rules" which include the acceptance of rather onerous "Continuing Obligations".

1. Offer for sale

When an unquoted company's flotation involves the sale of existing shares, the offer for sale is usually made by an Issuing House or merchant bank on behalf of the vendors (i.e. existing shareholders). The Issuing House buys the shares from the vendors at an agreed price and sells them to the public at an offer price. The difference between the buying and selling prices represents a commission, usually about 2%, which is effectively charged against the vendors. When new shares are issued by a company and offered to the public in a flotation, the vendor would be the company itself.

Whenever a company goes public, the Stock Exchange will require that a sufficient number of shares are made available so that a ready market exists, and there is no shortage of supply for would be investors. It is therefore generally ruled than an offer for sale will only be allowed if 25% or more of the company's equity is subject to the offer. Exceptions to the rule may be allowed if a smaller issue is still sufficient to create a ready market, so that when Pilkingtons went public (some years ago), only 10% of its shares were put on offer.

2. Offer by tender

It is often very difficult for the Issuing House to decide upon the right price at which the shares should be offered to the general public. One way of trying to ensure that the issue price reflects the value of the shares as perceived by the market is to make an offer for sale by tender. However this method is very rarely used.

Under this method a minimum price will be fixed and subscribers will be invited to tender for shares at prices equal to or above the minimum. The shares will be allotted at the highest price at which they will all be taken up. This is known as the striking price.

3. Offer for subscription

In an offer for subscription, or prospectus issue, a company offers its own shares to the general public. An Issuing House or merchant bank may act as an agent, but not as an underwriter. This type of issue is therefore risky, and is very rare. Well known companies making a large new issue may use this method, and the company would almost certainly already have a quotation on the Stock Exchange.

4. Stock Exchange placings

When it is unlikely that an offer for sale will be fully subscribed, or an offer for sale would prove too expensive or uneconomical for the issuing company, a placing may be possible. A placing is an arrangement whereby the shares are not offered to the general public, but

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are 'placed' – i.e. offered and sold privately – to a number of institutions, such as pension funds and insurance companies. The placing will be made on behalf of the company by an Issuing House or stockbroker.

The Stock Exchange will still require that the shares of the company must have a ready market for both buyers and sellers, so that if an unquoted company uses a placing to obtain a quotation, some of the shares must be made available to market makers.

5. Stock Exchange introductions

By this method of obtaining a quotation, no shares are made available to the market, neither existing nor newly-created shares; nevertheless, the Stock Exchange grants a quotation. This will only happen where shares in a company are already widely held, so that a market can be seen to exist.

It may therefore be asked why a company should want an introduction? The reasons would be greater marketability for the shares, a known share valuation for Inheritance tax purposes and easier access to additional capital in the future.

7. Miscellaneous Aspects

1. Underwriters

A company about to issue new securities (in order to raise finance) would find it advisable to have the issue underwritten. Underwriters are financial institutions which agree (in exchange for a fixed fee, usually 1 – 2% of the finance to be raised) to purchase at the issue price any securities which are not subscribed for by the investing public.

2. Bonus (or scrip) issues

There need be no limit to the accumulation of reserves out of profit retentions. Their total may, however, become disproportionately large in relation to the ordinary capital. The imbalance can be adjusted by **scrip** or **capitalisation** issues of new shares, which for instance may be one new share issued for every two held – two shares become three. Nothing is, of course, added to the value of a holding. The operation is simply a reduction in reserves with a corresponding increase in issued ordinary capital.

Scrip issues must not be confused with **scrip dividends**, which arise where ordinary shareholders opt for newly created shares in the company of a similar monetary value to the cash dividend to which they would have been entitled. Due to changes in tax legislation and accounting regulations, UK companies have now abandoned scrip dividend schemes.

Share-splits are very similar to bonus issues. However instead of reducing reserves, one ordinary share (of say, 5c nominal value) is withdrawn and replaced by say, 5 new ordinary shares (of 1c nominal value).

3. Rights issues

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A rights issue is a method of raising new share capital by means of an offer to existing shareholders, inviting them to subscribe cash for new shares in proportion to their existing holdings. It is by far the most common way in which new share capital is raised. A rights issue may be made by any type of company, private or public, listed or unlisted.

The offer price will usually be lower than the current market price of existing shares, so that there is a 'market discount' in the price. The size of the discount will vary, and will be larger for difficult issues. As a general guide, however, the average size of discount has historically been between 20% to 30% (so that if the current market price of a share was, say, $2, the company would issue rights to shareholders enabling them to buy new shares at a price of, say, $1.40 or $1.60 each).

The offer price must (by law) be at or above the nominal value of the shares – so as to avoid issuing shares at a discount. Where the current market price of shares is below the nominal value, or only very slightly above it, a rights issue would therefore be impracticable.

8. Investment Ratios

The ratios and calculations which follow are commonly used by investors and analysts when studying company published financial statements. They are also employed by financial management when planning the financial structure of an enterprise.

1. Total market capitalisation

This demonstrates the total market value of the called-up share capital of a company. Normally it is applicable to the called-up ordinary share capital, thus:

Total market capitalisation = Number of called-up ordinary shares x middle market price

However, it could equally apply to the preference share capital i.e.

Number of called-up preference shares x middle market price.

2. Price earnings ratio

The main use of the PE ratio is as a stock market indicator, which reflects the markets expectations for the future growth or decline in the earnings of a particular enterprise.

The PE ratio may be calculated as follows:

a) On the basis of a single ordinary share

$$\frac{\text{Mid-market price per share}}{\text{Earnings per share (EPS)}}$$

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You recall that EPS are after tax, minority interests, preference dividends and extraordinary items, **divided by** the number of called-up equity shares.

b) On the basis of the total called-up ordinary share capital

$$\frac{\text{Total market capitalisation of called up ordinary shares}}{\text{Profits after tax and preference dividends}}$$

3. Dividend yield

This measure is often referred to as "the yield". It is a measure of the rate of return represented by dividends (paid and/or proposed) for the year expressed as a percentage of the current quoted mid-price of the share.

Until early 1999, the dividend yield was commonly calculated on a gross basis i.e. with the addition of the related tax credit. Following changes to UK tax law, whereby tax credits could no longer be reclaimed, even by non-tax paying individuals, many newspapers (including the Financial Times) began quoting dividend yield on a net basis i.e. excluding any tax credit. Thus net dividend yield is calculated as follows:

a) On the basis of a single share:

$$\frac{\text{Cash dividend per share}}{\text{Quoted price}} \times \frac{100}{1}$$

b) On the basis of total called up shares:

$$\frac{\text{Total cash dividends}}{\text{Total market capitalisation}} \times \frac{100}{1}$$

4. Dividend cover

Ordinary dividend cover indicates the number of times on which the ordinary cash dividends (paid and proposed) are covered by the profit of the year available for distribution to equity shareholders. Dividend cover is therefore an indication of the ease of maintaining the dividend payment. It can normally be calculated as follows:

a) On the basis of a single ordinary share:

$$\frac{\text{EPS (as defined in IAS 33)}}{\text{Cash dividend per ordinary share}}$$

b) On the basis of total earnings and dividends:

$$\frac{\text{Total earnings}}{\text{Total cash dividends on ordinary shares}}$$

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Example 1

The following data relate to Henry plc

	Per share	Total
Earnings after tax and prior charges	40c	200,000
Cash dividends on 500,000 $1 ordinary shares	18c	90,000
Retentions	22c	110,000

The current quoted mid-price per share is $3.20, and the current rate of tax credit on gross dividends is 10% (i.e. 1/9 of net dividends)

Calculate:
a) Total market capitalisation
b) Price earnings ratio
c) Dividend yield
d) Dividend cover

Example 2

Xavier plc has 100 million shares in issue at a price of $2.96 each. The company wishes to raise a further $40 million by means of a rights issue at $2.00 each.

You are required to calculate:

a) The terms of the rights issue
b) The value of the company after the rights issue has taken place
c) The theoretical share price after the rights issue
d) The nil paid value of a right
e) The impact on the wealth of a shareholder currently holding 500 shares in the company.

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Chapter 13 – Islamic financing

Objectives:

- Explain the major difference between Islamic finance and other forms of business finance.
- Explain the concept of interest (riba) and how returns are made by Islamic financial securities.(calculations are not required)
- Identify and discuss a range of short and long term Islamic financial instruments available to businesses including
    i) trade credit (murabaha)
    ii) lease finance (ijara)
    iii) equity finance (mudaraba)
    iv) debt finance (sukuk)
    v) venture capital (musharaka)

1. Introduction

Also known as participant banking Islamic banking refers to a system of banking or banking activity that is consistent with the principles of Islamic law (Sharia) and its practical application through the development of Islamic economics.

The main principles of Islamic finance are that:

- Wealth must be generated from legitimate trade and asset-based investment. (The use of money for the purposes of making money is expressly forbidden.)
- Investment should also have a social and an ethical benefit to wider society beyond pure return.
- Risk should be shared.
- All harmful activities (haram) should be avoided.

While these principles were used as the basis for a flourishing economy in earlier times, it is only in the late 20th century that a number of Islamic banks were formed to apply these principles to private or semi-private commercial institutions within the Muslim community.

2. Haram – prohibited activities

Investments in businesses dealing with alcohol, gambling, drugs, pork, pornography or anything else that the Shariah considers unlawful or undesirable (*haram*)

Uncertainty, where transactions involve speculation, or extreme risk are seen as being akin to gambling. This prohibition, for example, would rule out speculating on the futures and options markets.

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3. Riba

The word "Riba" means excess, increase or addition, which according to Shariah terminology, implies any excess compensation without due consideration (consideration does not include time value of money).

The definition of riba in classical Islamic jurisprudence was "surplus value without counterpart", or "to ensure equivalency in real value", and that "numerical value was immaterial." During this period, gold and silver currencies were the benchmark metals that defined the value of all other materials being traded.

Applying interest to the benchmark itself made no logical sense as its value remained constant relative to all other materials: these metals could be added to but not created (from nothing).

4. Murabahah (trade credit)

This concept refers to the sale of goods at a price, which includes a profit margin agreed to by both parties. The purchase and selling price, other costs, and the profit margin must be clearly stated at the time of the sale agreement.

The bank buys the asset and then sells it onto its customer.

The bank is compensated for the time value of its money in the form of the profit margin. This is a fixed-income loan for the purchase of a real asset (such as real estate or a vehicle), with a fixed rate of profit determined by the profit margin. The bank is not compensated for the time value of money outside of the contracted term (i.e., the bank cannot charge additional profit on late payments); however, the asset remains as a mortgage with the bank until the default is settled.

Payment can be made by instalments. The bank is thus exposed to business risk because if its customer does not take the goods, no increase in the mark- up is allowed and the goods, belonging to the bank, might fall in value.

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5. Ijara (lease finance)

Ijara means lease, rent or wage. Generally, Ijarah concept means selling the benefit of use or service for a fixed price or wage. Under this concept, the Bank makes available to the customer the use of service of assets / equipment such as plant, office automation, motor vehicle for a fixed period and price.

Ijara is effectively an operating lease but can be structured with a transfer of ownership clause that makes it more like a finance lease.

An example of the *Ijara* structure is seen in Islamic mortgages. Under Islamic mortgages, the bank purchases a house then leases or rents it back to the customer. The customer makes regular payments to cover the rental for occupying or otherwise using the property, insurance premiums to safeguard the property, and also amounts to pay back the sum borrowed. At the end of the mortgage, title to the property can be transferred to the customer.

6. Sukuk (Islamic bonds)

Sukuk, plural of Sakk, is the Arabic name for financial certificates that are the Islamic equivalent of bonds. However, fixed-income, interest-bearing bonds are not permissible in Islam.

Sukuk are securities that comply with the Islamic law (Shariah) and its investment principles, which prohibit the charging or paying of interest. So that the *sukuk* are Shariah-compliant, the *sukuk* holders must have a proprietary interest in the assets which are being financed. The *sukuk* holders' return for providing finance is a share of the income generated by the assets.

Most *sukuk*, are 'asset-based', not 'asset-backed', giving investors ownership of the cash flows but not of the assets themselves. Asset-based is obviously more risky than asset backed in the event of a default.

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7. Mudaraba

"Mudaraba" is a special kind of partnership where one partner gives money to another for investing it in a commercial enterprise. The investment comes from the first partner who is called "rabb-ul-mal", while the management and work is an exclusive responsibility of the other, who is called "mudarib".

The Mudarabah (Profit Sharing) is a contract, with one party providing 100 percent of the capital and the other party providing its specialist knowledge to invest the capital and manage the investment project. Profits generated are shared between the parties according to a pre-agreed ratio. Compared to Musharaka, in a Mudaraba only the lender of the money has to take losses.

Mudaraba is essentially like equity finance in which the bank and the customer share any profits. The bank will provide the capital, and the borrower, using their expertise and knowledge, will invest the capital. Profits will be shared according to the finance agreement, but as with equity finance there is no certainty that there will ever be any profits, nor is there certainty that the capital will ever be recovered. This exposes the bank to considerable investment risk.

8. Musharakah (joint venture)

Musharakah is a relationship between two parties or more, of whom contribute capital to a business, and divide the net profit and loss pro rata.

All providers of capital are entitled to participate in management, but not necessarily required to do so. The profit is distributed among the partners in pre-agreed ratios, while the loss is borne by each partner strictly in proportion to respective capital contributions.

This concept is distinct from fixed-income investing (i.e. issuance of loans)

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Chapter 14 – Internal sources of finance and dividend policy

Objectives:

- *Identify and discuss internal sources of finance, including:*
  - *retained earnings*
  - *increasing working capital management efficiency*
  - *Explain the relationship between dividend policy and the financing decision*
  - *Discuss the theoretical approaches to, and the practical influences on, the dividend decision, including legal constraints, liquidity, shareholder expectations, alternatives to cash dividends*

1. Dividend Irrelevance Hypothesis

(a) Theory

The proponents of the dividend irrelevance hypothesis (Miller & Modigliani) claim that the value of a firm is determined by its future earnings stream. The way this stream is split between dividends and retentions has no impact upon shareholder wealth.

Given a set investment policy, a dividend cut now to finance new projects will be compensated by higher dividends at a later stage.

The shareholder will be indifferent to the dividend policy provided the PRESENT VALUE of dividend payments remains unchanged.

(b) Assumptions

- A set investment policy so that shareholders know the reason for withholding dividends
- No transactions costs
- No distorting taxes
- Share prices move in the manner predicted by the model

In the case of a withheld dividend, the shareholder can maintain his level of income by selling shares to generate 'home made' dividends, with no consequent decrease in wealth.

2. Dividends in an Imperfect Market

(a) Information Content (Dividend signalling)

- Dividends are an important current source of information
- Share price will increase if the dividend is greater than expected and vice versa. Tendency to over-react

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(b) Transactions costs

- Shareholder can no longer replace a withheld dividend by selling shares without incurring dealing commissions
- Company will benefit by financing investments from retained earnings to avoid the high costs associated with raising new finance

(c) Preference for current income

- It is sometimes argued that shareholders prefer high dividend payouts as they see these as more secure than capital gains (the “bird in the hand” theory)
- This argument is sometimes thought to be weak. Current dividends are safe, but so are current capital gains. Future dividends are just as uncertain as future capital gains.

(d) Distorting Taxes

- Individuals will generally prefer dividends to capital gains whether a basic-rate or higher-rate tax payer, subject to certain complications:

- exemption limit for capital gains tax
- non-tax-paying individuals
- tax-exempt institutions

3. Possible Approaches to Dividend Policy

(a) Stable Policy with Moderate Payout

- Stable level of dividends with occasional increases (where justified). This would avoid sharp movements in share price
- Moderate payout policy in order to sustain the level of dividends in the face of fluctuating earnings
- Very common approach for listed companies

(b) Constant Payout Ratio

- Constant proportion of earnings paid out as a dividend
- Not particularly suitable as dividends will fluctuate, causing erratic share price movements

(c) Residual Dividend Policy

- Remaining earnings, after funding all profitable projects, are paid out as dividend
- Tends to lead to fluctuating dividends and therefore not particularly suitable

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(d) Clientele Theory

- Consistent dividend policy is maintained which will attract a group of shareholders to whom the policy is suited in terms of tax, need for current income, etc

(e) Other considerations

- Legality, re distributable profits
- Existence of inflation and consideration of real profitability
- Growth and requirements for retained earnings
- Liquidity position
- Limited sources of funds (particularly for small companies)
- Stability of earnings

4. Alternatives to a Cash Dividend

During the last twenty years or so, a number of companies have established ways of rewarding shareholders other than by traditional dividend payments. These methods include:

(a) Shareholder perks

Several UK companies (notably hotel operators) offer discounts to shareholders on room bookings and restaurant meals. A number of transport companies offer reductions in fares. Some retailers provide discount vouchers, which are sent to shareholders at the same time as the annual report and accounts.

(b) Scrip dividends

When the directors of a company consider that they must pay a certain level of dividend, but would really prefer to retain funds within the business, they can introduce a scrip dividend scheme.

This involves giving ordinary shareholders the choice of a cash dividend or newly created shares in the company of a similar monetary value. Scrip dividend plans were very popular in the 1990s since they enabled companies to use share premium accounts to create the **new shares** (instead of reducing retained profits) and there were certain tax advantages for the company.

However a change in the accounting regulations subsequently forced companies to charge the profit and loss account with the scrip dividend, and a later change in UK legislation removed the tax advantages, which companies had enjoyed. Therefore UK companies abandoned scrip dividend schemes at the turn of the century.

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(c) Dividend reinvestment plans (DRIPs)

Since many companies had spent the 1990s persuading shareholders to take more shares in the company (rather than receive a cash dividend) shareholders were keen for an alternative to be offered when scrip dividend schemes were abandoned.

In the early years of the 21st century DRIPs were created. Shareholders opting for these schemes choose to have their dividends used to purchase **existing shares** in the company on the open market, through a special arrangement involving very low dealing charges and the payment of stamp duty.

(d) Share repurchases

Companies with cash surpluses, but having no positive NPV projects, may choose to introduce a share buy-back scheme, whereby the company's shares are purchased at the company's instructions on the open market.

This will have the effect of using up the surplus cash, increasing future EPS (because of the reduction in the number of shares in issue), changing the gearing level of the company and (hopefully) reducing the likelihood of a takeover. However share repurchases are often seen as an admission that the company cannot make better use of shareholders' funds.

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Chapter 15 – Sources of finance and their relative costs

Objectives:

- *Describe the relative risk-return relationship and the relative costs of equity and debt.*
- *Describe the creditor hierarchy and its connection with the relative costs of sources of finance.*
- *Estimate the cost of equity including:*
  - *Application of the dividend growth model and discuss its weaknesses.*
  - *Explanation and discussion of systematic and unsystematic risk*
  - *Relationship between portfolio theory and CAPM*
  - *Application of CAPM its assumptions, advantages and disadvantages*

- *Estimate the cost of debt:*
  - *irredeemable debt*
  - *redeemable debt*
  - *convertible debt*
  - *preference shares*
  - *bank debt*

- *Distinguish between average and marginal cost of capital.*
- *Calculate the weighted average cost of capital (WACC) using book value and market value weightings.*
- *Assess the impact of sources of finance on financial position, financial risk and shareholder wealth using appropriate measures including:*
  - *Ratio analysis*
  - *Cash flow forecasting*

1. Cost of Capital

Purpose - as a "discount rate" for NPV or "cut-off rate" for IRR

(N.B. Cost of Capital is sometimes denoted by the letter "r", whilst in other texts it is denoted by the letter "K". The note which follows uses the latter notation).

2. Cost of equity share capital

a) Retained earnings (an opportunity cost)

$$Ke = \frac{D}{Po \text{ (ex-div)}}$$

Example 1
Naylor plc is expected to pay a constant annual net dividend of 30c per ordinary share. The current market price per share is $2.30 (cum-div). The dividend is about to be paid. What is Ke?

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Fresh issue of equity

Two views:

i) $Ke = \frac{D}{Po - f}$

Example 2: Goodman plc wishes to finance a new project by the issue 40,000 ordinary shares of $2.50 each, out of which share issue (flotation) costs of 8% of issue price have to be paid. New shareholders expect constant annual dividends of 32.2c per share. What is Ke?

ii) Growth

The Dividend Growth model is:

$$Ke = \frac{Do\,(1 + g)}{Po} + g$$

$$= \frac{D_1}{Po} + g$$

Example 3:

Current cum-div price	$2.20
Impending dividend	20c
Expected growth p.a.	10%

Calculate Ke

Two methods of estimating future growth

i) Historical growth in dividends

Example 4: The dividends of Talbot plc over the last five years have been:

Year	Annual Net Dividends
2002	150,000
2003	172,000
2004	195,380
2005	230,100
2006	262,350

Estimate the historical growth rate as a prediction of future growth.

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ii) Use of Gordon growth approximation

$$g = br$$

where:

b = proportion of earnings retained p.a.
r = average return on reinvested funds

Strictly only applicable to all-equity companies, but is often used for geared companies as an approximation of growth rates.

Example 5: Establish an estimate of future growth and of Ke if:

Proportion of earnings distributed p.a.	60%
Average return on reinvested funds	10%
Current cum-div price	$1.08
Impending dividend	12c

Calculate Ke

3. Cost of preference share capital

$$Kps = \frac{D\ (net)}{Po(ex\text{-}div)}$$

4. Cost of debt

a) Irredeemable

$$Kd = \frac{Interest\ (1\text{-}t)}{Market\ Value\ of\ debt\ (ex\text{-}int)}$$

b) Redeemable

IRR exercise

Example 6: A 5% debenture is currently quoted at $92.84 (ex-int). It is redeemable at the end of 3 years at $100. Taking corporation tax at 30%, and ignoring the timing lag for tax savings, calculate Kd.

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5. Cost of convertibles

The cost of convertible debt is calculated in a similar manner to the calculation of the cost of redeemable debt, EXCEPT that in the final year, one must include the:

- redemption value of the debt, or
- conversion value of the debt

whichever is the GREATER.

6. Cost of Floating rate debt (e.g. bank loans)

The cost of floating rate debt (e.g. most bank loans and overdrafts) is the current interest rate being charged on such funds.

Accordingly, if a company is paying interest at LIBOR + 8% , when LIBOR is set at 5% p.a. and corporation tax rates are at 30%, Kd will be calculated as follows:

Kd = (5% + 8%) x (1 – 0.3) = 9.1%

7. Calculating the Weighted Average Cost of Capital (WACC)

Difficult to associate a project with a specific source of finance, as a pool of resources are available in order to invest in projects. Thus a WACC is an appropriate discount rate/cut off rate.

Example 7: Whyte plc has on issue:

a) 500,000 ordinary shares of $1 each, whose ex-div share price is $2. A constant dividend of 36c per share will be paid on these for several years hence.

b) 500,000 6% preference shares of $1 each, whose ex-div share price is 50c.

c) $1,000,000 10% irredeemable debentures, quoted at 75 (ex-interest).

Calculate the WACC assuming Corporation Tax at 40%.

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Example 8

The management of Hunt plc is trying to decide upon a cost of capital discount rate to apply to the evaluation of investment projects.

The company has an issued share capital of 500,000 ordinary $1 shares, with a current market value cum div of $1.17 per share. It has also issued $200,000 of 10% debentures, which are redeemable at par in 2 years and have a current ex-interest market value of $105.30 per cent and $100,000 of 6% preference shares, currently priced at 40c per share. The preference dividend has just been paid, and the ordinary dividend and debenture interest are due to be paid in the near future. (The preference dividend is shown net).

The ordinary share dividend will be $60,000 this year, and the directors have publicised

Their view that earnings and dividends will increase by 5% per annum into the indefinite future.

The fixed assets and working capital of the company are financed by:

	$
Ordinary shares of $1	500,000
6% $1 Preference shares	100,000
Debentures	200,000
Reserves	380,000
	1,180,000

Calculate the WACC. Assume corporation tax at 40% per annum

8. Main assumptions underlying use of WACC as the discount rate

1. Only under conditions of perfect capital markets will the costs of capital calculated represent the true opportunity cost of funds used.

2. The project must be small relative to the size of the company (i.e. it represents a marginal investment). This is because the costs of capital calculated refer to the minimum required return of marginal investors and therefore are only appropriate for the evaluation of marginal changes in the company's total investment.

3. Using the existing market value mix of funds as weights in the calculation assumes that in the long run funds will be raised in this proportion (i.e. in the long run the capital structure of the company will remain unchanged). This implies that the current gearing ratio is thought to be optimal.

4. No attempt is made to match a project with a particular source of funds. All funds are regarded as forming a pool out of which all projects are financed (the 'pool' concept).

5. The project is of average risk for the firm and will cause no change in the risk of the company as perceived by investors. This is because the cost of capital estimates are only valid for the existing level of risk in the enterprise.

Learn these and be able to critique them

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9. Justification for the use of WACC

Illustration:
Whyte plc has the following capital costs:

Ko	=	13.5%
Ke	=	18%
Kb	=	8%

Suppose that in March 20X8 the company proposes to raise debt at 8% to finance Project A whose IRR is 12%. Whyte plc accepts Project A since IRR > Kb.

Subsequently in June 20X8 Whyte plc considers the issue of equity at 18% to finance Project B whose IRR is 17%. However the company rejects Project B since IRR < Ke.

Is it logical to reject a project yielding 17%, whilst accepting one yielding 12%?

The use of WACC (at 13.5%) would have provided the logical answer i.e.

Reject Project A (with an IRR of 12%), and
Accept Project B (with an IRR of 17%)

Therefore generally do not test the viability of a project by reference to its specific financing source, but by reference to WACC.

The only exception to this rule is when the finance is provided (by e.g. a local authority or government department) to assist in the financing of a specific project undertaken for that agency.

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Nevada Plc

i) Nevada plc has issued 10 million ordinary shares of a nominal value of $1 each. Details of the company's earnings and dividends per share during the past four years are as follows:

Year ended 31 December	Earnings per share	Dividend Per share
20X3	35c	26c
20X4	33c	27c
20X5	43c	29c
20X6	42c	30c

The current (December 20X6) market value of each ordinary share of Nevada plc is $2.35 cum div. The 20X6 dividend of 30c per share is due to be paid in January 20X7.

Required

Estimate the cost of capital for Nevada plc's ordinary share capital.

ii) Ten years ago California plc issued $2.5 million 6% redeemable debentures at a price of $98 per cent. The debentures are redeemable six years from now at a price of $102 per cent. They are currently quoted at $59 per cent, ex interest.

Required

Estimate the cost of capital for California plc's redeemable debentures.

iii) The following figures are from the current balance sheet of Delaware plc

	$000
Ordinary share capital	
Authorised: 10,000,000 shares of $1	10,000
Issued: 8,000,000 shares of $1	8,000
Share premium account	2,000
Revenue reserves	6,000
Shareholders funds	16,000
12% Irredeemable debentures	4,000

An annual ordinary dividend of 20c per share has just been paid. In the past, ordinary dividends have grown at a rate of 10% per annum and this rate of growth is expected to continue. Annual interest has recently been paid on the debentures. The ordinary shares are currently quoted at $2.75 and the debentures at $80 per cent.
Tax is 20%

Required

Estimate the weighted average cost of capital for Delaware plc.

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10. Difficulties and uncertainties in estimating WACC

The concept of the cost of capital is perhaps the most difficult of all the DCF concepts and one about which there is still considerable controversy.

The approach taken above employs the weighted average cost of capital concept. It is based on the following basic principles:

i) The cost of capital required for investment appraisal is the cost of raising more capital in the market. The historical cost of existing capital is irrelevant. It is for this reason that current yields (returns related to current market prices) are used.

ii) It is assumed that the company will maintain approximately the same mix of capital as hitherto and that the consequent weighted average cost of capital is an appropriate measure of the future cost. This is management's declared intention in this case, although it is probably unrealistic in practice.

The difficulties and uncertainties in the estimation of the cost of capital are as follows:

i) Growth rate - the expected future growth rate of dividends has been obtained from the historical average growth rate of the last five years.

ii) Current share price - it is assumed that the current share price is a reflection on logical investor behaviour in the market and reflects the market's anticipation of future dividends unaffected by extraneous events or influences. This will frequently not be the case.

iii) Corporation tax - it is assumed that the future rate of corporation tax will remain at 40%. Any change in the rate, or for that matter in the system of taxation, would affect the earnings available for distribution and therefore the future dividend growth rate.

iv) Risk class - it is assumed that the project to be appraised is of the same risk class as existing project.

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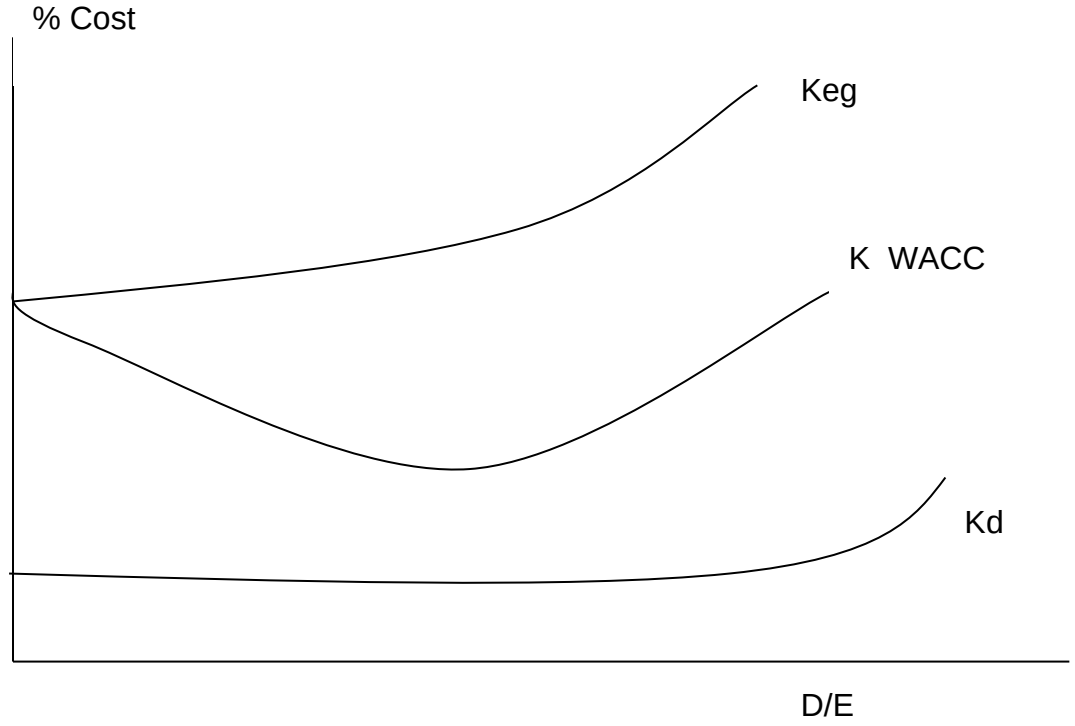
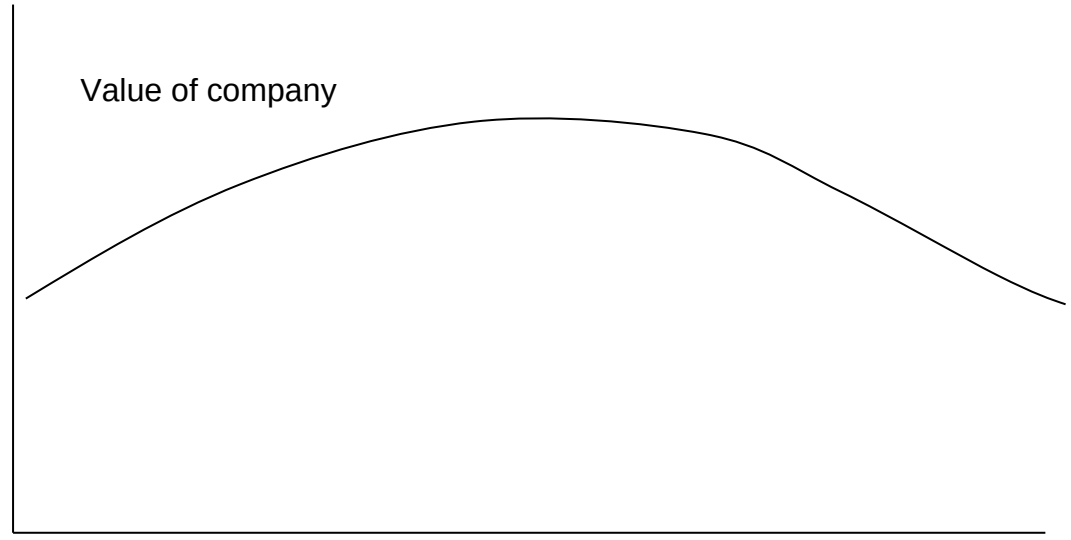
Chapter 16 – Capital structure theories and practical considerations

Objectives:

- *Describe the traditional view of capital structure and its assumptions.*
- *Describe the views of Miller and Modigliani on capital structure, both without and with corporate taxation, and their assumptions.*
- *Identify a range of capital market imperfections and describe their impact on the views of Miller and Modigliani on capital structure.*
- *Explain the relevance of pecking order theory to the selection of sources of finance.*

1. The Traditional View





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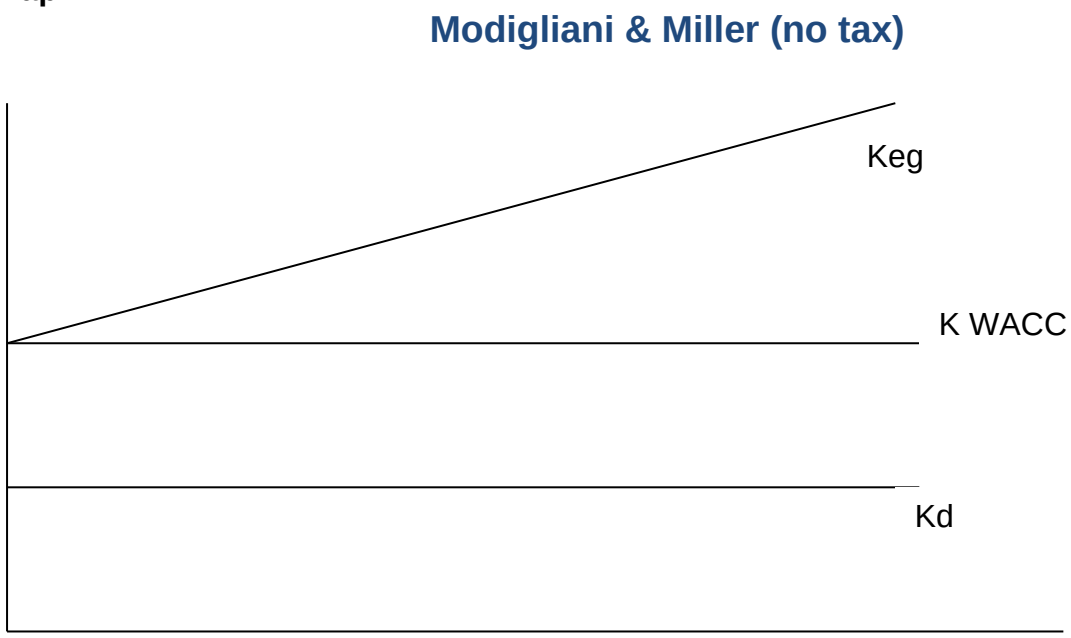
2. Modigliani and Miller – Tax Ignored (1958)

All companies with the same earnings in the same risk class have the same future income stream and should therefore have the same value, independent of capital structure.

Graph



Formulae

$$Vg = Vu$$

$$Keg = Keu + (Keu - Kb)\frac{D}{E}$$

$$Kog = Keu$$

N.B. These formulae may be derived from the expressions which include the effect of corporation tax treating t = 0

Assumptions

- Investors are rational
- Investors have the same view of the future
- Personal and corporate gearing are perfect substitutes
- Information is freely available
- No transaction costs
- No tax
- Firms can be grouped into similar risk classes

The arbitrage "proof", which incorporates these assumptions, can be used to support this M & M proposition.

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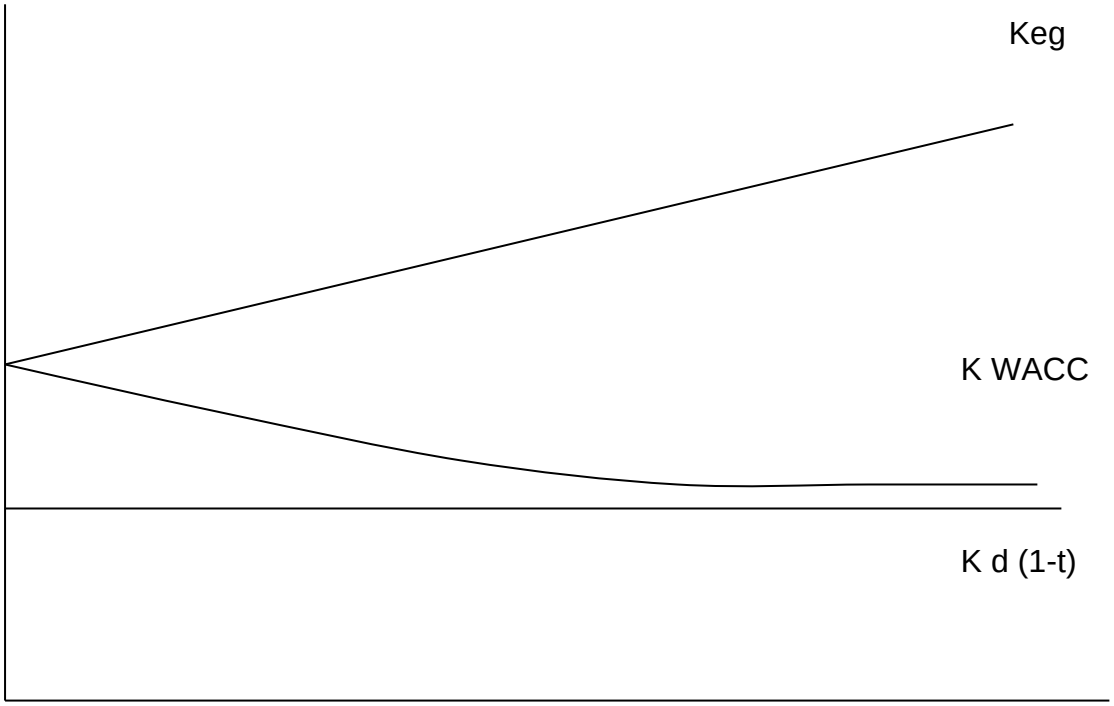
3. Modigliani and Miller – Including Corporation Tax (1963)

The values of companies with the same earnings in the same risk class are no longer independent. Companies with a higher gearing ratio have a greater net future income stream (purely due to corporation tax relief on interest payments) and therefore a higher value.



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Equilibrium position – M & M

M & M argue that as G pays less tax it can distribute more to its investors. The difference in equilibrium values is explained by the present value of the tax shield on debt interest available to G. As G's debt is irredeemable this difference can be measured by

$$\frac{D \times Kb \times t}{Kb} = Dt$$

therefore $Vg = Vu + Dt$

where Vu = value of an equivalent ungeared company

Assuming U is correctly valued and its cost of equity is 20%, then we calculate the equilibrium value of G with reference to U

CONCLUSION: a 99.9% debt structure is optimal!!!

Formulae

$Vg = Vu + Dt$

$Keg = Keu + (Keu - Kb^*) \frac{D(1-t)}{E}$ **or** $k^i_e + (1 - T)(k^i_e - k_d) \frac{V_d}{V_e}$

*Kb or k_d is the PRE-TAX COST OF DEBT for this formula

$$Keg = Keu \left(1 - \frac{Dt}{E + D}\right)$$

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4. Capital Structure *Illustration*

Grant plc (an all equity company) has on issue 6,000,000 $1 ordinary shares at market value of $2.50 each

Bell plc (a geared company) has on issue:

17,000,000 25c ordinary shares; and
$8,000,000 15% debentures (quoted at 125)

Taking corporation tax at 35%, and assuming that:

1) The companies are in all other respects identical; and

2) The market value of Grant's equity and the market value of Bell's debt are "in equilibrium"; calculate the equilibrium price per share of Bell's equity.

Solution

Vg = Vu + Dt

N.B. D = $8,000,000 x $\frac{125}{100}$ = $10m

				$m
Vu	=	6,000,000 @ $2.50	=	15
Dt	=	$10,000,000 x 35%	=	3.5
Vg	=			$18.5m

			$m
E	=	(balancing figure)	8.5
D		(as above)	10
Vg		(as above)	$18.5m

Price per share = $\frac{\$8.5m}{17m}$ = 50p

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Why do companies not attempt a 99.9% debt structure?

(i) Bankruptcy costs

The higher the level of gearing the greater the risk of bankruptcy with the associated "costs of financial distress".

Vg = Vu + Dt – Present value of costs of financial distress

(ii) Agency costs

Costs of restrictive covenants to protect the interests of debt holders at high levels of gearing.

(iii) Tax exhaustion

The value of the company will be reduced if advantage cannot be taken of the tax relief associated with debt interest.

(iv) Debt capacity

Generally loans must be secured against a company's assets and clearly some assets (e.g. property) provide better security for loans than other assets (e.g. high-tech equipment which may become obsolescent overnight). The depth of the asset's second hand market and its rate of depreciation are important characteristics.

(v) Personal taxes (MILLER'S CRITIQUE 1977)

Investors will be concerned with returns net of **all** taxes

- If a firm's income is paid out as debt interest, corporation tax savings are made (see M & M 1963) but investors will have to pay income tax on debt interest.

- If a firm's income is paid out as an equity return, corporation tax has to be paid but personal tax can be saved (e.g. by avoidance of capital gains tax using exemptions).

- In deciding its gearing level, a firm should consider its corporation tax position and the personal tax position of its investors if it wishes to maximise their wealth.

- In his 1977 article, Miller argues that firms will gear up until marginal investors face a personal tax cost of holding debt equal to the corporation tax saving. At this point there is no further advantage of gearing.

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5. Pecking Order Theory

The Pecking Order Theory is that a company's capital structure decision is **not** determined by the costs and benefits of using a combination of debt and equity finance to minimise the cost of capital.

The theory suggests that a company has a well defined order of preference in relation to available sources of finance i.e.

(a) The first preference is the use of retained earnings, since internal finance is readily accessible, has no issue costs and does not involve negotiating with third parties, such as banks.

(b) If external finance has to be used (because the company has identified more positive NPV projects than can be financed by retentions alone), bank borrowings, loan stock and debentures are the initial preferred source of external finance. The cost of issuing new debt is normally much smaller than the cost of equity issues. Furthermore it is possible to raise smaller amounts of debt than of equity.

When raising debt, initially it is advisable to issue low risk secured debt, and when there are no more assets available as security, then to issue unsecured debt with a consequent higher risk and higher cost.

(c) If, after the company's level of debt capacity is reached, there remain further positive NPV projects that remain to be financed, the final and least preferred source of finance is the issue of new equity capital.

Accordingly there appears to exist a financing pecking order i.e. first use retained profits, then secured debt, then unsecured debt and finally equity.

A more sophisticated explanation of the Pecking Order Theory was developed in 1984, when it was suggested that the order of preference stemmed from the existence of "asymmetry of information" between the company and the capital markets. This term refers to the fact that company management are likely to have a much better idea of the **true** worth of the company's shares than do outside investors.

Accordingly if a company wishes to raise new project finance and the capital market has underestimated the benefits of the project, company management (with their inside information) will be aware that the market has undervalued the company.

They would therefore choose to finance the project through retentions, so that when the market discovers the true value of the project, existing shareholders will benefit. If retained earnings are inadequate, the company would choose to raise debt finance in preference to a new equity issue (since they would not wish to issue new equity shares which are undervalued by the market).

However if the company's management believe that investors are overvaluing the benefits of the new project and therefore placing too high value on the company's shares, they would prefer to issue new equity at that overvalued price.

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6. Static Trade-Off Theory

This variation on the *1963 with corporate tax theory* of Modigliani and Miller arrives at a conclusion, which is similar to that of the traditional theory of gearing i.e. there exists an optimum level of leverage that companies should attempt to attain.

Provided a company is in a static position i.e. not in a period of extreme growth, it is likely to have a gearing policy that is stable over time. This is achieved by striking a balance between the benefits and the costs of raising debt.

The *benefits* of debt relate to the tax relief that is enjoyed when interest payments are made – the cheaper debt finance will reduce the weighted average cost of capital and increase corporate value.

The *costs* of debt relate to the increases in the costs of financial distress (e.g. bankruptcy costs) and increases in agency costs that arise when the company exceeds its optimum gearing levels. The resultant increase in required returns demanded by investors cause the weighted average cost of capital of the company to increase and hence corporate value to fall.

There is accordingly, in theory, a trade-off between these two effects and hence the cost of capital and the value of the company will be optimised. However, subsequent research suggests that there is little evidence of the static trade-off theory operating in the real world.

7. Solvency Ratios

a) Gearing Ratio

This indicates the relationship between:

Equity : Fixed return securities (or Debt) on issue

It may be based upon balance sheet values (in which case “Equity” will comprise ordinary share capital and reserves) or upon stock exchange values (in which event the shares and debentures on issue are valued at mid market price).

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Illustration

Called-up Share Capital:

$250,000 of ordinary shares of 25c, quoted price 53c – 55c
$500,000 of 7% preference shares of $1, quoted price 71c – 73c

Reserves $100,000

Loans: $200,000 of 12% irredeemable debentures – market yield currently 10%

You are required to calculate the Capital Gearing Ratio, based upon
a) Book values
b) Market values

Solution to Illustration

a) Book values = (250,000 + 100,000) : (500,000 + 200,000) = 0.5 : 1

b) Market values = 540,000 : (360,000 + 240,000) = 0.9 : 1

N.B. Gearing ratios are expressed in a number of ways e.g.

$$\frac{\text{Debt}}{\text{Equity}} \qquad \frac{\text{Debt}}{\text{Equity + Debt}}$$

Debt may include long-term borrowings only **or** both short and long-term debt.

A further problem is the classification of hybrid securities e.g preference shares.

In the above illustration they have been classified as debt, but this is open to debate when the ratio is calculated for the benefit of lenders.

b) Interest cover i.e.

$$\frac{\text{Earnings before Interest and Tax}}{\text{Gross Interest}}$$

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Berlan and Canalot

Berlan plc

Berlan plc has annual earnings before interest and tax of $15m. These earnings are expected to remain constant. The market price of the company's ordinary shares is 86c per share cum div and of debentures $105.50 per debenture ex-interest. An interim dividend of six cents per share has been declared. Corporate tax is at the rate of 35% and all available earnings are distributed as dividends.

Berlan's long-term capital structure is shown below:

	$'000
Ordinary shares (25 c par value)	12,500
Reserves	24,300
	36,800
16% debentures 31.12.2007 ($100 par value)	23,697
	60,497

Required:

Calculate the cost of capital of Berlan plc according to the traditional theory of capital structure. Assume that it is now 31 December 2004.

Canalot plc

Canalot plc is an all-equity company with an equilibrium market value of $32.5 million and a cost of capital of 18% per year.

The company proposes to repurchase $5 million of equity and to replace it with 13% irredeemable loan stock.

Canalot's earnings before interest and tax are expected to be constant for the foreseeable future. Corporate tax is at the rate of 35%. All profits are paid out as dividends.

Required:

a) Using the assumptions of Modigliani and Miller, explain and demonstrate how this change in capital structure will affect:
   i) the market value
   ii) the cost of equity
   iii) the cost of capital

of Canalot plc.

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Chapter 17 – Impact of cost of capital on investments

Objectives:

- *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 discount rate.*

1. The Underlying Theory of CAPM

The CAPM assesses investments from the viewpoint of well-diversified shareholders and considers that when companies invest in projects they must accept that the majority of their shareholders are well-diversified institutions (i.e. pension funds, insurance companies, unit trusts and investment trust companies). In fact only about 13% of the shares in UK quoted companies are held by individuals and many of these are so wealthy that they can invest their savings in a number of different companies in various market sectors.

Obviously an investor can reduce risk by holding a portfolio of shares in companies in different industries, which will to some degree offer different risk/return profiles over time. For instance an investor holding shares in both BP and British Airways should find that if oil prices increase the share price of BP should rise, whereas the share price of BA would probably fall. Obviously an oil price decrease would cause an opposite effect on the share prices of the two companies.

Provided that the returns on shares do not demonstrate perfect positive correlation, any additional investment brought into a shareholders portfolio should (subject to the point made in the next paragraph) cause the overall risk of the portfolio to reduce.

Suppose an investor who has built up a small portfolio in the shares of (say) three companies now decides to add to that portfolio the shares of a few more companies in different market sectors. He should find a substantial risk reduction as the additional investments are added to the portfolio. However as the shares of more and more companies (in different sectors) are added to the portfolio, the risk reduction will eventually slow down and once the portfolio increases up to about 16 to 20 companies (again in different market sectors) the risk reduction will eventually cease.

Thus a standard deviation (σ) is a measure of total risk, and this can be analysed between:

- UNSYSTEMATIC (aka SPECIFIC or UNIQUE) RISK i.e. the risk which will initially disappear as a result of diversification, and

- SYSTEMATIC (aka MARKET) RISK i.e. the risk which can never be avoided when investing in company shares.

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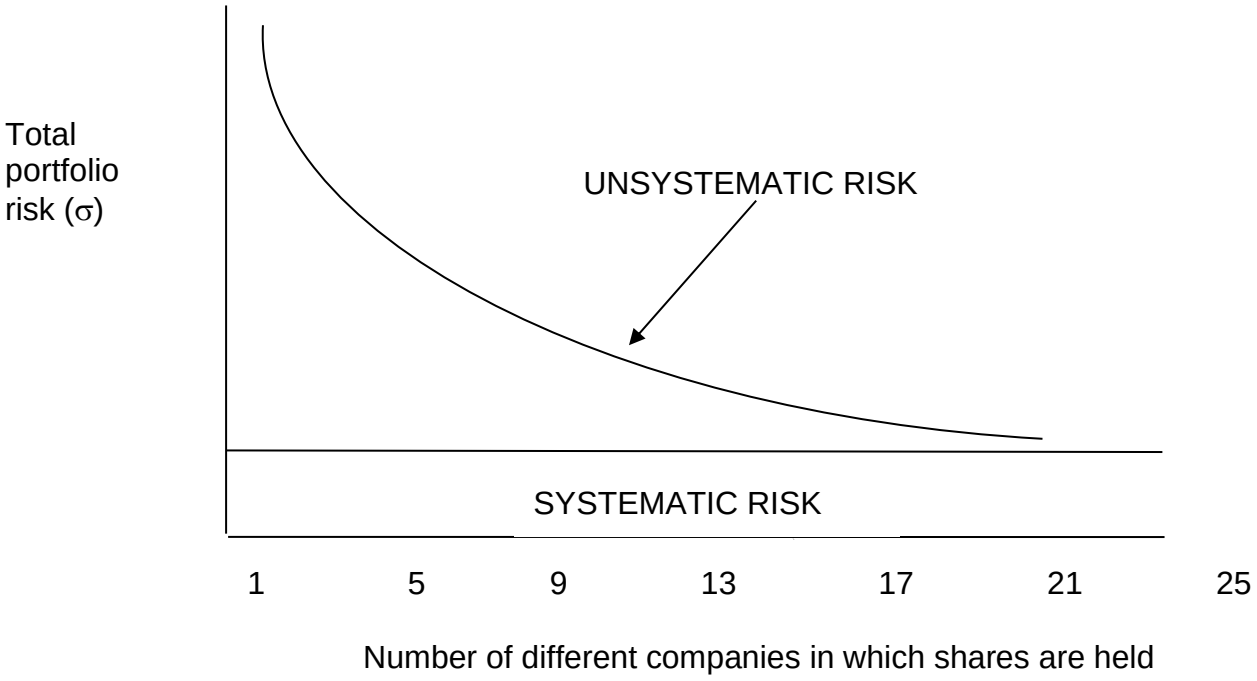
Specific risk reflects factors which are unique to the company or to the industry in which it operates, whereas systematic risk reflects market wide factors such as the state of the economy.

Diversification therefore eliminates the unsystematic risk relating to shares held in a well-diversified portfolio, but sadly the systematic risk of that portfolio will remain.

Accordingly, CAPM recognises that investors cannot expect to receive a return on their exposure to unsystematic risk – therefore returns will only be received as a result of systematic risk, which investors can never avoid.

CAPM uses a β factor, which compares the systematic risk of the shares of a company with the systematic risk of the market. The higher the β, the greater the return the investor demands as compensation for the systematic risk borne. Obviously unsystematic risk (which is diversified away by holding the shares of a sufficient number of companies) can be ignored.

2. Systematic and Unsystematic Risk



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3. CAPM formulae

CAPM provides the return that would be required by a well-diversified, risk-averse investor. The formula can be expressed in a variety of ways, e.g.:

$$E(r_i) = R_f + \beta_i (E(r_m) - R_f)$$

$$K_e = R_f + [R_m - R_f] \beta$$

Required return = $r_f + (Er_m - rf) \beta_j$

where:

R_f = the risk free rate of interest (e.g. the return on 90 day Treasury bills)

R_m = the average return on a market portfolio (e.g. the return on FTSE 100 constituents)

$[R_m - R_f]$ = the market risk premium or excess market return

β (beta) = an index which compares the systematic risk of the investment with the systematic risk of the market portfolio

The above CAPM formula appears in one form or another on formulae sheets provided by the accountancy bodies. However the following formulae for calculating β are not provided in the examination and must therefore be committed to memory:

4. Formulae for calculating β

Formula one

$$\beta_j = \frac{\rho_{jm} \sigma_j}{\sigma_m}$$

Where ρ_{jm} = correlation coefficient between the investment and the market

σ_j = total risk of the investment

σ_m = total risk of the market, which is entirely systematic risk since the market is totally diversified

Formula two

$$\beta_j = \frac{COV_{(jm)}}{\sigma_m^2}$$

Where $COV_{(jm)}$ = covariance between the investment and the market

σ_m^2 = variance of the market (i.e. the standard deviation squared)

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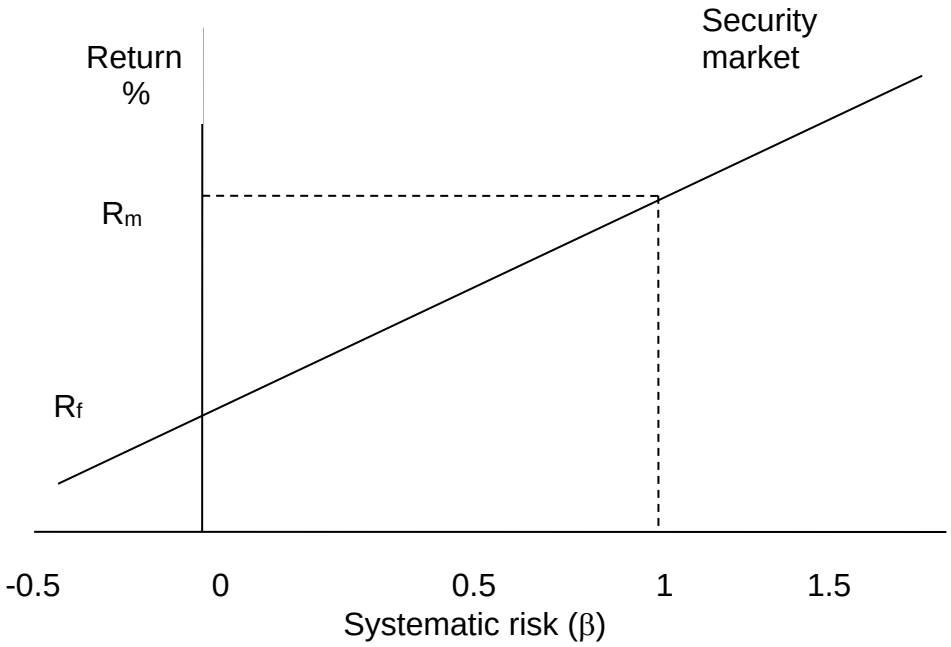
5. The Security Market Line

The security market line is a graph of the capital asset pricing model i.e.



There are accordingly two benchmarks for β and for the Security market line, i.e.

- The return on a risk free security, which obviously carries no systematic risk and therefore has a β of 0;
- The return on the market portfolio, which due to its ultimate diversification carries only systematic risk and will always have a β of 1.

An investment with a:

β of 0 is referred to as a risk free investment;

β of 1 is called a neutral investment (since its risk is equivalent to that of the market);

β of > 1 is termed an aggressive investment (since it is riskier than average);

β of < 1 is called a defensive investment (since it is less risky than the market average)

Accordingly if an investor wishes to hold equity shares despite the existence of a bear market, he would be advised to invest in defensive investments, since their prices would fall more slowly than the market average. During a bull market an investor should hold aggressive investments, since their increases in value would outpace the market average.

©

6. Systematic Business Risk and Systematic Financial Risk

At a gearing level of zero, the equity shareholders of a company would have to bear systematic business risk only. However as a company increases its debt levels and becomes more and more highly leveraged, its equity shareholders will not only have to face the same level of systematic business risk as before, but will also have to accept increasing amounts of systematic financial risk.

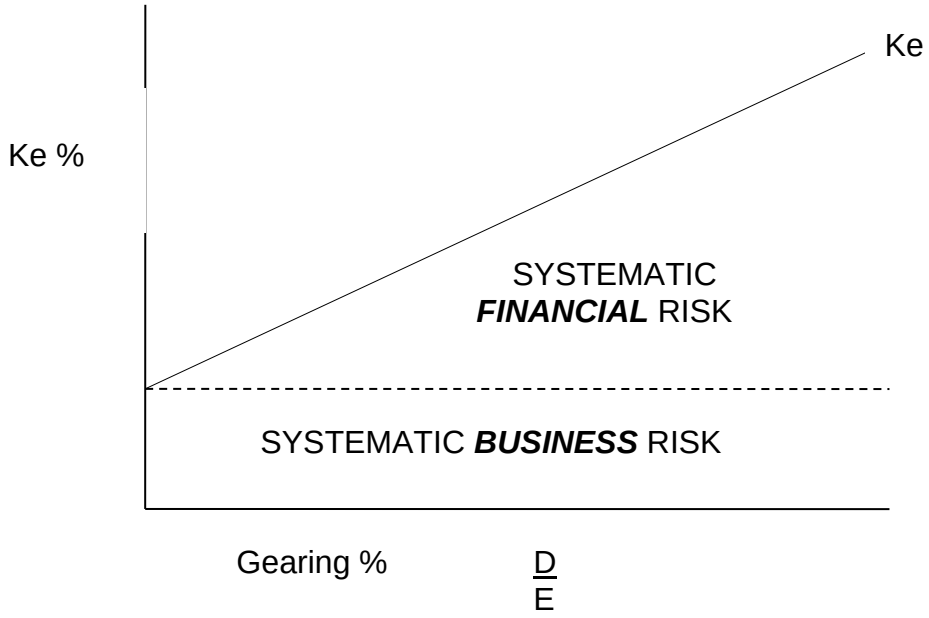
Accordingly:

- Equity shareholders in an ***ungeared*** company bear systematic ***business*** risk ***only***, whereas

- Equity shareholders in an otherwise identical ***geared*** company bear the same level of systematic ***business*** risk as before, but will also have to face an ever increasing level of systematic ***financial*** risk as borrowing levels become greater and greater,

with a consequence increase in the Ke of the company concerned. This is illustrated below.

Following the M & M with corporation tax theory of 1963, as gearing levels increase, Ke behaves as follows:



Now that the issue of leverage has been introduced, there becomes a need to distinguish:

- **β asset (βa)**, which reflects systematic ***business*** risk ***only***, and

- **β equity (βe)**, which reflects **both** systematic ***business*** risk TOGETHER WITH ANY systematic ***financial*** risk which MAY exist

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Therefore:

- In the case of an **all equity company**, **βe = βa**, since no systematic financial risk can possibly exist.

- In the case of a **geared company**, **βe > βa**, since βe contains **both** systematic business risk **and** systematic financial risk, whereas βa reflects systematic business risk **only**.

The theoretical relationship between βa and βe is commonly expressed by the following formulae:

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

$$\beta_a = \beta_e \frac{E}{E + D(1-t)} + \beta_d \frac{D(1-t)}{E + D(1-t)}$$

The latter version will now be used throughout this course.

Example 1

Giles plc is an all-equity company whose β coefficient is 0.95. Stiles plc is a levered company in all other respects has the same risk and operating characteristics as Giles

The capital structure of Stiles plc is as follows:

	Nominal value $m	Market value $m
Equity	6	15
Debt	4	6
	10	21

The debentures of Stiles plc are virtually risk-free and the corporation tax rate is 40%.

What would be the predicted β of the equity of Stiles plc?

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7. Assumptions, Advantages and Limitations of CAPM

Assumptions

- All shareholders hold the market portfolio. Although this is questionable in practice, even a limited spread of shareholdings produces some diversification, therefore this assumption is appropriate;
- A perfect capital market (e.g. no transaction costs, information about risk and return is freely available);
- The ability of investors to both borrow and lend at the risk free rate of interest;
- All forecasts are made for a single time period only;
- All investors share the same uniform expectations concerning future earnings streams and are only concerned with risk and return.

Advantages

- It demonstrates that unsystematic risk can be diversified away, therefore the only risk premium required is for systematic risk only;
- Probably the best practical method for establishing the Ke of a publicly traded company;
- It highlights the relationship between risk and return, based upon stock market performance and provides a measure of the risk of shares held within a well-diversified portfolio and measures the required rate of return in view of that level of risk;
- Helps to provide a risk adjusted discount rate for use in investment appraisal.

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Limitations

- It concentrates purely upon systematic risk and is therefore of limited use for investors who do not hold a well-diversified portfolio;

- Since CAPM only considers the *level* of return to investors, it ignores the manner in which that return is received. Therefore, it treats dividends and capital gains as equally desirable to investors, thus totally ignoring the tax position of individual investors;

- It is purely a single period model, therefore not ideal for use in projects which extend for multiple periods;

- The model requires the use of data which can be difficult to obtain i.e.

  i) *The risk free rate of interest*: It is necessary to take the best proxy measure of a short-term default free rate e.g. UK 90 day Treasury bills;
  ii) *The return on the market portfolio*: Should the FT all-share index be used, or the FTSE 100, or the FTSE 350, or a world composite share price index?;
  iii) *Beta*: Clearly this should strictly be based on subjective probabilities of future events, but since this is impracticable in practice, regression analysis is often used to compare the historical behaviour of individual securities with the behaviour of a suitable market index within the same time period.

- CAPM tends to overstate the required return of high beta securities and to understate the required return of low beta securities. The returns of small companies, returns on certain days of the week or months of the year have in practice been observed to differ from those expected from CAPM

8. The main problems of using CAPM in investment appraisal

The problems of using CAPM include

i) the assumptions behind the model

ii) the difficulty in obtaining data

iii) the accuracy of the model in explaining investment and security returns

Many of the assumptions behind the model are unrealistic. The assumptions include:

i) Investors can borrow and lend easily at the risk-free rate of return
ii) No transaction costs or market imperfections exist
iii) Information about the risk and return of investments is freely available
iv) Investors measure risk by the standard deviation of expected returns
v) All investors have the same expectations about future profits and dividends and are single-period terminal wealth maximisers. This is based only on risk and return.

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Obtaining data for the model is difficult. It is an 'ex-ante' model which requires data for expected returns and risk of the investment and the market. The practical difficulty of forecasting such risk and returns means that the model is usually applied using historical 'ex-post' data, requiring the beta to be stable over time.

The model requires the risk-free rate, and the market return. What is the appropriate measure of the risk-free rate and the market return? Over what period should data be used? At what interval should observations be made? What is the market – the UK all-share index, or a world composite share price index, or some other measure e.g. the FTSE 100 index? These are only some of the possible data problems.

The accuracy of the model has been questioned by many pieces of empirical research. CAPM requires alpha, the intercept term, not to be significantly different from zero; many studies suggest that it is significantly different from zero. Low beta securities earn higher returns than CAPM would predict, and higher beta securities earn lower returns. Company size, seasonality, day of the week, dividend yield, and price-earnings ratios are among the factors that are said to explain observed returns in addition to the systematic risk.

Such problems raise serious questions about the accuracy of using CAPM in investment appraisal.

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Nelson Plc

The management of Nelson plc wish to estimate their firm's equity beta. Nelson has had a stock market listing for only two months and the financial manager feels that it would be inappropriate to attempt to estimate beta from the actual share price behaviour over such a short period. Instead, it is proposed to ascertain, and where necessary adjust, the observed equity betas of other companies operating in the same industry and with the same operating characteristics as Nelson, as these should be based on similar levels of systematic risk and be capable of providing an accurate estimate of Nelson's beta.

Three companies have been identified as firms having operations in the same industry as Nelson which utilise identical operating characteristics. However, only one company, Oak plc, operates exclusively in the same industry as Nelson. The other two companies have some dissimilar activities or opportunities, in addition to operating characteristics which are identical to those of Nelson.

Details of the three companies are:

i) Oak plc Observed equity beta 1.12 Capital structure at market values is 60% equity, 40% debt.

ii) Beech plc Observed equity beta 1.11 It is estimated that 30% of the current market value of Beech is caused by risky growth opportunities which have an estimated beta of 1.9. The growth opportunities are reflected in the observed beta. The current operating activities of Beech are identical to those of Nelson. Beech is financed entirely by equity.

iii) Pine plc Observed equity beta 1.14 Pine has two divisions – East and West. East's operating characteristics are considered to be identical to those of Nelson. The operating characteristics of West are considered to be 50% more risky than those of East. In terms of financial valuation East is estimated as being twice as valuable as West. Capital structure of Pine at market values is 75% equity, 25% debt.

Nelson is financed entirely by equity. The tax rate is 40%.

Required:

a) Assuming all debt is virtually risk-free, determine three estimates of the likely equity beta of Nelson plc. The three estimates should be based, separately, on the information provided for Oak, Beech and Pine plc.

b) Explain why the estimated beta of Nelson, when eventually determined from observed share price movements, may differ from those derived from the approach employed in a) above.

c) Specify the reasons why a company which has a high level of share price volatility and is generally considered to be extremely risky, can have a lower beta value, and therefore lower systematic risk, than an equally geared firm whose share price is much less volatile.

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Chapter 18 – Business Valuations

Objectives:

- *Identify and discuss reasons for valuing businesses and financial assets.*
- *Identify information requirements for valuation and discuss the limitations of different types of information.*
- *Asset-based valuation models, including:*
  - *net book value (balance sheet basis).*
  - *net realisable value basis.*
  - *net replacement cost basis.*
- *Income-based valuation models, including:*
  - *price/earnings ratio method.*
  - *earnings yield method.*
- *Cash flow-based valuation models, including:*
  - *dividend valuation model and the dividend growth model.*
  - *discounted cash flow basis.*

- *Apply appropriate valuation methods to:*
  - *irredeemable debt*
  - *redeemable debt*
  - *convertible debt*
  - *preference shares*

1. Reasons for valuations

Valuations of businesses and financial assets may be needed for several reasons e.g.

- To establish the terms of takeover bids or mergers;
- To fix a share price for an initial public offering;
- For investors to make buy, hold or sell decisions;
- For capital gains tax or inheritance tax purposes;
- Where a major shareholder or director wishes to dispose of a large block of shares;
- When the company needs to raise additional finance.

2. Methods of share valuation

The main approaches are:

- The dividend valuation model or dividend growth model;
- The discounted cash flow basis;
- The PE ratio (or earnings yield) basis;
- The net assets basis;
- The dividend yield method.

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3. The dividend valuation model

This method is based upon the fundamental theory of share valuation, whereby a current share price is taken to reflect the PV of expected future cash flows, discounted at the required rate of return of the shareholder. In the case of minority shareholders, this would represent the PV to infinity of the future dividend stream. In the case of majority shareholders, these amounts will be increased by the PV of synergies achieved as a result of the acquisition.

Example 1

The market expects a rate of return of 20% per annum on ordinary shares in Winterburn plc, a company which is expected to pay constant annual dividends of 20c per share. At what price will the market value the shares?

Example 2

Seaman plc is expected to pay a dividend of 30c per share next year. The market expects dividends to grow at the rate of 5% per annum and has a required return of 20%.

Estimate the share price.

Example 3

Merson plc is just about to pay a dividend of 40c per share. Future dividends are expected to grow at the rate of 6% per annum. The market's required return on shares of this risk level is 25%. What is the cum-div share valuation?

4. Discounted cash flow basis

This method is based upon the present value of the free cash flow to equity of an enterprise, either for a limited time horizon (fifteen years may be regarded as typical) or to infinity.

There are a number of variations in the definition of free cash flow to equity, but it is often described as follows:

Free cash flow to equity is the cash flow available to a company from operations after interest expenses, tax, repayment of debt and lease obligations, any changes in working capital and capital spending on assets needed to continue existing operations (i.e. replacement capital expenditure equivalent to economic depreciation).

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In theory, this is probably the best method by which to value a company. However it relies on estimates of cash flows, discount rates, tax rates, inflation rates and the choice of a suitable time horizon. The notion of using a valuation to infinity is probably unrealistic.

Example 4

The predicted free cash flows of Miller Ltd, an all equity company, for its planning horizon, (which for simplicity is taken to be the next five years) are:

Year	Free cash flows
	$000
1	150
2	200
3	250
4	375
5	500

A cost of capital of 12% is assumed to represent the systematic risk of the cash flows of Miller Ltd. What is the estimated market capitalisation of this company?

Example 5

The following data relating to Morrison Ltd is expected to continue annually for the foreseeable future:

	$m
Turnover	525
Cost of goods sold, excluding depreciation	315
Distribution costs and administrative expenses, excluding depreciation	36
Capital allowances claimed	46.5
Non-current assets purchased in the year	72
Irredeemable bonds (market value $130)	21

Working capital changes are assumed to be insignificant because of the absence of growth.

Corporation tax rate	30%
Weighted average cost of capital in nominal (i.e. money) terms	13.3%
Predicted inflation rate	3%

Calculate the estimated equity market capitalisation of this company.

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5. Price earnings ratio basis

This income based method is popular for the valuation of majority holdings in a going concern. It requires the prediction of a maintainable EPS for the company being valued and the use of the PE ratio of a listed company, whose activities are very similar to those of the business being valued i.e.

Share value = EPS of company being valued x PE of similar listed company

If a similar listed company (pure–play company) is not readily available, it may be appropriate to use the average PE for the market sector in which the company operates.

It may be necessary to adjust the PE used or the final calculated price, if the company being valued is an unlisted company, or where the company in question has different risk or different growth potential from the similar company or constituents of the industry average.

Since an earnings yield is simply a reciprocal of the PE ratio, a valuation on an earnings yield basis would be as follows:

Share value = EPS of company being valued ÷ earnings yield of similar listed company

Example 6

Flycatcher Ltd wishes to make a takeover bid for the shares of an unlisted company, Mayfly Ltd. The earnings of Mayfly Ltd over the past five years have been as follows.

2002	$50,000	2005	$71,000
2003	$72,000	2006	$75,000
2004	$68,000		

The average P/E ratio of listed companies in the industry in which Mayfly Ltd operates is 10. Listed companies which are similar in many respects to Mayfly Ltd are:

Bumblebee plc, which has a P/E ratio of 15, but is a company with very good growth prospects;

Wasp plc, which has had a poor profit record for several years, and has a P/E ratio of 7.

What would be a suitable range of valuations for the shares of Mayfly Ltd?

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6. Net assets basis

Asset-based valuation models include:

- net book value (balance sheet basis) – largely a meaningless figure, since it is affected by accounting conventions;
- net realisable value basis – again, not particularly relevant. However, where the break-up value exceeds income-based valuations, it would be advisable for the proprietor to cease trading and sell the assets as quickly as possible;
- net replacement cost basis – this represents the current cost of setting up the existing business. Sadly it totally ignores goodwill, which can only be established by using income-based valuations.

Example 7
The current balance sheet of Cactus Ltd is as follows:

	$	$
Fixed assets		
Land and buildings		160,000
Plant and machinery		80,000
Motor vehicles		20,000
Goodwill		20,000
		280,000
Current assets		
Stocks	80,000	
Debtors	60,000	
Short-term investments	15,000	
Cash	5,000	
		160,000
		440,000

	$	$
Capital and reserves		
Ordinary shares of 50p		80,000
Reserves		140,000
		220,000
4.9% preference shares of $1		50,000
		270,000
12% debentures	60,000	
Deferred taxation	10,000	
		70,000
Creditors: amounts falling due within one year		
Creditors	60,000	
Taxation	20,000	
Proposed ordinary dividend	20,000	
		100,000
		440,000

What is the value of an ordinary share using the net assets basis?

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7. Dividend yield basis

This income based method is popular for the valuation of minority holdings in a going concern. It requires the prediction of a maintainable dividend for the company being valued and the use of the dividend yield of a listed company, whose activities are very similar to those of the business being valued i.e.

$$\text{Share value} = \frac{\text{Dividend of the company being valued}}{\text{Dividend yield of similar listed company}}$$

If a similar listed company (pure–play company) is not readily available, it may be appropriate to use the average dividend yield for the market sector in which the company operates.

It may be necessary to adjust the calculated price if the company being valued is an unlisted company, or where the company in question has different risk or different growth potential from the similar company or constituents of the industry average.

Care must be taken to ensure consistency in the treatment of tax credits i.e. look at the information given in a question very carefully to establish whether the yields given are net or gross dividend yields and whether the dividends provided include or exclude related tax credits.

Example 8

Taylor Ltd, which has on issue $500,000 ordinary shares of 25c each, intends to pay a constant dividend of $360,000 (net) for the foreseeable future. Listed companies within the same industry sector as Taylor Ltd currently provide a gross dividend yield of 5% p.a. The current rate of tax credit on gross dividends is 10% (i.e. 1/9th of net dividend).

Estimate a current share price for Taylor Ltd.

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8. Summary of valuation methods

Earnings Based

	Advantages	Disadvantages
Present value of future cash flows	- Theoretically sound	- Estimation of future costs and suitable discount rate - Only suitable for controlling interest
PE Ratio	- Simple - Few data requirements - Can be used for controlling interest	- Estimation of maintainable earnings - Estimation of suitable PE ratio (size, industry, systematic risk) - Adjustments for non marketability
Dividend valuation -	- Simple Can be used for non-controlling interest	- Estimating future dividends - Estimation of suitable cost of equity - Adjustments for non marketability

Asset Based

Historical cost	- Readily available	- Gives unexpired cost not value
Replacement cost	- Gives cost of setting up equivalent company	- Excludes goodwill - Valuation problems - Only suitable for controlling interest
Net realisable value	- Gives disposal value to existing owners, often seen as a minimum figure	- Excludes goodwill - Valuation problems

N.B. If the valuation is made for purposes of the acquisition of a listed company, whose market value is (of course) readily available, this current market value then sets a minimum figure for purposes of the takeover bid. Normally substantial bid premiums are paid.

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9. Valuation of debt and preference shares

Irredeemable debt

Example 9

Koren plc has on issue 7% irredeemable loan stock. The gross return required by investors is 5% p.a. The corporation tax rate is 30%. Establish the current market value for this stock.

Redeemable loan stock

Example 10

Beattie plc has issued $1,000,000 of 6% redeemable bonds. Interest payments will be made at the end of March, June, September and December of each year until redemption occurs on 30 June 20Y0 at $120 per cent. Bondholders require a gross redemption yield of 1% per quarter. Calculate the current market value of these bonds at 1 January 20X7.

Preference shares

Example 11

Steele Ltd has on issue some 9% preference shares of $1 nominal value. Investors require a return of 12.5% p.a. on these shares. Estimate the current market price per share.

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Convertible debt

The value of a convertible cannot fall below its value as debt, but upside potential exists due to the possibility of an increase in the share price prior to expiry of the conversion period.

Therefore the theoretical value of a convertible (known as its "**formula value**") is the greater of its value as debt and its value as shares i.e. its conversion value. In practice the actual price of convertibles will tend to trade at a value in excess of formula value, reflecting so called "time value" i.e. the possibility that the share price could rise prior to expiry of the conversion period.

Example 12

Kiely plc has 11% convertible loan notes on issue. Each $100 unit may be converted at any time up to the date of expiry (in seven years time) into 15 fully-paid ordinary shares in Kiely plc. Any loan notes which remain outstanding at the end of the seven year period are to be redeemed at $120 per cent.

Loan note holders normally require a yield of 9% p.a. on seven year debt.

Recommend whether investors should convert, if the current share price is:

a) $7.00, or
b) $8.00, or
c) $9.00

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Chapter 19 – Efficient Market Hypothesis (EMH) and practical considerations in the valuation of shares

Objectives:

- *Distinguish between and discuss weak form efficiency, semi-strong form efficiency and strong form efficiency*
- *Discuss practical considerations in the valuation of shares and businesses, including:*
  - *marketability and liquidity of shares*
  - *availability and sources of information*
  - *market imperfections and pricing anomalies*
  - *market capitalization*
- *Describe the significance of investor speculation and the explanations of investor decisions offered by behavioural finance*

1. Definition and Forms of Efficiency

An efficient market is one in which the market price of all securities traded on it instantly and perfectly reflect all new information as it becomes available.

If this is correct, a company's real financial position, with respect to both current and future profitability, will be reflected in its share price.

The implication for an investor is that he can rarely outperform the market, because it will already have anticipated developments in the future and have reflected these in the share price. Therefore the best course of action for an investor is to hold a well-diversified portfolio of shares to reduce overall risk.

Other areas of financial management, such as the dividend valuation model, Modigliani and Miller's arbitrage "proof", the dividend irrelevancy hypothesis and aspects of mergers and takeovers rely on the existence of an efficient market.

Forms of Market Efficiency

(i) Weak form

Share prices reflect all the information contained in the record of past prices and past trading volumes. As a result it is not possible to predict future share price movements by reference to past trends. Share prices follow a 'random walk'. Accordingly a chartist (technical analyst) must regard the stock market as being totally inefficient.

(ii) Semi-strong form

Share prices also reflect all current publicly available information. Therefore prices will change only when new information is published. As a result it would only be possible to predict share price movements if unpublished information were known (insider dealing). Accordingly fundamental analysis is a waste of effort if the stock market is semi-strong efficient.

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(iii) Strong form

Share prices reflect all information which is relevant to the company.
If this is the case then share price movements can never be predicted.

Gains through insider dealing are not possible because shares are priced absolutely fairly. The government must not consider the stock market to be strong form efficient, because of its attempts to outlaw insider dealing.

2. The Implications of the EMH for Financial Managers

In their book "Principles of Corporate Finance", Richard Brealey, Stewart Myers and Franklin Allen describe six lessons of market efficiency as follows:

Lesson 1 - Markets Have No Memory. The weak form of the EMH states that a study of past price changes will not be helpful in predicting future price changes, i.e. markets have no memory. This means that there is no right time to issue shares and the common reluctance of managers to make a new issue after a price fall has no basis in theory.

Lesson 2 - Trust Market Prices. In an efficient market the price of a security is reliable and allows for all available information about that security. This means that it is not possible for most investors to achieve consistently above average returns, i.e. you cannot beat the market.

Lesson 3 - Read the Entrails. If the market is efficient, the current price incorporates all available information about the future. Therefore, a careful study of security prices will provide a lot of information about investors' expectations of the future, since investors are heavily influenced by economic prospects.

Lesson 4 - There Are No Financial Illusions. Attempts to improve the image of the company through such cosmetic operations as bonus issues and changes in accounting policies or methods (e.g. depreciation methods) are unlikely to have any material effects on market values in the long-run. In fact they may be regarded as a sign of weakness and not of strength.

Lesson 5 - The Do-It-Yourself Alternative. Rational investors operating in an efficient market will not pay others to do what they can do equally well themselves. Diversification for its own sake will not enhance market values, because shareholders could achieve the same results for themselves, much more cheaply, by holding shares in a variety of companies.

Lesson 6 - Seen One Stock, Seen Them All. In buying shares investors are simply buying an expected return for a given level of risk. Where two shares have the same risk and return characteristics they will be seen by the market as perfect substitutes one for the other (just like similar brands of coffee). The homogeneous nature of many securities results in the demand for the company's shares being very elastic.
N.B. Most studies of this subject have been based on Wall Street or the London Stock Exchange, which are surely more efficient than most other stock markets.

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Example 1

Company A has 2 million shares in issue and company B, 6 million.

On day 1 the market value per share is $2 for A and $3 for B.

On day 2 the management of B decides, at a private meeting, to make a cash takeover bid for A at a price of $3.00 per share. The takeover will produce large operating savings with a present value of $3.2 million.

On day 4 B publicly announces an unconditional offer to purchase all shares of A at a price of $3.00 per share with settlement on day 15. Details of the large savings are not announced and are not public knowledge.

On day 10 B announces details of the savings which will be derived from the takeover.

Requirements

Ignoring tax and the time-value of money between day 1 and 15, and assuming the details given are the only factors having an impact on the share price of A and B, determine the day 2, day 4 and day 10 share price of A and B if the market is:

1 semi-strong form efficient, and
2 strong form efficient,

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Chapter 20 – Nature and types of risk and approaches to risk management

Objectives:

- *Describe and discuss different types of foreign currency risk:*
  - *translation risk*
  - *transaction risk*
  - *economic risk*
- *Describe and discuss different types of interest rate risk:*
  - *gap exposure*
  - *basis risk*

- *Describe the causes of exchange rate fluctuations, including:*
  - *balance of payments*
  - *purchasing power parity theory*
  - *interest rate parity theory*
  - *four-way equivalence*
- *Forecast exchange rates using:*
  - *purchasing power parity*
  - *interest rate parity*
- *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 foreign currency risk management, including:*
  - *currency of invoice*
  - *netting and matching*
  - *leading and lagging*
  - *forward exchange contracts*
  - *money market hedging*
  - *asset and liability management*
- *Compare and evaluate traditional methods of foreign currency risk management.*
- *Identify the main types of foreign currency derivates used to hedge foreign currency risk and explain how they are used in hedging. (No numerical questions will be set on this topic)*

- *Discuss and apply traditional and basic methods of interest rate risk management, including:*
  - *matching and smoothing*
  - *asset and liability management*
  - *forward rate agreements*
- *Identify the main types of interest rate derivates used to hedge interest rate risk and explain how they are used in hedging. (No numerical questions will be set on this topic)*

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1. Risks of foreign trade

Importing from and exporting to foreign countries involves a number of categories of risk, e.g. political risk, physical risk, credit risk, trade risk, liquidity risk and cultural risk. The type of risk particularly relevant to your syllabus is currency risk – sometimes referred to as "exchange rate risk". It involves the possibility of financial gains or losses arising out of unpredictable changes in exchange rates. Foreign currency risk can be classified into:

Translation risk: The gains or losses to be reported when overseas operations are consolidated into group accounts in accordance with IFRS's.

Economic risk**:** The possibility that the value of the overseas entity (based upon the PV of all future cash flows) will change because of unexpected exchange rate movements arising at sometime in the future.

Transaction risk: This is seen as the short-term manifestation of economic risk. Transaction risk refers to the gains or losses that are made when ultimate settlement occurs at a date when the exchange rate differs from the rate prevailing at the date of the original transaction. It is this category of foreign currency risk, which is particularly relevant to this syllabus.

2. Hedging techniques for foreign currency risk

When an enterprise decides to trade internationally, it will become exposed to exchange rate risk. Indeed, where a company has a long-term overseas investment (e.g. in a foreign subsidiary), it may wish to hedge its foreign currency assets by raising a long-term loan in the same foreign currency – whereby exchange losses or gains on the assets are offset by matching currency gains or losses on the liability. Sometimes management may consider it appropriate not to hedge exchange rate risk in order to avoid transaction costs – this must be carefully considered and not be an outright gamble, which could of course, be dangerous!! The traditional basic methods of currency risk management are:

Trade in the domestic currency only: If an exporter always invoices in his domestic currency or an importer insists on paying in his own domestic currency, there is no foreign exchange risk for that company. However, the risk shifts to the other party in the transaction, which may not be welcomed by an exporter's overseas customers.

Matching: When an enterprise has both receipts and payments expected on the same date for the same amount in the same foreign currency, no formal hedge is really necessary, since they can be matched against each other.

Netting: When an enterprise has both receipts and payments expected on the same date in the same foreign currency, but the amounts are different, netting may be employed. For instance, if a company expects to receive €5,000,000 from an Italian customer and expects to pay €3,700,000 to a Spanish supplier on the same future date, it would only be necessary to use a formal hedging technique (with the associated transaction costs) for the net receipt of €1,300,000.

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Leading and lagging: If an importer believes that the currency that it is shortly expecting to pay will appreciate against its home currency, it may decide to settle the liability as soon as possible. This is referred to as *leading* (and, of course, it may also be possible to take advantage of an early settlement discount). However, if an importer believes that the currency it is shortly expecting to pay will depreciate against its home currency, it may choose to delay payment beyond the due date. This course of action is known as *lagging*.

These approaches are not really hedging techniques, they are simply based upon belief and this will only succeed if the direction of rate movement is correctly estimated.

Forward exchange contracts: A forward market hedge offers protection against foreign exchange risk through a company entering into a binding contract with a bank to purchase or sell a specified quantity of foreign currency at a rate of exchange that is fixed when the contract is made. The purchase or sale is fixed for a specified date when a company expects foreign currency payments or receipts, or between two specified dates (an option forward contract). Most forward contracts are for periods of up to one year, but longer contracts may be arranged in major currencies.

Money market hedging: This involves the company borrowing funds in one currency and exchanging the proceeds for another currency, often with reinvestment in the second currency. For example a UK company due to pay a dollar debt in three months time might borrow pounds now, convert these pounds to dollars at the present spot rate (this fixes the exchange rate) and invest the dollars in the USA for three months at the end of which the total proceeds of the investment may be used to pay the dollar debt. The cost of the money market hedge is directly determined by the interest rate differential between the two countries concerned. This is in contrast to the cost of a forward market hedge, which depends upon the forward rates quoted by the bank (NB these are, of course, indirectly influenced by that interest rate differential, as explained below under the interest rate parity theory).

In addition to the traditional basic methods of foreign currency risk management, it is important to have an appreciation of the two rather more complex techniques set out below.

Foreign currency options: These offer the right to buy or sell a given amount of foreign exchange at a fixed price (the exercise price) usually at any time during a specified period. There is normally a choice of exercise price and maturity date, the price of the option varying according to the combination of exercise price and maturity date selected.

The price of the option is determined by the difference between the exercise price and spot rate, maturity, relative interest rates in the countries concerned, currency volatility and the supply and demand for specific options. The option need only be exercised if exchange rates move in favour of the option holder; this limits the “downside risk” of the holder.

Options may be purchased in “standard” sizes and maturities on certain Futures Exchanges or over-the-counter in major banks to the clients’ particular size and maturity requirements.

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Financial futures market: Several financial futures markets offer foreign currency futures. These offer purchase or sale of a standard amount of a limited number of foreign currencies at a specified time and price.

They may be considered as an alternative to the forward foreign exchange market, but are less flexible and require initial margin and thereafter variation margin may have to be paid dependent upon subsequent movements in exchange rates.

Example 1

a) Structure of Exchange Rates

Dollar spot - forward against the dollar:

	Days spread	Close	Three months
Randomland	1.7545 – 1.7710	1.7680 – 1.7690	1.56 – 1.51 cpm
Trainland	2.2669 – 2.2770	2.2693 – 2.2714	3.39 – 3.73 cdis

Requirement
i) Identify the bank's buying and selling rates
ii) Calculate the three months rates for the Randoms and Trains

b) Determinants of Forward Rates

The spot rate for the R/$ exchange is R1.77. Interest rates at home are 14% p.a. and in Randomland 12% p.a.

Requirement:
Ignoring transaction costs calculate the best rate (for the customer) at which a bank will sell the Randoms twelve months forward.

c) Hedging 'Forex' Risk

The following information is available with respect to the R/$ exchange rate and interest rates in London and New York.

	R/$		
Spot	1.7680	–	1.7690
Three months	1.56	–	1.51 cpm

Interest rates:

	Borrow	Lend
Homeland	15% p.a.	13% p.a.
Randomland	10.5% p.a.	8.5% p.a.

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Requirements:

i) A Randomland customer will pay R3m in three months' time. Show how foreign exchange risk can be eliminated using:
   1) forward market cover, and
   2) money market cover

ii) You must pay a Randomland supplier R3m in three months' time. Show how foreign exchange risk can be eliminated using:
   1) forward market cover, and
   2) money market cover

3. Interest rate parity theory (IRPT)

Proponents of this theory claim that the difference between current spot rates and forward rates is based upon interest rate differentials between the two countries concerned. Therefore the principle of interest rate parity links the international money markets with the foreign exchange markets.

$$\textbf{Forward rate } (F_o) = \textbf{Current Spot rate} \times \frac{\textbf{1 + f}\text{oreign interest rate}}{\textbf{1 + h}\text{ome interest rate}} = S_o \times \left(\frac{1 + i_c}{1 + i_b}\right)$$

$$\text{Forward rate} = R1.77 \times \frac{1.12}{1.14} = \textbf{R1.7389}$$

In this instance the current spot rate is R1.77 = $1, whereas the one year forward rate is R1.7389 = $1. Thus there is a premium of R0.0311!

Accordingly, provided this theory holds, where:

Foreign interest rates < Domestic interest rates, the forward rate is quoted at a premium,

and where:

Foreign interest rates > Domestic interest rates, the forward rate is quoted at a discount.

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Example 2

Fidden Ltd is a medium-sized company with export and import trade with Trainland. The following transactions are due within the next six months. Transactions are in the currency specified.

Purchases of components, cash payment due in three months:	$116,000
Sale of finished goods, cash receipt due in three months:	T197,000
Purchase of finished goods for resale, cash payment due in six months:	T447,000
Sale of finished goods, cash receipt due in six months:	T154,000

Exchange rates	T/$
Spot	1.7106 – 1.7140
Three months forward	0.82 – 0.77 cents premium
Six months forward	1.39 – 1.34 cents premium

	Interest rates	
Three months or six months	Borrowing	Lending
Dollars	12.5%	9.5%
Trainland	9%	6%

Requirements:

i) Calculate the net dollar receipts/payments that Fidden Ltd might expect for both its three and six month transactions if the company hedges foreign exchange risk on:

   i) the forward foreign exchange market;
   ii) the money market

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4. Purchasing power parity theory (PPPT)

This theory is based upon the "law of one price" i.e. in equilibrium identical products must have the same relative cost irrespective of the currency used. PPPT claims that the rate of exchange between two currencies depends upon the inflation levels in the countries concerned. The formula is designed to estimate a predicted spot rate between two currencies at some future time.

Formula

$$\text{Predicted Spot rate (S1)} = \text{Current Spot rate} \times \frac{1 + \text{foreign inflation rate}}{1 + \text{home inflation rate}} = \text{So} \times \frac{(1 + hc)}{(1 + hb)}$$

5. Balance of payments

Since currencies are needed to finance international trade, changes in the volume of trade between currencies may lead to changes in exchange rates. For instance, an increase in imports into the UK will create a demand for foreign currency, whilst overseas demand for UK exports will create a demand for sterling (GB$).

Thus a country with a deficit on balance of payments (where imports exceed exports) may find its currency will depreciate. Whereas a country with a balance of payments surplus (because exports exceed imports) may find its currency will appreciate. Any factors causing current account surpluses or deficits on balance of payments are likely to affect exchange rates.

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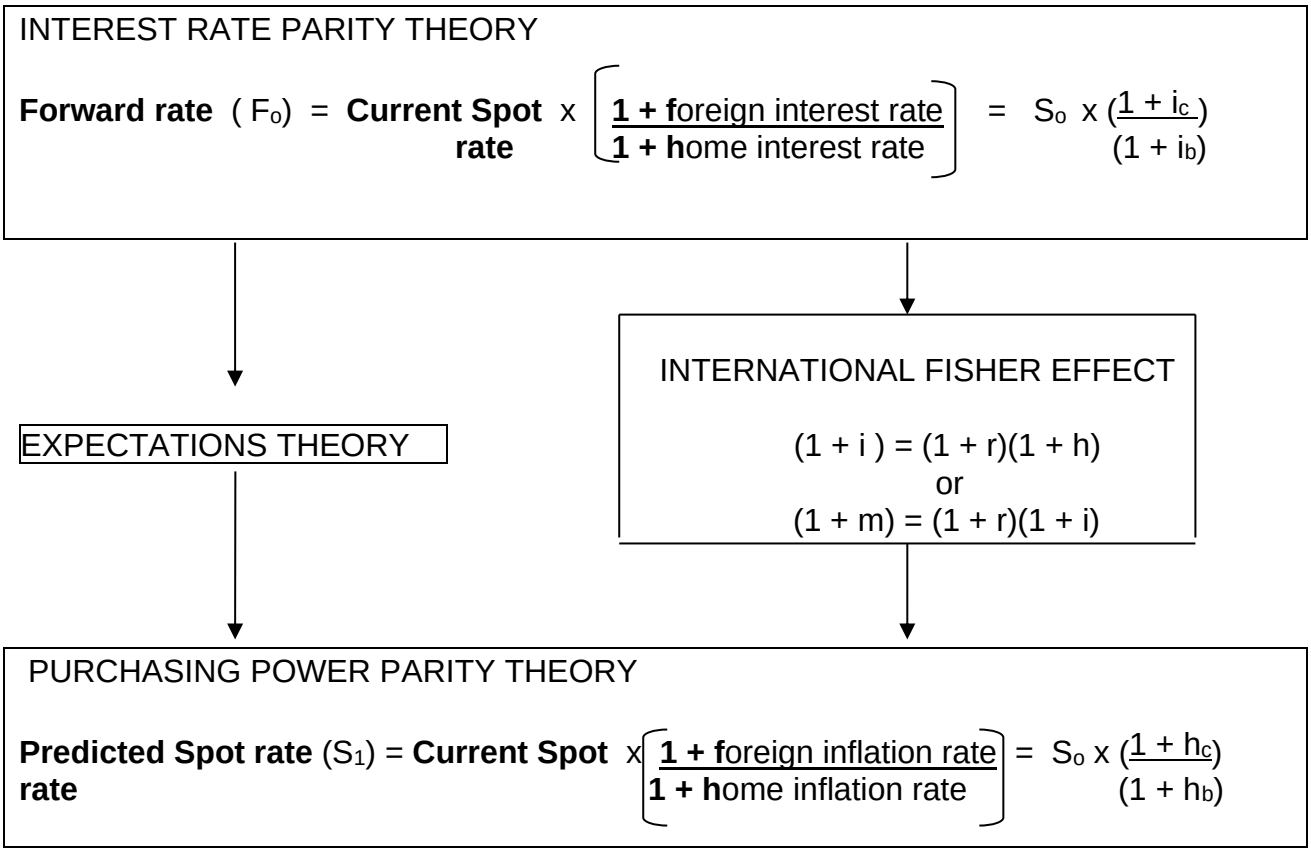
Four-way equivalence



Where F_o = forward rate

S_o = current spot rate

S_1 = predicted spot rate

i_c = interest rate in country c (the foreign country)

i_b = interest rate in country b (the home country)

h_c = expected inflation rate in country c (the foreign country)

h_b = expected inflation rate in country b (the home country)

i (or m) = money (or nominal) interest rate (i.e. including the effect of inflation)

r = real interest rate (i.e. excluding the effect of inflation)

h (or i) = expected inflation rate

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6. Methods of hedging interest rate risk

There are a number of methods that may be used by a company to reduce its exposure to possible adverse fluctuations in interest rates, in either a borrowing or lending arrangement.

The main methods are as follows:

- ***Forward rate agreements (FRA)***

  A forward rate agreement allows a company to effectively agree with a banker a fixed interest rate for a specified level of borrowing or lending for a given future period.

  An FRA is commonly quoted so as to specify the number of months hence when the borrowing or lending starts and the number of months hence when it finishes. For instance, where a company wishes to borrow for a five month period starting in two months time, this would require a "2 v.7 FRA", i.e. the borrowing will start in two months time and end in seven months time.

  Accordingly, a company which has borrowed at a floating rate of interest may enter into an FRA, which effectively locks the company into a fixed rate of interest.

  Whatever happens, the company will continue to pay its original lender the appropriate amount of interest based upon the agreed floating rate.

  However, if actual interest rates rise higher than the percentage agreed under the FRA, the bank will pay the amount of the difference as compensation to the company. If rates fall lower than agreed, the company must pay the difference as compensation to the bank.

  Conversely a lender (i.e. investor) may enter into a similar agreement. If actual floating interest rates fall below the agreed fixed percentage, the bank will pay the difference to the company. If rates rise above that specified in the FRA, the company must pay the difference to the bank.

  FRAs involve no borrowing or lending of the principal sum. They are usually for at least $500,000 (or the equivalent in major currencies) and for periods of less than one year.

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- ***Interest rate guarantees (IRG)***

  An interest rate guarantee is an interest rate option specifically arranged with a bank, i.e. it is an over-the-counter (OTC) product. An IRG provides the right, but not the obligation, to pay or receive a fixed specified rate of interest for a defined period of time. Accordingly, it would provide a borrower with the assurance of never paying more than a maximum interest rate (a cap) or give an investor the peace of mind of never earning less than a minimum interest rate (a floor). However, an IRG, like all options will allow the buying company to take advantage of favourable movements in interest rates.

  An interest rate guarantee therefore gives 'the best of both worlds', in that if a borrower purchases such an option, it will be exercised if rates rise above the guaranteed percentage, but will be abandoned if rates fall below that percentage, so that the borrower will be able to take advantage of the lower market interest rates.

  Equally, if an investor buys an interest rate guarantee, it will be exercised if rates fall below the guaranteed percentage, but will be allowed to lapse if rates rise above that percentage, so that the investor can take advantage of the higher market interest rates.

  The opportunity to abandon the arrangement is not available with FRAs or the futures market. However this advantage must be weighted against the price of the option (the 'premium') which must be paid up-front to the bank. Many companies consider that they are too expensive since a significant premium is payable.

- ***Interest rate futures***

  An interest rate future is a binding contract between a buyer and a seller for delivery of an agreed interest rate commitment on an agreed date and at an agreed price. It can be used to protect against unwanted interest rate movements.

  For example, if a borrower is worried about interest rates rising, it may **sell** interest rate futures, knowing that if interest rates do rise, the price of the futures will fall, allowing the borrower to **buy** them back at a lower price. The gain on the futures market can be offset against the additional interest suffered. The reverse happens if interest rates fall. This will have the effect of more or less fixing the effective interest rate paid by the borrower.

  Equally, if an investor is concerned about interest rates falling, it may **buy** interest rate futures, knowing that if interest rates do fall, the price of the futures will rise, allowing the investor to **sell** them at a higher price. The gain on the futures market can be added to the smaller amount of interest actually earned. The reverse happens if interest rates rise. This again has the effect of more or less fixing the effective interest rate received by the investor.

  Each futures exchange has a Clearing House. When a futures deal has been made the Clearing House assumes the role of counterparty to both the buyer and the seller. Thus the buyer has effectively bought from the Clearing House, whilst the seller is

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treated as having sold to the Clearing House, thus removing the risk of default on the futures contract.

When a deal has been made, both buyer and seller are required to pay margin to the Clearing House. This sum of money must be deposited (and maintained) in order to provide protection to both parties.

Initial margin (of about 3% of contract value) is the sum deposited when the contract is first made. **Variation margin** is payable or receivable to reflect the day-to-day profits or losses made on the futures contract. If the futures price moves adversely a cash payment must be made to the Clearing House, whilst if the futures price moves favourably the party concerned can elect to receive a cash refund from the Clearing House. This process of realising profits or losses on a daily basis is known as "marking to market".

Contract sizes are for fixed sums, e.g. $500,000 for short sterling contracts, which means that a perfect hedge is difficult to achieve.

A further reason why a perfect hedge is unlikely is basis risk i.e. the possibility of variability in the prices of the two related securities in the hedging arrangement. For example, if changes in the price of the interest rate future do not perfectly match the changes in the rate of interest, a profit or loss may occur on the hedge position.

Futures contracts are available from LIFFE (London International Financial Futures and Options Exchange). In 2002, LIFFE was taken ov er by Euronext and is now known as Euronext.liffe.

Example 3

Explain briefly these three alternatives to interest rate risk management

i) A forward rate agreement (FRA), or
ii) Interest rate futures, or
iii) An interest rate guarantee

7. Asset and liability management

Problems may arise if interest arrangements on liabilities are for different durations and different rates from the interest arrangements on related assets. Assume that interest paid on a liability is 7% p.a. (maturing in 8 years time) whilst a related asset earns 9% p.a. (maturing in 3 years). Three years from now, the company must reinvest the proceeds from the asset and if market interest rates have fallen, it may only be able to reinvest at (say) 6% p.a. For the intervening 5 years, it would earn at 6% p.a. whilst continuing to pay at 7%. To avoid this problem, companies attempt to match the duration of assets and related liabilities.

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8. Types of interest rate risk

- ***Basis risk***: A company may have assets and liabilities of similar sizes, both with floating interest rates, and so both will receive and pay interest. Initially, there may appear to be no interest rate risk exposure. However, if the two floating rates are not determined using the same basis (e.g. one is linked to LIBOR, but the other is not), it is unlikely that they will move perfectly in line with each other, so that as one rate increases, the other rate might change by a different amount or might change at a different time.

- ***Gap exposure***: Even more subtle is the situation where a company has assets and liabilities which are matched in terms of size, and where the floating interest rates on each are determined on the same basis (e.g. by reference to LIBOR). It is still possible for interest rate risk to exist, as the rates on loans may be revised on a three-monthly basis, whereas the rates on assets may be revised on a six-monthly basis.

9. Internal management of interest rate risk

In the same book, two general methods of internal hedging are referred to. These can be employed to manage interest rate exposure within a company's balance sheet.

- ***Smoothing***: This occurs where a company maintains a balance between its fixed and floating rate borrowing. If interest rates *rise*, the disadvantage of the expensive floating rate loan will be cancelled out by the inexpensive fixed rate loan. If interest rates *fall*, the disadvantage of an expensive fixed rate loan will be cancelled out by the inexpensive floating rate loan. One drawback of this hedging method is that it reduces the *comparative advantage* a company may gain, by using fixed rate debt instead of floating rate debt or vice versa. The company may also duplicate transaction and arrangement costs.

- ***Matching***: This method involves the internal matching of liabilities and assets with a common interest rate. Consider a decentralised group with two subsidiaries. One subsidiary may be investing in the money markets at LIBOR, whilst the other subsidiary is borrowing through the same money market at LIBOR. If LIBOR rises, one subsidiary's borrowing cost increases whilst the other subsidiary's returns increase. The interest rates on the assets and liabilities are matched. One problem with this method is that it may be difficult for commercial and industrial companies to match the magnitudes and characteristics of their liabilities and assets, as many companies, whilst paying interest on their liabilities do not earn income in the form of interest receipts. Matching is most widely used by institutions such as banks, which derive large amounts of their income from interest received on advances.

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10. Swaps

- ***Interest rate swaps***: These are transactions which allow a company to exploit different interest rates in different markets for borrowing, and thereby reduce or alter the timing of interest payments. The parties to a swap may either be two companies, or a company and a bank. In the former case the companies may arrange the agreement themselves or a bank may act as intermediary.

  The parties to a swap exchange their interest rate commitments with each other. That is, the company with a fixed rate commitment (which believes that interest rates are about to fall) effectively swaps with a counterparty with a floating rate commitment (which believes that interest rates are about to increase). In doing this they simulate each others' borrowings, but retain their obligations to the original lenders. Thus they must accept a degree of counterparty risk since if the other party defaults on the interest payments, the original borrower remains liable to the lender.

  The benefits are that the company can obtain interest rates which are lower than it could get directly from a bank or from other investors, and may be able to structure the timing of payments so as to improve the matching of cash outflows with revenues. Swaps are easy to organise and are flexible since they can be arranged in any size. They may also be reversible by negotiation, but this may involve the payment of a substantial termination premium by the party seeking release from the swap commitment.

- ***Currency swaps***: Two parties agree to swap equivalent amounts of currency for a given period. This effectively involves the exchange of debt from one currency to another. Again, liability on the principal is retained and the parties are liable to counterparty risk.

  One benefit to a company is that it can gain access to debt finance in another country and currency where it is little known (and consequently has a poorer credit rating) than in its home country. It can therefore take advantage of lower interest rates than it could obtain if it arranged the loan itself.

  A further purpose of currency swaps is to restructure the currency base of the company's liabilities. This may be important where the company is trading overseas and receiving revenues in foreign currencies, but its borrowings are denominated in its home currency. Currency swaps therefore provide a means of reducing exchange rate risk exposure.

  A third benefit of currency swaps is that at the same time as exchanging currency, the company may also be able to convert fixed rate debt to floating rate or vice versa. Thus it may obtain some of the benefits of an interest rate swap in addition to achieving the other advantages of a currency swap.

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Answers to examples

Chapter 1 - Financial Management Function

No Examples

Chapter 2 - Stakeholders and impact on corporate objectives

No Examples

Chapter 3 - The economic environment for business

No Examples

Chapter 4 - The nature and role of financial markets and institutions

No Examples

Chapter 5 - The nature, elements and importance of working capital

No Examples

Chapter 6 - Management of inventories, accounts receivable, accounts payable and cash

Answer to example 1

Cost of sales = 75% x $3,600,000 = $2,700,000

Raw material usage = 60% x $2,700,000 = $1,620,000

				Days
Raw materials in stock	$150,000 / $1,620,000	x	365	34
Credit taken from suppliers	$130,000 / $1,620,000	x	365	(29)
				5
WIP stock	$350,000 / $2,700,000	x	365	47
Finished goods in stock	$200,000 / $2,700,000	x	365	27
Credit given to customers	$306,000 / $3,600,000	x	365	31
Number of days between payment and receipt				110

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Answer to example 2

$$EOQ = \sqrt{\frac{2 \times 2 \times 40{,}000}{1}} = 400 \text{ units}$$

N.B. Notice how total purchase costs do not affect the formula. In the absence of any discounts, purchase costs will amount to (40,000 x $9) i.e. $360,000 p.a., whatever the size of the orders placed.

Answer to example 3

a) Current EOQ $= \sqrt{\frac{2 \times 25 \times 20{,}000}{10\% \times 40}} = 500$ units

Total cost at EOQ

			$
Purchase costs	20,000 x $40	=	800,000
Order costs	$\frac{20{,}000}{500}$ x $25	=	1,000
Holding costs	$\frac{500}{2}$ x $40 x 10%	=	1,000
			$802,000

b) Total cost if discount claimed

			$
Purchase costs	20,000 x $40 x 0.98	=	784,000
Order costs	$\frac{20{,}000}{1{,}000}$ x $25	=	500
Holding costs	$\frac{1{,}000}{2}$ x $40 x 0.98 x 10%	=	1,960
			$786,460

Since the total costs of inventories under b) i.e. with acceptance of the discount is lower than the total costs under a), accept the discount and the new EOQ will be 1,000 units.

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Answer to example 4

EOQ $= \sqrt{\frac{2 \times 30 \times 5{,}000}{7.5}} =$ 200 units

Total cost at EOQ

			$
Purchase costs	5,000 x $1.10	=	5,500
Order costs	$\frac{5{,}000}{200}$ x $30	=	750
Holding costs	$\frac{200}{2}$ x $7.50	=	750
			$7,000

Total cost if discount claimed

			$
Purchase costs	5,000 x $1.10 x 0.97	=	5,335
Order costs	$\frac{5{,}000}{300}$ x $30	=	500
Holding costs	$\frac{300}{2}$ x $7.50	=	1,125
			$6,960

The new EOQ should be 300 units, which will attract the 3% discount, thus minimising the total costs of inventories.

Answer to example 5

Reorder level = *maximum* usage x *maximum* lead time = (95 x 18)

= 1,710 units (thus ensuring a stock-out will *never* occur)

Maximum level =
reorder level + reorder quantity – (*minimum* usage x *minimum* lead time)

= 1,710 + 1,750 – (50 x 12)

= 2,860 units (this quantity can *never* be exceeded following a delivery)

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Answer to example 6

We are effectively paying $1.50 to borrow $98.50 for 30 days.

Annual cost:

Using simple interest : $\frac{1.5}{98.5} \times \frac{365}{30} = \underline{18.53\%}$

Using compound interest: $(1 + \frac{1.5}{98.5})^{365/30} - 1 = 0.2019 = \underline{20.19\%}$

For purposes of the examination (in the absence of alternative instructions) the simple interest approach would suffice!

Answer to example 7

Costs			$
Discounts granted	(2m x 1.05 x 50% x 2.5%)		(26,250)
Benefits			
Extra contribution earned	(2m x 5% x 40%)	=	40,000
Reduced bad debts	(2m x 5%) – (2.1m x 4%)	=	16,000
Financing costs saved	(2m x $\frac{90}{365}$ x 10%) – (2.1m x $\frac{75}{365}$ x 10%)	=	6,164
Net benefit			$35,914

Therefore adopt the discount scheme.

Answer to example 8

a) Sales ledger administration

Sarah Ltd would achieve a net saving of [$5,000 – (3% x $100,000)] = $2,000

b) Advance payment

The debtor days will be reduced from 80 days to 30 days,			$
Thus the interest saving will be	$\frac{(80 - 30)}{365}$ x 10% x 100,000	=	1,370
Less: Factors fees	1.25% x 100,000	=	(1,250)
Net benefit to Sarah Ltd			$ 120

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Therefore Sarah Ltd should take up both services offered by the factor.

Answer to example 9

a) Debtor days = $\frac{6m}{30m} \times 365$ = 73 days

Cost to the company = 12% x 6m = $720,000

b) Since 30% of debtors take up the facility, the other 70% continue to pay after 73 days.

Therefore the revised average debtor days will be:

(30% x 15 days) + (70% x 73 days) = 55.6 days

			$
Interest cost	= $\frac{55.6}{365}$ x 12% x 30m	(rounded)	548,400
Cost of discount	= 1% x 30% x 30m		90,000
Total cost			$638,400

Milano Ltd should offer this discount, since the costs associated with accounts receivable are expected to fall by ($720,000 - $638,400) i.e. $81,600.

c) Cost of the factor's proposal:

		$
Interest cost	= $\frac{50}{365}$ x 12% x 30m	493,151
Factors fee	= 1.5% x 30m	450,000
Saving in administration costs		(300,000)
Total cost		$ 643,151

Milano Ltd should not accept the factor's offer – it is more expensive than the discount policy calculated in b) above!!

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Answer to example 10

There are three possible options.

- Turino Ltd could continue as at present, or
- use Factor A (with normal overdraft financing), or
- use Factor B with finance from factor (80%) and overdraft finance (18%)

Continue as at present

Annual cost of granting credit	$\frac{60}{365}$ x 17% x 500,000	$13,973

Factor A

		$
Service fee	2% x 500,000	10,000
Saving in administration costs		(8,000)
Cost of debtors	$\frac{50}{365}$ x 17% x 500,000	11,644
		$13,644

Factor B

		$
Service fee	2% x 500,000	10,000
Saving in administration costs		(8,000)
Financing by factor	80% x $\frac{45}{365}$ x 18% x 500,000	8,877
Financing by overdraft	20% x $\frac{45}{365}$ x 17% x 500,000	2,096
		$12,973

The cheapest option is to use Factor B

Answer to example 11

From the viewpoint of Mark Ltd:

Benefit:	2% x 1,000	=	20.00
Cost	$\frac{30}{365}$ x 20% x (1,000 – 20)	=	(16.11)
Net benefit			$ 3.89

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Accept the supplier's offer of a discount.

Answer to example 12

Optimal amount of cash transferred = $\sqrt{\frac{2 \times 22.50 \times 500{,}000}{0.10}}$ = $15,000

Answer to example 13

Optimal amount of cash transferred = $\sqrt{\frac{2 \times 22.50 \times 500{,}000}{0.05}}$ = $21,213

Answer to example 14

Variance of daily cash flows = $2{,}500^2$ = 6,250,000

Interest rate per day = (9.125 ÷ 365) = 0.025%

Spread = $3 \times \left[\frac{75\% \times 20 \times 6{,}250{,}000}{0.00025}\right]^{1/3}$ = $21,634

Upper limit = $10,000 + $21,634 = $31,634

Return point = $10,000 + ($^1/_3$ x $21,634) = $17,211

Decision rule

If cash balances rise to $31,634, invest (31,634 – 17,211) i.e. $14,423 in marketable securities.

If cash balances fall to $10,000, sell (17,211 – 10,000) i.e. $7,211 of marketable securities to replenish cash balances.

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Chapter 7 – Investment Appraisal Techniques

Answer to example 1

X plc is considering a project with the following estimated cash flows.

	t_0 $	t_1 $	t_2 $	t_3 $	t_4 $
Net cash flow	(10,000)	3,000	4,000	4,000	3,000
Cumulative cash flow	(10,000)	(7,000)	(3,000)	1,000	4,000

Payback period is between 2 and 3 years (3/4 of the way through year 3)

Answer to example 2

X plc has the following cash flow estimates for a new project it is appraising.

	t_0 $	t_1	t_2	t_3 $
Plant and machinery	(200)			20
Net trading cash flows		80	120	100

Total depreciation charge = 200 – 20 = 180

Total trading cash flows = 80 + 120 + 100 = 300

Total accounting profits = 300 – 180 = 120
Annual average accounting profits = 120 / 3 years = 40 pa

Initial investment = 200
ARR = 40 / 200 x 100% = 20%

Average investment = (200 + 20) / 2 = 110
ARR = 40 / 110 x 100% = 36%

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Chapter 8 – Discounted cash flow (DCF) techniques

Answer to example 1

Summary of results

Project		1	2
a)	Accounting rate of return	33%	25%
b)	Net present value ($000)	142	210
c)	Payback period (years)	2.8 or 3	3.2 or 4
d)	DPP	3.9	4.5

Summary of rankings

		Better project
a)	Accounting rate of return	1
b)	Net present value	2
c)	Payback period	1
d)	DPP	1

Workings

		Project 1	Project 2
a)	Accounting rate of return	$000	$000
	Initial investment	556	1,616
	Scrap value	(56)	(301)
	Total depreciation	500	1,315
	Annual depreciation	100	263
	Cash flows	200	500
	Depreciation (see above)	(100)	(263)
	Average accounting profit	100	237

	Project 1	Project 2
Average book value of investment ($000)		
½ (556 + 56)	306	
½ (1,616 + 301)		958
Accounting rate of return	33%	25%

			$000	$000
b)	Net present value			
	Year			
	0	Initial outlay	(556)	(1,616)
	1 – 5	Cash flows		
		200 x 3.352	670	
		500 x 3.352		1,676
	5	Residual value		
		56 x 0.497	28	
		301 x 0.497	____	150

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Net present value ($000)	142	210

c) Payback period

Annual cash flows	200	500
Initial investment	556	1,616
Payback period in years		
If cash flows arose during each year	2.8	3.2
If cash flows arose at year end (as in this question)	3	4

d) DPP Project 1

Discounted payback period (will take into account time value of money)

	t = 0	1	2	3	4
DPP cum PV	(556,000)	(382,000)	(230,800)	(99,200)	15,200

3 years + 99.2 / 114.4 = 3.9

Project 2

DPP	(1,616)	(1,181)	(803)	(474)	(188)	210

4 years + 188 / 398 = 4.5

Answer to example 2

Projects A and B (Workings)

PROJECT A

Year	$	8%	$	16%	$
1	5,000	.93	4,650	.86	4,300
2	20,000	.86	17,200	.74	14,800
3	100,000	.79	79,000	.64	64,000
4	10,000	.74	7,400	.55	5,500
PV			108,250		88,600
0	Initial cost		(100,000)		(100,000)
NPV			$8,250		$(11,400)

IRR = 8% + (8,250) x (16% - 8%) = 11.4%
8,250 + 11,400

PROJECT B

Year	$	8%	$	16%	$
1	60,000	.93	55,800	.86	51,600
2	40,000	.86	34,400	.74	29,600
3	20,000	.79	15,800	.64	12,800
4	5,000	.74	3,700	.55	2,750
PV			109,700		96,750
0	Initial cost		(100,000)		(100,000)

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NPV	$9,700	$(3,250)

$$IRR = 8\% + \frac{9,700}{9,700 + 3,250} \times (16\% - 8\%) = 14.0\%$$

Answer to example 3

project 1

	CF	t =	DF 15%	PV	DF 10%	PV
machinery cost	(14,000)	0	1.000	(14,000)	1.000	(14,000)
residual value	300	5	0.476	143	0.621	186
Net cash flows	4,000	1 to 5	3.352	13,408	3.791	15,164
				(449)		1,350

IRR = 0.10 + 1,350 / (1,350 + 449) x (0.15 - 0.10) = 13.8%

project 2

	CF	t =	DF 15%	PV	DF 10%	PV
machinery cost	(31,320)	0	1.000	(31,320)	1.000	(31,320)
residual value	6,020	5	0.476	2,866	0.621	3,738
Net cash flows	8,000	1 to 5	3.352	26,816	3.791	30,328
				(1,638)		2,746

IRR = 13.1%

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Chapter 9 – Allowing for inflation and taxation in DCF

Answer to example 1

Method 1: Compute the real discount rate and discount the real cash flows

$$1 + r = \frac{1 + m}{1 + i} = \frac{1.155}{1.05} = 1.1$$

Thus r = 0.1 or 10%

Year	'Real' cash flow	10% factor	Present value
	$		$
0	(1,500)	1	(1,500)
1	670	1/1.1	609.1
2	500	$1/1.1^2$	413.2
3	1,200	$1/1.1^3$	901.6
		NPV	+ 423.9

Method 2: Compute the money cash flows, using the rate of inflation and discount at the money discount rate.

Year	'Money' cash flow	15.5% factor	Present value
	$		$
0	(1,500)	1	(1,500)
1	670 x 1.05 = 703.5	1/1.155	609.1
2	500 x 1.05^2 = 551.25	$1/1.155^2$	413.2
3	1,200 x 1.05^3 = 1,389.15	$1/1.155^3$	901.6
		NPV	+ 423.9

Please note that discount rates have been computed as opposed to looked up in tables, to ensure that accuracy is obtained for the reconciliation

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Answer to example 2

	t_0	t_1	t_2	t_3
Net trading revenue		5,000	5,000	
Tax at 33%			(1,650)	(1,650)
Fixed asset	(10,000)			
Scrap proceeds			6,000	
Tax savings on WDAs			825	495
Net cashflow	(10,000)	5,000	10,175	(1,155)

Working

Tax savings on writing down allowances

			Tax relief at 33%	Timing
		$	$	
t_0	Investment in fixed asset	10,000		
t_1	WDA @ 25% (y/e 31.12.01)	(2,500)	825	t_2
		7,500		
t_2	Proceeds	(6,000)		
	Balancing allowance	(1,500)	495	t_3

Answer to example 3

	t_0	t_1	t_2	t_3
Net trading revenue		5,000	5,000	
Tax at 33%			(1,650)	(1,650)
Fixed asset	(10,000)			
Tax savings on WDAs		825	619	1,856
Net cashflows	(10,000)	5,825	3,969	206

Working

Tax savings on writing down allowances

Timing			Tax relief at 33%	
t_0	Investment in fixed asset	10,000		
t_0	WDA @ 25%	(2,500)	825	t_1
		7,500		
t_1	WDA @25%	(1,875)	619	t_2
		5,625		
t_2	Proceeds	-		
	Balancing allowance	(5,625)	1,856	t_3

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Chapter 10 – Adjusting for risk and uncertainty in investment appraisal

Answer to example 1

a) i) **Calculation of expected Net Present value**

Project

A. $70,000 x 3.605 - $246,000= $6,350

B. $75,000 x 0.893 + $87,000 x 0.797 + $64,000 x 0.712 - $180,000 = $1,882

C. $48,000 x 0.893 + $48,000 x 0.797 +
$63,000 x 0.712 + $73,000 x 0.636 - $175,000 = ($2,596)

D. $62,000 x 3.037 - $180,000 = $8,294

E. $40,000 x 0.893 + $50,000 x 0.797 + $60,000 x 0.712
+ $70,000 x 0.636 + $40,000 x 0.567 - $180,000 = $5,490

F. $35,000 x 0.893 + $82,000 x 0.797 + $82,000
x 0.712 - $150,000 = $4,993

ii) **Calculation of Profitability Index**

Present value of cash inflows ÷ initial outlay:

A.	$252,350/$246,000	=	1.026
B.	$181,882/$180,000	=	1.010
C.	$172,404/$175,000	=	0.985
D.	$188,294/$180,000	=	1.046
E.	$185,490/$180,000	=	1.031
F.	$154,993/$150,000	=	1.033

Ranking	**NPV**	**P.I.**
1	D	D
2	A	F
3	E	E
4	F	A
5	B	B
6	C	C

The rankings differ because NPV is an absolute measure of the benefit from a project, whilst profitability index is a relative measure, and shows the benefit per $ of outlay. Where the initial outlays vary in size the two methods may give different rankings.

b) In a capital rationing situation, the projects should be selected which give the greatest total NPV from the limited outlay available.

- A and E are mutually exclusive

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- C is not considered as it has a negative NPV
- Total outlay is limited to $620,000

Possible selections are:

Projects	Expected NPV $	Total NPV $	Outlay in $000
A, B, D	(6,350 + 1,882 + 8,294)	16,526	(246 + 180 + 180) 606
A, B, F	(6,350 + 1,882 + 4,993)	13,225	(246 + 180 + 150) 576
A, D, F	(6,350 + 8,294 + 4,993)	19,637	(246 + 180 + 150) 576
B, D, E	(1,882 + 8,294 + 5,490)	15,666	(180 + 180 + 180) 540
B, D, F	(1,882 + 8,294 + 4,993)	15,169	(180 + 180 + 150) 510
D, E, F	(8,294 + 5,490 + 4,993)	18,777	(180 + 180 + 150) 510

The recommended selection is projects A, D and F

Answer to example 2

1. **The financing decision**

Use the after tax cost of debt to discount cashflows associated with financing the proposal.

a) **Lease**

Time	0	1	2	3	4	5	6
Lease payment	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)		
Tax relief			0.525	0.525	0.525	0.525	0.525
Net cash flow	(1.5)	(1.5)	(0.975)	(0.975)	(0.975)	0.525	0.525
12% discount factor	1.0	0.893	0.797	0.712	0.636	0.567	0.507
PV	(1.5)	(1.340)	(0.777)	(0.694)	(0.620)	0.298	0.266

NPV = ($4.367m)

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b) **Buy**

Time	0	1	2	3	4	5
Purchase price	(6.4)					
Tax saving from CAs*			0.560	0.560	0.560	0.560
12% discount Factor	1.0	0.893	0.797	0.712	0.636	0.567
PV	(6.4)	0	0.446	0.399	0.356	0.317

NPV = ($4.882m)

*** Capital allowance calculation**
25% x 6,400,000 = 1,600,000 x tax rate of 35% = 560,000
Note that all tax savings are delayed by one year and that the timing of capital allowances can vary depending upon the date of purchase. This analysis assumes that time 0 is at the beginning of the first year, and therefore the tax relief (on capital allowances and/or leasing payments) commences 24 months later.

Conclusion: Leasing is the cheaper alternative

Answer to example 3

EAC method
Cycle cost of two year replacement

t	$	10% DF	$
0	1,000	1.00	1,000
2	(300)	0.826	(248)
			752

Two year annuity factor @ 10% p.a. = 1.736

EAC = $\frac{\$752}{1.736}$ = $433

Cycle cost of three year replacement

t	$	10% DF	$
0	1,000	1.00	1,000
2	100	0.826	83
3	(100)	0.751	(75)
			1,008

Three year annuity factor @ 10% p.a. = 2.487
EAC = $\frac{\$1,008}{2.487}$ = $405
Since $405 is cheaper, the optimum replacement cycle is three years.

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Answer to example 4

t = 0	(240)	1.000	(240)	(240)
0	(300)	1.000	(300)	(300)
1	30	0.909	27	27
				(513)
		AF 10%		0.909
		EAC		(564)

Answer to example 5

a) The question involves two stages of calculation, involving both the life of the new machine and the life of the existing machine. The following alternatives need to be considered:

1) New machine
Assuming that the new machine will have to be perpetually replaced, should the new machine be replaced

a) Every five years
b) Every eight years
c) Every ten years?

It is first necessary to decide whether in general a 5 year, 8 year or 10 year cycle is the best policy for replacing the new machine.

1) Present value of costs:

Replacement cycle	**Cost**	**Year**	**15% PV Factor**	**PV**
	$			$
5 years	40,000	0	1	$40,000
8 years	40,000	0	1	40,000
	10,000	5	0.497	4,970
				$44,970
10 years	40,000	0	1	40,000
	10,000	5	0.497	4,970
	20,000	8	0.327	6,540
				$51,510

2) Annual equivalent cost

Replacement cycle	**PV / Annuity factor**	**Annual equivalent cost**
5 years	40,000 / 3.352	$11,933

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8 years	44,970 / 4.487	$10,022
10 years	51,510 / 5.019	$10,263

This shows that the best policy is replacement every eight years.

Chapter 11 – Sources of and raising short-term finance

No examples

Chapter 12 - Sources of and raising, long-term finance

Answer to example 1

a) Total market capitalisation = 500,000 @ $3.20 = $1,600,000

b) Price earnings ratio = $3.20 / 40p = 8

c) Dividend yield:

Gross @ 10% = (18c + (1/9 x 18c)) / $3.20 x 100/1 = 6.25%

Net = 18c / $3.20 x 100/1 = 5.625%

d) Dividend cover = 40c / 18c = 2.22 times

Answer to example 2

a) *Terms of the rights issue*
To raise $40million at $2.00 each, 20 million shares must be issued. This is equal to one-fifth of the existing issued capital. These offer terms are a 1 for 5 rights issue.

b) *Value of company after rights issue*
The equity market capitalisation is currently (100m x $2.96) $296 million. If shareholders inject an additional $40 million in cash, the market capitalisation of the company will increase to $336 million.

c) *Theoretical ex-rights price*

Share price = $336m ÷ (100m + 20m) = $2.80

d) *Nil paid value of a right*

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Existing shareholders can, if they wish, sell their rights to a third party. The buyer would still have to pay the company $2.00 per share, but they would obtain a share which is expected to be worth $2.80 upon completion of the rights issue. The nil paid value of the right is the difference between these two amounts i.e.

	$
Value of share after rights issue (theoretical ex-rights price)	2.80
Price payable to the company	(2.00)
Nil paid value of a right	$0.80

Since 5 shares must be held before there becomes an entitlement to take up one new share, the nil paid value is $0.16 per existing share.

e) *Impact on shareholder wealth*

Situation 1 – shareholder takes up rights

Value of shares cum-rights (500 shares @ $2.96)		$1,480.00
		$
Value of shares ex-rights (600 shares @ $2.80)	1,680.00	
Less cash paid to company (100 shares @ $2.00)	(200.00)	
	$1,480.00	

There is no change in shareholder wealth

Situation 2 – shareholder sells the rights

Value of shares cum-rights (500 shares @ $2.96)	$1,480.00	
		$
Value of shares ex-rights (500 shares @ $2.80)	1,400.00	
Plus cash proceeds from sale of rights (100 rights sold @ nil paid value of $0.80 per share)	80.00	
	$1,480.00	

Again there is no change in shareholder wealth

Notice that despite the rights price ($2.00) being set at a discount to the current market price ($2.96), there is no impact on the wealth of existing shareholders.

Chapter 13 – Islamic financing

No Examples

Chapter 14 - Internal sources of finance and dividend policy

No Examples

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Chapter 15 - Sources of finance and their relative costs

Answer to example 1

$$Ke = \frac{30c}{230c - 30c} = \underline{15\%}$$

Answer to example 2

$$Ke = \frac{32.2c}{92\% \times \$2.50} = \underline{14\%}$$

ii) Carsberg recommends that share issue costs are treated as a year 0 cash outflow of the project for which the share capital is raised. Thus share issue costs do not affect Ke. In Example 2, Ke would be calculated as follows:

$$Ke = \frac{32.2p}{\$2.50} = 12.9\%$$

Answer to example 3

$$Ke = \frac{22c}{\$2} + 10\% = \underline{21\%}$$

Two methods of estimating future growth

i) Historical growth in dividends

Answer to example 4

Dividend in 2002 $(1 + g)^4$ = Dividend in 2006

$$(1 + g)^4 = \frac{\text{Dividend in 2006}}{\text{Dividend in 2002}}$$

$$= \frac{\$262,350}{\$150,000} = 1.749$$

$$(1 + g) = \sqrt[4]{1.749} = 1.15$$

$$g = \underline{15\%}$$

Answer to example 5

$$g = 40\% \times 10\% = \underline{4\%}$$

$$Ke = \underline{12.48c} + 4\% = \underline{17\%}$$

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96c

Answer to example 6

Narrative	t =	Cash flows	DF 5%	PV	DF @ 7%	PV
Investment	0	(92.84)	1.000	(92.84)	1.000	(92.84)
Coupon after tax	1 - 3	3.50	2.723	9.53	2.624	9.18
Redemption	3	100.00	0.864	86.40	0.816	81.60
				3.09		(2.06)

$$\text{IRR} = 5\% + \frac{3.09}{3.09 + 2.06} \times (7\% - 5\%) = 6.2\%$$

Answer to example 7

	Market Value $	Component Cost	$
Equity (½ m @ $2)	1,000,000	18%	180,000
Prefs (½m @ 50p)	250,000	12%	30,000
Debt ($1m @ 75)	750,000	8%*	60,000
	2,000,000		$270,000

$$\text{Ko} = \frac{\$270,000}{\$2,000,000} = 13.5\%$$

$$*\text{Kd} = \frac{\$10\ (1 - 0.4)}{75} = 8\%$$

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Answer to example 8

Example 8

	working	cost of cap	MV of cap
equity	W2	17%	525,000
prefs	W1	15%	40,000
red debt	W3	3.2%	210,600
			775,600

calculate WACC

WACC = Ke x E / D +E+P + Kp x P /D+E+EP + Kd (1-t) x D/D+E+P

WACC = 13.1%

W1 prefs

Kp = Dp / Sp

$$\frac{6\% \times 100p}{40p} = 15.0\%$$

P = 100,000 x 40p/100c = 40,000

W2 equity

$$Ke = \frac{Do\ (1+g)}{Po} + g$$

Po = 117 - 12 = 105c
D 0 = dividend per share = 60,000 / 500,000 shares = 12c
g = 5%

$$Ke = \frac{12 \times 1.05}{105} + 0.05 = 17.0\%$$

E = no of shares x MV (ex div) per share =

500,000 x 1.05 = 525,000

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W3 red debt

	0	1	2		
initial invest	(105.30)				
interest paid each year		10.00	10.00		
less; tax break (40%)		(4.00)	(4.00)		
redemption proceeds			100.00	note this can change if question has convertibles or a redemption premium	
	(105.30)	6.00	106.00		
DF 3%	1.000	0.971	0.943		
PV	(105.30)	5.83	99.96	NPV	0.48
DF 5%	1.000	0.952	0.907		
PV	(105.30)	5.71	96.14	NPV	(3.45)

IRR = 0.03 + 0.48 / (0.48 + 3.45) x (0.05 - 0.03)

3.2% this is Kd (1-t) ie after tax

D = 200,000 x 105.30 / 100 = 210,600

How to estimate a discount rate

interest cost	10%
less: tax break	-40%
net after tax cost	6%
buy asset for 105 redemption of 100 105 - 100 = 5 / no of years 2 = subtract as purchase at a premium	2.5%
expected IRR	3.5%

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Nevada Plc Solution

i) Cost of ordinary shares

Growth rate in dividend = $\sqrt[3]{\frac{30}{26}} - 1 = 0.049$ (i.e. 4.9%)

Cost of equity = $\frac{D_1}{P_o} + g$

$= \frac{30 \times 1.049}{235 - 30} + 0.049$

$= 0.2025$ (i.e. 20.25%)

ii) Cost of redeemable debentures

Time	Flow $	20% factor	PV $	15% factor	PV $
0	(59)	1	(59.000)	1	(59.000)
1-6	6	3.326	19.956	3.784	22.704
6	102	0.335	34.170	0.432	44.064
			(4.874)		7.768

By interpolation:

$IRR = 15 + \frac{7.768}{7.768 + 4.874} \times (20 - 15) = 18.07$

Cost of debentures = 18.07%

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iii) Weighted average cost of capital

$$\text{Cost of equity} = \frac{20 \times 1.1}{275} + 0.1 = 0.18 \text{ (i.e. 18\%)}$$

$$\text{Cost of debenture} = \frac{12 \times 0.80}{80} = 12\%$$

$$\text{Weighted average cost of capital} = \frac{(8m \times 2.75 \times 18\%) + (4m \times 0.80 \times 12\%)}{(8m \times 2.75) + (4m \times 0.80)}$$

$$= \underline{\underline{17.2\%}}$$

Chapter 16 – Capital structure theories and practical considerations

Berlan's weighted average cost of capital

Cost of equity	$'000
Earnings before interest and tax	15,000
Interest (16% x 23,697)	3,792
	11,208
Tax (35% x 11,208)	3,923
Earnings	7,285
Dividend (full distribution)	7,285
	NIL

Number of shares = $12.5 million x 4 = 50 million

Market price per share: cum div	86
Less interim dividend declared	6
Ex div	80c

Value of shares = 50 million x 80c = $40 million

Cost of equity capital, using the dividend valuation model and assuming constant dividends

$$= \frac{7,285}{40,000} = \underline{\underline{18.21\%}}$$

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Cost of debt

A market value higher than redemption value implies that the cost (pre-tax) is less than the nominal rate of 16%.

Using 8% and 9% as discount rates.

Year		$	8% Factors	PV	9% factors	PV
0	Market value	(105.50)	1	(105.50)	1	(105.50)
1-3	Interest (net of tax)	10.40	2.577	26.80	2.531	26.32
3	Redemption	100.00	0.794	79.40	0.772	77.20
				+0.70		–1.98

$$\text{Cost of debt} = 8\% + \left(\frac{0.7}{0.7 + 1.98}\right) \times 1\% = 8.26\%$$

$$\text{Market value of debt} = \$23.697 \text{ million} \times \frac{105.50}{100} = \$25 \text{ million}$$

Value of debt plus equity = $(25 + 40) million = $65 million

Weighted average cost of capital

$$\text{WACC} = 18.21\% + \frac{40}{65} + 8.26\% \times \frac{25}{65} = 14.38\%$$

Changes to capital structure: Canalot plc

a) i) Market value

Using a Modigliani-Miller formula for the value of a geared company (with irredeemable debt):

Vg = Vu + Dt

When Canalot replaces equity with loan stock, the company will increase in value by the tax shield, Dt.

= $5 million debt issued x 35% tax rate

= $1.75 million

The market value of the company increases to
$32.5 million + $1.75 million =$34.25 million

The market value of equity becomes
$34.25 million – $5 million = $29.25 million

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ii) The cost of equity

This can be computed
- from first principles, or
- by using the MM formula for Ke

From first principles

Consider the distribution of profits before and after the change in capital structure.

Before the change, equity earnings = 18% x market value of $32.5 million = $5.85 million

Pre-tax profits = $5.85 million x $\frac{100}{65}$ = $9 million

After the debt issue:

	$'000	
Earnings before interest and tax	9,000	
Less interest: $5m x 13%	650	
	8,350	
Tax (35% x 8,350)	2,922	
Equity earnings (= dividend)		5,428

Cost of equity = $\frac{5,428}{29,250}$ = 18.56%

The cost of equity has increased by 0.56% because of the increased financial risk experienced by shareholders.

Using the MM formula for Ke:

$$Keg = Keu + (Keu - Kd)\frac{D(1-t)}{E}$$

$$= 18\% + (18\% - 13\%)\frac{5(1 - 0.35)}{29.25} = 18.56\%$$

iii) Weighted average cost of capital

Again, this can be computed either from first principles or by using the MM formula for WACC.

From first principles

$$WACC = \frac{29.25}{34.25} \times 18.56\% + \frac{5}{34.25} \times 13\% \times 0.65 = 17.08\%$$

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Using the MM formula for WACC

$$WACCg = Keu\left(1 - \frac{Dt}{E + D}\right)$$

$$= 18\%\left(1 - \frac{5 \times 0.35}{34.25}\right) = \underline{17.08\%}$$

The WACC has declined from 18%, reflecting the benefits of tax relief on interest.

Chapter 17 – Impact of cost of capital on investments

Answer to example 1

Since the debt of Stiles plc may be assumed to be risk free:

$$\beta_a = \beta_e \frac{E}{E + D(1-t)}$$

Therefore since Giles plc is an all equity company within the same industry as Stiles plc, the β_e of Stiles plc can be calculated as follows:

$$\beta_e = \beta_a \frac{E + D(1-t)}{E}$$

$$= 0.95 \times \frac{15 + 6(1-0.4)}{15}$$

$$= \underline{1.178}$$

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Suggested Solution to Nelson Plc

a) Estimates of likely beta

$$\beta a = \beta e \frac{E}{E + D(1-t)} + \beta d \frac{D(1-t)}{E + D(1-t)}$$

But assumed $\beta d = 0$

$$\beta a = \beta e \frac{E}{E + D(1-t)}$$

Therefore $\beta e = \beta a \frac{E + D(1-t)}{E}$

i) The beta of Oak's equity must be degeared to reflect Nelson's all equity status Hence,

$$\beta a = \beta e \frac{E}{E + D(1-t)}$$

$$= 1.12 \times \frac{6}{6 + 4(1-0.4)} = 0.8$$

ii) To obtain a beta for Nelson, we must isolate the beta of Beech's current operating activities.

Hence
$1.11 = (\beta \text{ Current operations} \times 0.7) + (1.9 \times 0.3)$
$1.11 = (\beta \text{ Current operations} \times 0.7) + 0.57$
$0.54 = \beta \text{ Current operations} \times 0.7$

$$\beta \text{ Current operations} = \frac{0.54}{0.7} = 0.77$$

iii) In this case we must degear Pine's equity beta to remove the financial risk carried by Pine and then isolate the beta of Pine's Eastern Division.

$$\beta a = \beta e \frac{E}{E + D(1-t)}$$

$$\beta a = 1.14 \times \frac{75}{75 + 25(1-0.4)} = 0.95$$

β overall $= 2/3\ \beta E + 1/3\ \beta W$

$0.95 = 2/3\ \beta E + 1/3\ \beta W$

$= 2/3\ \beta E + 1/3 \times 1.5\ \beta E$

$= 2/3\ \beta E + 1/2\ \beta E$

$= 7/6\ \beta E$

Therefore $\beta a = 0.95 \times 6/7 = 0.814$

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Note that this calculation could have been performed by firstly isolating the beta of the Eastern division and then by degearing to remove the financial risk carried by Pine.

b) Reasons for estimated beta differences

The reasons include:

i) Statistical estimation

Estimates of beta derived from observed share prices are usually the results of a linear regression. They are, therefore, an estimate of the share beta rather than a precise determination of that beta. Even if the true underlying betas are identical, the regression estimates may differ. Normally betas of portfolios are considered to be more reliable than betas of individual securities.

ii) Changes in operations

While the firms may currently have identical operating activities, by the time a valid estimate of Nelson's beta can be made from actual share price data (probably at least three years hence) the operating practices may have changed.

iii) Abnormal share price behaviour

The period immediately following a firm's quotation on a stock exchange may produce non-typical share price behaviour. The inclusion of such a period in the observations used to determine beta may distort the calculations.

iv) Size difference

Difference in size between Nelson and the other companies may cause a difference in perceived risk which is reflected in the beta estimation. Generally, smaller companies are perceived as being of greater risk than larger firms.

v) Differences in current cost structures

Although firms may appear to have identical operating characteristics, differences in cost structures (e.g. caused by differences in the ages of production equipment) can affect beta. Usually, the higher the proportion of fixed costs the higher will be beta.

vi) Growth opportunities of Nelson

Investors may perceive Nelson as having opportunities for growth and its actual share price, share price behaviour and beta may reflect growth opportunities as well as current activities.

vii) Degearing process

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The approach used to degear betas is derived from the Modigliani and Miller 1963 hypothesis. If any of the assumptions of their theory are violated (e.g. risk free and permanent debt) then the procedure is invalid. In general terms any of the criticisms levelled against the Modigliani and Miller 1963 theory (e.g. bankruptcy costs, tax exhaustion, personal taxes, etc) could be used to criticise our calculations above.

c) Share price volatility and systematic risk

The reasons for the lower beta value of a company with high share price volatility stem from the differences between total risk and systematic risk. Total risk, represented by measures of total share price (or return) volatility, comprise:

systematic risk + unsystematic risk

The unsystematic element of total risk is not connected with economy-wide factors but is unique to a particular firm. This unsystematic risk can largely be diversified away in a widely spread portfolio. The systematic risk results from the connection between the share and the economy, or stock market, generally and cannot be diversified away in a portfolio. It is this systematic risk, measured by beta, which is of relevance.

For example, the success of a mineral prospecting company is unlikely to be a function of the economy generally and is more likely to be determined by factors unique to the firm. While the firm's share price may be very volatile and the share is extremely risky if held in isolation, the small level of dependence on the economy means the share is largely risk-free in a portfolio context. Hence, large total risk but small systematic risk is to be expected from this type of firm.

However, a manufacturing company may have a far greater dependence on the economy and so its systematic risk is higher, even though its total risk is lower than that of the prospecting firm.

Chapter 18 – Business Valuations

Answer to example 1

$$Po = \frac{D}{Ke} = \frac{\$0.20}{0.2} = \underline{\$1.00}$$

Answer to example 2

$$Po = \frac{D_1}{Ke - g} = \frac{\$0.30}{0.2 - 0.05} = \underline{\$2.00}$$

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Answer to example 3

This year's dividend, Do = 40p. Next year's dividend will be a factor of g higher:

$$D_1 = Do\ (1 + g) = 40c\ (1 + 0.06)$$

$$= 42.4p$$

$$Po = \frac{D_1}{Ke - g} + Do = \frac{42.4p}{0.25 - 0.06} + 40p$$

$$= \underline{\$2.63}$$

Answer to example 4

Year	Free cash flows	Discount factor	Present values
	$000	12%	$
1	150	0.893	133,950
2	200	0.797	159,400
3	250	0.712	178,000
4	375	0.636	238,500
5	500	0.567	283,500

Estimated market capitalisation for 5 year planning horizon $993,350

Answer to example 5

Net cash flows

	$000
Turnover	525,000
Cost of goods sold	(315,000)
Distribution costs and administrative expenses	(36,000)
	174,000
Tax on operating profits (30% x 174,000)	(52,200)
Tax saved on writing down allowances (30% x 46,500)	13,950
Non-current assets purchased	(72,000)
Annual net cash flows	63,750

Real discount rate (using Fisher effect)

$$r = \frac{(1 + m)}{(1 + i)} - 1 = \frac{1.133}{1.03} - 1 = 10\%$$

Since the annual net cash flows are perpetuities expressed in terms of real cash flows, it has been necessary to establish a real discount rate.

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		$000
Corporate value	63,750	637,500
	10%	
Less market value of irredeemable bonds (21,000 x 1.3)		(27,300)
Equity market capitalisation		610,200

Answer to example 6

Earnings. Average earnings over the last five years have been $67,200, and over the last four years $71,500. There might appear to be some growth prospects, but estimates of future earnings are uncertain.

A low estimate of earnings in 2007 would be, perhaps, $71,500.

A high estimate of earnings might be $75,000 or more. This solution will use the most recent earnings figure of $75,000 as the high estimate.

P/E ratio. A P/E ratio of 15 (Bumblebee's) would be much too high for Mayfly Ltd, because the growth of Mayfly Ltd earnings is not as certain, and Mayfly Ltd is an unlisted company.

On the other hand, Mayfly Ltd's expectations of earnings are probably better than those of Wasp plc.

A suitable P/E ratio might be based on the industry's average, 10; but since Mayfly is an unlisted company and therefore more risky, a lower P/E ratio might be more appropriate: perhaps (60% to 70% of 10) = 6 or 7, or conceivably even as low as (50% of 10) = 5.

Valuation. The valuation of Mayfly's shares might therefore range between:

High P/E ratio and high earnings: 7 x $75,000 = $525,000; and

Low P/E ratio and low earnings: 5 x $71,500 = $357,500

Answer to example 7

There is insufficient information to answer this question, but an attempt must be made, otherwise no marks will be gained, i.e.

	$
Total value of net assets	270,000
Less Goodwill	(20,000)
Preference shares	(50,000)
Net asset value of equity	$200,000
Number of ordinary shares (of 50c each)	160,000
Share price	$1.25

Now state that fair value (under IFRS 3) details are needed for a decent answer! Furthermore, how does one establish goodwill?

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Answer to example 8

Number of ordinary shares on issue = 2,000,000

Expected net dividend per share = $\frac{\$360,000}{2,000,000}$ = 18p

Expected gross dividend per share = 18c + (1/9 x 18p) = 20p

Net dividend yield for market sector = 5% x 0.9 = 4.5%

Share price = $\frac{\text{Gross dividend}}{\text{Gross yield}} = \frac{20c}{5\%} = \$4.00$

or $\frac{\text{Net dividend}}{\text{Net yield}} = \frac{18c}{4.5\%} = \$4.00$

Since Taylor Ltd is a private company the calculated share price of $4.00 could be reduced by between 30% to 50%, i.e. around $2.80 to $2.00, due to lack of marketability.

Answer to example 9

Market value = $\frac{\text{Gross interest payment}}{\text{Gross yield}} = \frac{7\% \times \$100}{5\%} = \$140$

Answer to example 10

Interest payment for 14 quarters = $\frac{6\% \times \$1,000,000}{4}$ = $15,000

Redemption value = 120% x $1,000,000 = $1,200,000

Market value

Period	Cash flow $	Discount factor 1% per quarter	Present value $
1-14	15,000	13.00	195,000
14	1,200,000	0.870	1,044,000
Market value of redeemable bonds			$1,239,000

Since there are 10,000 bonds on issue each with a $100 par value, an individual bond has a market value of:

$\frac{\$1,239,000}{} = \$123.90$

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10,000

Answer to example 11

$$Po = \frac{D}{Kps} = \frac{9\% \times \$1}{0.125} = 72p$$

Answer to example 12

Value as debt (i.e. if conversion does not take place):

End of year		$	Discount factor 9%	Present value $
1-7	Gross annual interest	11	5.033	55.36
7	Redemption value	120	0.547	65.64
Value as debt				121.00

	Value as equity	Value as debt	Formula value	Convert ?
a)	(15 shares @ $7) = $105	$121	$121	NO
b)	(15 shares @ $8) = $120	$121	$121	NO
c)	(15 shares @ $9) = $135	$121	$135	YES

Notice that there is no need to calculate the present value of the share price, since under the fundamental theory of share valuation a current share price reflects the PV of the future cash flow streams associated with holding the share.

The conversion price where the investor would be indifferent between redemption and conversion is ($121 ÷ 15 shares) i.e. $8.07. The value of the convertible will never fall below its value as debt ($121). However if the share price rises above $8.07, the convertible loan notes will then reflect the value of the equity receivable on conversion.

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Chapter 19 – Efficient Market Hypothesis (EMH) and practical considerations in the valuation of shares

Answer to example 1

The important thing in answering this type of question is to be methodical. The first step is to get a clear idea of what is required. Here the question is asking for the prices of two different shares on three different days with two forms of the efficient market hypothesis and two alternative forms of purchase consideration, a total of 2 x 3 x 2 x 2 = 24 prices! Set up a series of grids that will show the eventual answers.

Semi-strong form

Day	Share A	Share B	Note
2	$2.00	$3.00	1
4	$3.00	$2.67	2
10	$3.00	$3.20	3

Notes

Only publicly available information affects share prices under the semi-strong form. No information is publicly available until day 4 so prices remain unaltered from day 1 levels.

Offer made known so A rises to offer price. B is apparently paying $6m for assets worth $4m. The apparent loss of $2m spread over 6 million shares causes the price to fall by 33p.

News of savings publicly available so price of B increases by $3.2m spread over 6 million shares, i.e. increase of 53p.

Strong form

Day	Share A	Share B	Note
2	$3.00	$3.20	4
4	$3.00	$3.20	4
10	$3.00	$3.20	4

Strong form so all information, public and private, is immediately reflected in share price. Final price, as per note 3, operates from day 2.

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Chapter 20 - The nature and types of risk and approaches to risk management

Answer to example 1

a) The spot and the three month forward rates are:

		Randoms		Trains	
i)	Spot	1.7680 – 1.7690		2.2693 – 2.2714	
	(Prem)/dis	(0.0156) – (0.0151)	cpm	0.0339 – 0.0373	cdis
ii)	3 month rates	1.7524 – 1.7539		2.3032 – 2.3087	

BANK	Sell R	Buy R	Sell T	Buy T
WE	Buy R	Sell R	Buy T	Sell T

b) Using interest rate parity theory

Forward rate = spot x 1 + foreign rate / 1 + domestic rate

Forward rate = 1.77 x 1.12 / 1.14 = 1.7389 (note there are some roundings in this)

c)
Forward market hedge: exporter case

The selling rate in the 3 month forward market (i.e. the banks buying rate) is R1.7539 (see part a))

By selling forward you will receive R3,000,000 ÷ 1.7539 = **$1,710,474** in three months time.

Money market hedge : exporter case

Has a R asset therefore must create R liability

1) Borrow in Randomland R3,000,000 ÷ 1.02625* = R2,923,264

2) Sell R spot R2,923,264 ÷ 1.7690 = $1,652,495

3) Invest in $'s $1,652,495 x 1.0325%# = $**1,706,201** proceeds

4) Repay R loan with receipts from customer = R3,000,000

$*\frac{10.5\%}{4} = 2.625\%$

$\#\ \frac{13\%}{4} = 3.25\%$

It is more effective to hedge in the forward market.

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ii) 1) **Forward market hedge: importer case**

Buy R forward : R3,000,000 ÷ 1.7524 = $**1,711,938**

Money market hedge : importer case

Has R liability therefore must create R asset

3) Borrow in $'s = $1,661,525

2) Convert to R's, $1,661,525 x 1.7680 = R2,937,577

1) Invest in Randomland R2,937,577 x 1.02125* = R3,000,000

4) Repay $ loan $1,661,525 x 1.0375 # = **£1,723,832** cost

* $\frac{8.5\%}{4}$ = 2.125%

$\frac{15\%}{4}$ = 3.75%

The forward market cover is cheaper

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Answer to example 2

		curr'y	Cash flow	
purchase		Dollars	(116,000)	no hedge req'd
sales	3 months	Trains	197,000	hedge required
purchases	6 months	Trains	(447,000)	
sales	6 months	Trains	154,000	
			(293,000)	hedge required

3 months hedge now

Spot rates	1.7106	1.7140
3 months premium	(0.0082)	(0.0077)
3 months fwd rate	1.7024	1.7063

in 3 months we need to sell Trains
we will get the worst rate that will generate the smallest amount of dollars
ie 1.7063

dollar equiv of the Train receipt will be
197,000 / 1.7063 = 115,454

Money market Hedge – 3 Months

	Foreign currency (Trains)	Domestic currency (dollars)
3months	receive T197,000 here	112,407 x 1.02375 = $115,076
	Interest rate 9 x 3/12 = 2.25%	int on deposit 9.5 x 3/12 = 2.375%
Now	borrow T's now 197,000 / 1.025 = 192,665	$112,407

Spot rate of 1.7140

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Forward rate in 6 months

6 months hedge now

Spot rates	1.7106	1.7140
6 months premium	(0.0139)	(0.0134)
6 months fwd rate	1.6967	1.7006

in 6 months we need to buy Trains

we will get the worst rate that will generate the smallest amount of sterling

ie 1.6967

dollar equiv of the Train payment will be

293,000 / 1.6967 = 172,688

Money market Hedge – 6 Months

	Foreign currency (Trains)	Domestic currency (dollars)
3months	pay T293,000 here	166,296 x 1.0625 = $176,690
	Interest rate 6 x 6/12 = 3%	int on loan 12.5 x 6/12 = 6.25%
Now	put T's on deposit now 293,000 / 1.03 = 284,466	borrow $'s from bank and buy Trains 284,466/1.7106 = $166,296

Spot rate of 1.7106

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Answer to example 3

a) Explanation of the three alternative hedging strategies

i) **Forward rate agreements**

A forward rate agreement is a contract between a company and a bank which sets the interest rate on future borrowings (or deposits). A company can make a FRA with a bank that fixes the rate of interest to be paid at a certain time in the future. If the actual interest rate at the time is higher than that agreed, the bank pays the difference; if it is lower than the rate agreed then the company pays the difference. A FRA does not affect the principal sum. The actual borrowing itself must be arranged separately either with the same bank as the FRA is organised or with a different bank.

A FRA could be useful to Omniown since the treasurer will know in advance what the loan is going to cost. The minimum amount is usually $500,000 so would not be a problem in this case. However, if it is expected that interest rates are going to rise, the treasurer might have difficulty in negotiating a FRA at the current rate of 14%.

ii) **Interest rate futures**

Interest rate futures are contracts of standard amounts and for standard periods of time running from a limited number of dates. They are therefore less flexible than a FRA. They take the form of a contract between buyer and seller on an interest rate at an agreed price on an agreed date. The contract will require a small initial margin payment and thereafter variation margin will apply. Interest rate futures are similar in effect to forward rate agreements, except that the terms, amounts and periods are standardised. They are traded on the London International Futures and Options Exchange (LIFFE).

For Omniown protection against interest rate increases could be achieved by selling futures contracts now. As interest rates rise the value of futures contracts will fall. Hence Omniown can buy back the contracts at a lower price and make a profit. This profit should compensate the company for the increase in market interest rates, though (due to basis risk) this profit is unlikely to match perfectly the additional interest costs incurred.

iii) **Interest rate guarantees**

An interest rate guarantee is an option which enables the treasurer to fix a maximum interest rate for a period in the future. If the market rate falls the treasurer would choose not to exercise the option and take advantage of the lower rate. Because of the additional benefit of taking advantage of lower interest rates, options tend to be rather expensive. They involve payment of a non-refundable premium in advance at the time the contract is entered into.

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In this case, since the option would be to guarantee rates at their existing level and because it is a short-term option, the premium is likely to be fairly high unless the market expects rates to fall.

N.B. The premium would be lower if the guaranteed rate were higher than existing rates e.g. 16%.

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