

KAPLAN



BAF-503

Strategic Financial Management

Study Text



ICMA
Pakistan

Institute of Cost and Management
Accountants of Pakistan

a chartered institute of professional accountants and business leaders

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Study Text

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Disclaimer

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HOW TO USE THE MATERIAL

The main body of the text is divided into a number of chapters, each of which is organized on the following pattern:

- **Detailed learning outcomes.** You should assimilate these before beginning detailed work on the chapter, so that you can appreciate where your studies are leading.
- **Step-by-step topic coverage.** This is the heart of each chapter, containing detailed explanatory text supported where appropriate by worked examples and exercises. You should work carefully through this section, ensuring that you understand the material being explained and can tackle the examples and exercises successfully. Remember that in many cases knowledge is cumulative; if you fail to digest earlier material thoroughly, you may struggle to understand later chapters.
- **Examples.** Most chapters are illustrated by more practical elements, such as relevant practical examples together with comments and questions designed to stimulate discussion.
- **Self Test question.** The test of how well you have learned the material is your ability to tackle standard questions. Make a serious attempt at producing your own answers, but at this stage don't be too concerned about attempting the questions in examination conditions. In particular, it is more important to absorb the material thoroughly by completing a full solution than to observe the time limits that would apply in the actual exam.
- **Solutions.** Avoid the temptation merely to 'audit' the solutions provided. It is an illusion to think that this provides the same benefits as you would gain from a serious attempt of your own. However, if you are struggling to get started on a question you should read the introductory guidance provided at the beginning of the solution, and then make your own attempt before referring back to the full solution.

Study Text Symbols



Definition: These sections explain important areas of knowledge which must be understood and reproduced in an exam environment.



Key Point: Identifies topics which are key to success and are often examined.



Supplementary Reading: Identifies a more detailed explanation of key terms, these sections will help to provide a deeper understanding of core areas. Reference to the text is vital when self studying.



Test Your Understanding: Following key points and definitions are exercises which give the opportunity to assess the understanding of these core areas.



Illustration: To help develop an understanding of particular topics. The illustrative examples are useful in preparing for the Test Your Understanding exercises.



Exclamation Mark: This symbol signifies a topic can be more difficult to understand, when reviewing these areas care should be taken.

Revision Kit Symbols



Key Answer Tips: Many answers include key answer tips to help your understanding of each question.



Tutorial Note: Many answers include more notes to explain some of the technical points in more detail.



Top Tutor Tips: For selected questions. We "walk through the answer" giving guidance on how to approach the question with helpful 'tips from the tutor', together with technical tutor notes. These answers are indicated with the "footsteps" icon in the index.

STUDY SKILLS AND REVISION GUIDANCE

Planning

To begin with, formal planning is essential to get the best return from the time you spend studying. Estimate how much time in total you are going to need for each subject you are studying for the Strategic Level. Remember that you need to allow time for revision as well as for initial study of the material. This book will provide you with proven study techniques. Chapter by chapter it covers the building blocks of successful learning and examination techniques. This is the ultimate guide to pass your ICMA Pakistan examination, written by a team of developers and shows you how to earn all the marks you deserve, and explains how to avoid the most common pitfalls.

With your study material before you, decide which chapters you are going to study in each week, and which weeks you will devote revision and final question practice.

Prepare a written schedule summarizing the above and stick to it.

It is essential to know your syllabus. As your studies progress you will become more familiar with how long it takes to cover topics in sufficient depth. Your timetable may need to be adapted to allocate enough time for the whole syllabus.

Tips for effective studying

- 1) Aim to find a quiet and undisturbed location for your study, and plan as far as possible to use the same period of time each day. Getting into a routine helps to avoid wasting time. Make sure that you have all the materials you need before you begin so as to minimize interruptions.
- 2) Store all your materials in one place, so that you do not waste time searching for items around your accommodation. If you have to pack everything away after each study period, keep them in a box or even a suitcase, which will not be disturbed until the next time.
- 3) Limit distractions; to make the most effective use of your study periods you should be able to apply total concentration, so turn off all entertainment equipment, set your phones to message mode and put up your 'do not disturb' sign.
- 4) Your timetable will tell you which topic to study. However, before diving in and becoming engrossed in the finer points, make sure you have an overall picture of all the areas that need to be covered by the end of that session. After an hour, allow yourself a short break and move away from your study text. With experience, you will learn to assess the pace you need to work at.

- 5) Work carefully through a chapter, note important points as you go. When you have covered a suitable amount of material, verify the pattern by attempting a practice question. When you have finished your attempt, make notes of any mistakes you made, or any areas that you failed to cover or covered more briefly.

1

Introduction to Financial Strategy

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Introduction to Financial Strategy

Introduction to Financial Strategy

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Understand objectives of companies
- Comprehend stakeholders and objectives
- Elucidate objectives of public owned companies
- Explicate objectives of non-commercial bodies
- Realize constraint factors
- Apprehend economic constraints
- Comprehend international constraints
- Know about regulatory bodies
- Learn dividend policy
- Understand scrip dividend and bonus issue

CHAPTER I

CHAPTER I

1 Overview of Chapter



Definition of key terms

Strategy: A course of action, including the specification of resources required, to achieve a specific objective.

Financial Strategy is the aspect of strategy which falls within the scope of financial management, which will include decisions on investment, financing and dividends.

Strategic financial management: The identification of the possible strategies capable of maximizing and entity's net present value, the allocation of scarce capital resources among the competing opportunities and the implementation and monitoring of the chosen strategy so as to achieve stated objectives.

2 The Importance of Financial Strategy to the Organization

An organization's financial managers must plan their courses of action to achieve the organization's financial objectives. Decisions that they must take include:

- From which sources should funds be raised?
- Should proposed investments be undertaken?
- How large a dividend should be paid?
- How should working capital be controlled, e.g. should discounts be offered to debtors for prompt payment?

Introduction to Financial Strategy

This Chapter first defines some of the key terms which will be used throughout the syllabus, and then looks at the main decisions (financing decision, investment decision and dividend decision) in detail.

3. Financial Strategy and Overall Corporate Strategy

Each level of a business can have its own strategy. Three levels are commonly identified:



Corporate strategy

This concerns the decisions to be made by senior management such as the particular business that the company is in, and whether new markets should be entered or current markets withdrawn from.

Business strategy

This concerns the decisions to be made by the separate strategic business units within the group. Each unit will try to maximize its competitive positions within its chosen market.

Operational strategy

This concerns how the different functional areas within a strategic business unit plan their operations to satisfy the corporate and business strategies being followed. We are of course most interested in the decisions facing the finance functions.

4. Objective

Financial objectives of profit seeking organizations

Decisions to be made depend on the ultimate objectives of an organization. Academic studies have shown that organizations often have many, **sometimes**

Introduction to Financial Strategy

conflicting, objectives.

It is generally accepted that the primary strategic objective of a commercial company is the long-term goal of the **maximization of the wealth of the shareholders**.

However, an organization has many other stakeholders with both long and short-term goals, such as:

- Equity investors (ordinary shareholders);
- The community at large;
- Company employees;
- Company managers / directors;
- Customers;
- Suppliers;
- Finance providers;
- The government.

Examples of stakeholder objective

Equity investors (ordinary shareholders) - Within any economic system, the equity investors provide the risk finance. There is a very strong argument for maximizing the wealth of equity investors. In order to attract funds, the company has to compete with other risk free investment opportunities, e.g., government securities.

The community at large - The goals of the community will be broad but will include such aspects as legal and social responsibilities, pollution control and employee welfare.

Company employees - Returns = wages or salaries. However, maximizing the returns to employees does assume that risk finance can be raised purely on the basis of satisfying the returns to finance providers.

Company managers / directors - Such senior employees are in an ideal position to follow their own aims at the expense of other stakeholders. Their goals will be both long-term (defending against takeovers, sales maximization) and short-term (profit margins leading to increased bonuses).

Customers - Satisfaction of customer needs will be achieved through the provision of value for money products and services.

Suppliers - Suppliers to the organization will have short-term goals such as prompt payment terms alongside longterm requirements including contracts and regular business. The importance of the needs of suppliers will depend upon both their relative size and the number of suppliers.

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Finance providers - Providers of loan finance (banks, loan creditors) will primarily be interested in the ability of the firm to repay the finance including interest. As a result it will be the firm's ability to generate cash both long and short term that will be the basis of the goals of these providers.

The government - The government will have political and financial interests in the firm. Politically it will wish to increase exports and decrease imports whilst monitoring companies via the Competition Commission. Financially it requires long-term profits to maximize taxation income.

Objectives and economic forces

When setting the company's financial strategy the financial manager is often constrained by both internal and external factors. For example, significant expansion and an increase in dividends may not be feasible if the entity has a lack of skilled staff, and may become uneconomic if interest rates are set to rise (the increasing the amount payable to banks and other debt finance providers).

Internal and external constraints on financial strategy

Internal constraints on financial strategy

Two of the main internal constraints on financial strategy are financing and gearing (if there are covenants in debt agreements). The main argument in favor of gearing is that introducing borrowings into the capital structure attracts tax relief on interest payments. The argument against borrowing is that it introduces financial risk into the entity. Financial managers have to formulate a policy that balances the effects of these opposing features. Other internal constraints on financial strategy include:

- The need to maintain good investor relations and provide a satisfactory return on investment;
- A shortage of key skills;
- Limited production capacity.

External constraints on financial strategy

Major external constraints include:

- Limited access to sources of finance;
- Government influence (see below);
- Regulatory bodies (see below);

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- Major economic influences, such as interest rates, growth in GDP, inflation rates and exchange rates. The effects of interest rate and inflation changes on the economy are covered below;
- Accounting concepts. (Note: Detailed knowledge of accounting procedures will not be examined in this paper).

Government influence

Governments often play a large part in influencing business activity. Some examples of the way in which governments can have an influence are as follows:

- **Employment policy.** Governments play a major role in attempting to stimulate employment. They can do this by funding vocational training programmes and funding employment programmes.
- **Regional policy.** Governments may make funds available to support regions of high unemployment and social deprivation.
- **Inflation policy.** Governments may use interest rates to control inflation. Increasing interest rates makes it more expensive for profit-making entities to borrow. It also makes borrowing more expensive for consumers, who then have less to spend. This will help to push prices down.
- **Taxation policy.** The government's raises taxes on the profits generated by profit-making entities and on shareholders' dividends.
- **International policy.** Governments can promote trade, encourage exports or discourage imports.
- **Legislation.** Laws set out how people can and should behave towards one another, and particularly, how business should be conducted.

Developing financial strategy in the context of regulatory requirements

The financial manager must have a proper understanding of those aspects of legislation which impact upon entities. Such legislation will include the Companies Acts, health and safety regulations, laws relating to consumer protection and consumer rights, laws relating to contract and agency, employment law and laws relating to protection of the environment and promoting competition. Listed companies also have to comply with Stock Exchange regulations, and entities which operate in some high profile industries will also find regulatory body's monitoring their performance. For example, in the UK, Ofcom (telecommunications), Ofcom (media) and Ofwat (water) have been set up by the government to monitor and regulate their respective industries.

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Regulatory bodies

A clear set objective is required for each regulatory body. These objectives may be classified under three headings:

- 1) The protection of customers from monopoly power;
 - 2) The promotion of social and macroeconomic objectives;
 - 3) The promotion of competition.
- 1) **Monopoly power**
Where market participants are judged to possess significant market power, and where there is no other protection for customers, controls on prices and on quality of service may be considered.
 - 2) **Social objectives**
Government objectives may include the availability and affordability of services in particular areas and to particular groups such as customers in remote rural areas.
 - 3) **Competition**
Where a market is not competitive, or is in the early stages of becoming so, there is a need for regulators whose role is to try to balance the interests of the various stakeholders.
Important issues for regulation are the prevention of 'cross-subsidy' that is the transferring or offloading of portions of overhead costs from lower to higher-margin products, the limitation of non-price barriers affecting the entry of new competitors, and assuring reasonable quality of product in relation to price. Non-price barriers could include trade restrictions, or restricted access to supplies or distribution channels.

The effect of interest rate and inflation changes

The effects of interest rate changes

Changes in interest rates affect the economy in many ways. The following consequences are the main effects of an increase in interest rates:

Spending falls - expenditure by consumers, both individual and business, will be reduced. This occurs because the higher interest rates raise the cost of credit and deter spending. If we take incomes as fairly stable in the short term, higher interest payments on credit cards / mortgages, etc., leave less income for spending on consumer goods and services. This fall in spending means less aggregate demand in the economy and thus unemployment results.

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Asset values fall - the market value of financial assets will drop, because of the inverse relationship (between bonds and the rate of interest) explained earlier. This, in turn, will reduce many people's wealth. It is likely that they will react to maintain the value of their total wealth and so may save, thereby further reducing expenditure in the economy. The phenomenon seems to fit the UK recession of the early 1990s when the house-price slump deepened the economic gloom. For many consumers today a house, rather than bonds, is their main asset.

Foreign funds are attracted into the country - a rise in interest rates will encourage overseas financial speculators to deposit money in the country's banking institutions because the rate of return has increased relative to that in other countries. Such funds could be made available as loans to firms in that country by the banking sector.

The exchange rate rises - the inflow of foreign funds raises demand for the domestic currency and so pushes up the exchange rate. This has the benefit of lowering import prices and thereby bearing down on domestic inflation. However, it makes exports more expensive and possibly harder to sell. The longer-term effect on the balance of payments could be beneficial or harmful depending on the elasticity of demand and supply for traded goods.

Inflation falls - higher interest rates affect the rate of inflation in three ways. First, less demand in the economy may encourage producers to lower prices in order to sell. This could be achieved by squeezing profit margins and/or wage levels. Second, new borrowing is deferred by the high interest rates and so demand will fall. Third, the higher exchange rate will raise export prices and thereby threaten sales which in turn pressurizes producers to cut costs, particularly wages. If workers are laid off then again total demand is reduced and inflation is likely to fall.

The effects of inflation

Inflation is demand simply as 'rising prices' and shows the cost of living in general terms.

If the rate of inflation is low, then the effects may be beneficial to an economy. Business people are encouraged by fairly stable prices and the prospect of higher profits. However, there is some argument about whether getting inflation below 3% to say, zero, is worth the economic pain (if, say, higher unemployment). There is agreement, though, that inflation above 5% is harmful - worse still if it is accelerating. The main arguments are that such inflation:

Distorts consumer behavior - people may bring forward purchases because they

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fear higher prices later⁵. This can cause hoarding and so destabilize markets, creating unnecessary shortages.

Redistributes income - people on fixed incomes or those lacking bargaining power will become relatively worse off, as their purchasing power falls. This is unfair.

Affects wage bargainers - trades unionists on behalf of labour may submit higher claims at times of high inflation, particularly if previously they had underestimated the future rise in prices. If employers accept such claims this may precipitate a wage-price spiral which exacerbates the inflation problem.

Undermines business confidence - wide fluctuations in the inflation rate make it difficult for entrepreneurs to predict the economic future and accurately calculate prices and investment returns. This uncertainty handicaps planning and production.

Weakens the country's competitive position - if inflation in a country exceeds that in a competitor country, then it makes exports less attractive (assuming unchanged exchange rates) and imports more competitive. This could mean fewer sales of that country's goods at home and abroad and thus a bigger trade deficit. For example the decline of Britain's manufacturing industry can be partly attributed to the growth of cheap imports when they were experiencing high inflation in the period 1978 - 1983.

Redistributes wealth - if the rate of interest is below the rate of inflation, the borrowers are gaining at the expense of lenders. The real value of savings is being eroded. This wealth is being redistributed from savers to borrowers and from payable to receivables. As the government is the largest borrower, via the national debt, it gains most during inflationary times.

Conflicting objectives

We have already noted that other parties with interests in the organization (e.g., employees, the community at large, creditors and customers) have objectives that differ to those of the shareholders. As the objectives of these other parties are likely to conflict with those of the shareholders it will be impossible to maximize shareholder wealth and the objectives of other parties at the same time. In this situation the firm will face multiple, conflicting objectives, and satisfying of interested parties' objectives becomes the only practical approach for management. If this strategy is adopted then the firm will seek to earn a satisfactory return for its shareholders while at the same time (for example) paying reasonable wages and being a good citizen of the community in which it operates.

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Non-financial objectives

The influence of the various parties with interests in the firm results in firms adopting many nonfinancial objectives, e.g.:

- growth;
- survival;
- maintaining a contented workforce;
- becoming research and development leaders;
- providing top quality service to customers;
- maintaining respect for the environment.

Some of these objectives may be viewed as specific to individual parties (e.g., engineering managers may stress research and development) whereas others may be seen as straight surrogates for profit, and thus shareholder wealth (e.g., customer service). Organizations are encouraged to consider the nonfinancial objectives as important, if not more important than the financial ones.

Objectives and economic forces

When setting the company's financial strategy the economic environment in which it operates plays a vital role e.g., there is little point planning significant expansion and an increase in dividends if interest rates are set to rise and GDP is forecast to decline.

Things to consider are interest rates, growth in GDP, inflation rates and exchange rates.

Performance and Progress Indicators (PIs)

In order to achieve the overall objective companies should set specific targets, financial and nonfinancial, in order to both communicate direction and measure performance, for example:

Financial

Profitability e.g., 10% improvement in EPS.

Cash generation e.g., 10% improvement in operating cash.

Nonfinancial

Market share e.g., four products out of six are dominant in the market.

Customer satisfaction e.g., complaints to reduce from 5% to 2%.

Objectives of not for profit organizations

Organizations such as charities and trade unions are not run to make profits but to

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benefit prescribed groups of people. Since the services provided are limited primarily by the funds available, the key objective is to raise the maximum possible sum each year (net of fund-raising expenses).

Financial objectives in the public sector

Financial objectives in public corporations

This category of organization includes such bodies as nationalized industries and local government organizations. They represent a significant part of many countries' economies and sound financial management is essential if their affairs are to be conducted efficiently. The major problem here lies in obtaining a measurable objective.

For a stock market listed company we can take the maximization of shareholder wealth as a working objective and know that the achievement of this objective can be monitored with reference to share price and dividend payments. For a public corporation the situation is more complex.

There are two questions to be answered:

- In whose interests are they run?
- What are the objectives of the interested parties?

Presumably such organizations are run in the interests of society as a whole and therefore we should seek to attain the position where the gap between the benefits they provide to society and the costs of their operation is the widest (in positive terms). The cost is relatively easily measured in accounting terms. However, many of the benefits are intangible. For example, the benefits of such bodies as the National Health Service or Local Education Authorities are almost impossible to quantify.

Economists have tried to evaluate many public sector investments through the use of cost benefit analysis, with varying degrees of success. Problems are usually encountered in evaluating all the benefits. Value for money audits can be conducted in the public sector but these concentrate on monetary costs rather than benefits.

Value for Money (VFM) is a notoriously elusive concept and yet it is assumed that everyone recognises it when they see it. The term is frequently bandied about but rarely defined. It is generally taken to mean the pursuit of economy, efficiency and effectiveness.

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Regulation

It is worth remembering that organizations that have had a public sector history or are themselves natural monopolies are often regulated in order to ensure the public are not the victims of the monopoly power these companies enjoy. This regulation can take many forms but can include the capping of selling process, the taxing of super profits or simply a limit on the profits these organizations are allowed to make.

Performance and progress indicators public sector

- Economy is a measure of inputs to achieve a certain service or level of service.
- Effectiveness is a measure of outputs, i.e., services / facilities.
- Efficiency is the optimum of economy and effectiveness, i.e., the measure of outputs over inputs.

5 The Key Decisions of Financial Management

Three key decisions of financial management that can be identified are:

- Investment: what projects should be undertaken by the organization?
- Finance: how should the necessary funds be raised?
- Dividends: how much cash should be allocated each year to be paid as a return to shareholders?

These three areas are very closely interlinked.

Investment decision

Financial managers have responsibility for the allocation of financial resources to achieve the organization's objectives. An important part of their job is to understand the short medium and long-term capital requirements for investment in fixed assets and working capital that fits with the overall strategy.

Whilst financial managers are unlikely to be solely responsible for the final choice of capital investment projects to be undertaken, they will be actively involved in the evaluation of possible investment opportunities.

More detail on the investment decision

When considering whether a project is worthwhile, a company must consider its implications. Any potential investment is likely to affect:

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- **The liquidity of the company** - All projects involve cash flows in and out. The size and timing of such flows should be considered when appraising projects. If an aim of investment appraisal is to satisfy shareholders then it is important to remember that, if a company has no cash, it cannot pay a dividend.
- **The reported profit and earnings** - All projects will change the revenues, expenses and asset values shown in the financial accounts. If shareholders are concerned about such statistics as earnings per share, then the effect of investments on reported figures must be part of the investment appraisal.
- **The variability of cash flows and earnings** - Investors are concerned about the variability of returns from their investments. The greater the variability, the greater the risk, and therefore the greater the return they will require. Thus, when appraising potential projects, managers should consider not only the likely size and direction of cash flows and profits but also whether they are likely to add to or reduce the variability of such flows.

Working capital investment

It is also part of the financial manager's job to decide on the level of investment in working capital, stocks, debtors and cash, net of short-term creditors. This requires careful analysis of the costs and benefits associated with each element of working capital, to ensure the organization's day-to-day requirements are met, without incurring excessive holding costs.

This area of financial management is central to this syllabus, and is dealt with in depth later in the text.

Finance decision

For both fixed asset and working capital investment, the financial manager must decide on the most appropriate type and source of funding. This will include such considerations as:

- the extent to which requirements can be funded internally, from the organization's operations. This will involve considerations of dividend policy and tax implications;
- if new, externally provided, finance is required, whether it should be in the form of equity or debt finance. This may affect the level of gearing (the ratio of debt to equity finance) which can have implications for returns required by the providers of capital;
- the extent to which working capital should be financed by long-term finance or short-term credit.

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Dividend decision

When deciding on the type of investment and level of finance needed, the financial manager must have regard for the potential effects on the risk and level of dividends payable to shareholders. If the shareholders are not happy with their return, they will be reluctant to invest further, which in turn will affect the funding available for future investment.

Links between the three key decisions

It is clear from the discussions above that the three areas are closely interrelated. Investment decisions cannot be taken without consideration of where and how the funds are to be raised to finance them. The type of finance available will, in turn, depend to some extent on the nature of the project - its size, duration, risk, capital asset backing, etc.,.

Dividends represent the payment of returns on the investment back to the shareholders the level and risk of which will depend upon the project itself, and how it was financed.

Fixed debt finance, for example, can be cheap (particularly where interest is tax deductible) but requires a fixed payment to be made out of project earnings, which can increase the risk of the shareholders' dividends.

6 Dividend Policy

One longstanding question in corporate finance is: Is shareholders' wealth affected by a company's dividend policy?

Notice that the question is not asking whether dividends matter - of course they do (as we know from the dividend valuation model) - what the question asks is whether the chosen policy matters. Examples of such policies may include:

- i) paying a constant annual dividend;
- ii) paying out a constant proportion of annual earnings;
- iii) increasing dividends in line with the annual rate of inflation, etc.;
- iv) paying out what's left after financing all future investment - the residual policy.

Four aspects to consider in relation to the payment of dividends are:

- 1) Modigliani and Miller's (M & M) dividend irrelevancy argument.
- 2) The clientele effect.
- 3) The bird in the hand argument.
- 4) The signaling effect or information content of dividends.

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Dividend irrelevancy

M & M's dividend irrelevancy theory says that the pattern of dividend payout should be irrelevant. As long as companies continue to invest in positive NPV projects, the wealth of the shareholders should increase whether or not the company makes a dividend payment this year.

M & M's dividend irrelevancy theory

M & M's argument here is built up as follows:

- i) The return on a share is determined by the share's (systematic) risk.
- ii) The return itself is delivered to shareholders in two parts: one part is dividend paid and the other is the capital gain / loss in the share price.
- iii) The dividend decision that a company makes is a decision as to how the return is delivered: how much of the annual earnings should be paid out as dividends and how much of the annual earnings should be retained and reinvested within the company and so flow through to shareholders in the form of a capital gain on the share price.
- iv) As the dividend decision does not affect the risk of the shares, it does not affect their return. All the dividend decision therefore does is to determine how the return is to be split up between dividends and capital gains.
- v) Do shareholders mind how their returns are split between dividends and capital gains? The answer according to M & M is: no, they do not if we assume:
 - a) There are no taxes (really, there are no differences between the taxation on dividends and on capital gains).
 - b) Shares can be bought and sold free of any transaction costs (such as stockbrokers' commission).

M & M argue that shareholders can 'manufacture' a dividend policy irrespective of the company policy. For instance, if a person is holding shares for income but the company withholds a dividend, the shareholder can sell some of the shares to replace the lost income.

The assumptions that M & M make play a key role. Obviously, if dividends were taxed and capital gains were tax free, shareholders would mind how their return was delivered: they would strongly prefer it to be delivered in the form of capital gains rather than dividends.

Similarly, investors who were holding shares for the income they generated would mind how their return was delivered if they had to incur transaction costs when

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realizing their capital gains so as to turn them into income: such investors would strongly prefer if the return were delivered in the form of dividends, rather than capital gains.

However, given their assumptions hold good, M & M could claim that shareholders are indifferent between dividends and capital gains and so the dividend decision / the dividend policy that the company pursues is irrelevant.

Clientele effect

This analysis argues that, in the real world, there are differential tax treatments of dividends and capital gains, and there are transaction costs on share dealings. As a result, shareholders are concerned as to how their return is delivered to them by the company. Thus companies should follow a consistent dividend policy so as to ensure that they gather to them a clientele of shareholders who like that particular policy.

Thus, the argument here is that the actual dividend policy that a company follows is unimportant but, having decided on a particular policy, it should then keep to it.

The bird-in-the-hand argument

This analysis puts forward a very simple argument. Some investors may find capital gains more tax efficient than dividends, and some investors will avoid transaction costs if their returns are delivered in the form of capital gains rather than dividends; despite all this, investors generally have a strong preference for dividends.

The reason given is that a dividend is certain and investors prefer a certain dividend now, to the promise of uncertain future dividends (arising out of retaining and re-investing earnings).

The signaling effect

This theory holds that investors read 'signals' into the company's dividend decision and that these signals say as much about the company's future financial performance as they say about its past financial performance. Thus management will not necessarily reduce the dividend per share just because last year's performance was poor, if they believe that next year's performance will be good. If this theory is correct, and investors do indeed read signals into the dividend decision, then the dividend decision becomes important: it becomes important for the company not to give the wrong signal.

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CHAPTER I



More details on signaling

It is widely believed that there are two very strong dividend signals:

- 1) a reduction in the dividend per share signals that the company is financial difficulties;
- 2) a failure to pay out any dividend at all signals that the company is very close to receivership.

Thus, a company must take great care not to reduce its dividend share (because, suppose, it wishes to retain extra earnings to undertake a highly profitable investment), for fear that the actions may be misinterpreted.

These ideas are very widely held in practice and this view is supported by Lintner who discovered that dividend growth lagged two to three years behind earnings growth. This evidence can be interpreted to mean that managers are reluctant to increase the dividend per share until they are confident that they will be able to maintain that new level of dividends in the future (and will not be subsequently obliged to reduce the dividend per share).

How to reconcile these differing views of dividend policy in the real world

Given these contrasting views, how are managers to decide on the dividend policy that they should pursue?

The answer is that, in the real world, like so much else in corporate finance, managers have to make a judgement after taking many varying factors into account. In this process they will consider:

- 1) What dividends are our shareholders expecting (i.e., the clientele effect)?
- 2) What dividend did we pay last time (i.e., we must not pay less than that because of the signal that it might give)?

However, they will also take into account a range of other factors, such as:

- 3) Is it legal to pay out a dividend?
- 4) Is the cash available to pay out a dividend?
- 5) Do we have a minimum dividend cover ratio imposed on the company as a loan condition?
- 6) What is the tax impact of paying dividends?
- 7) What investment opportunities does the company face?
- 8) How difficult/expensive is it to raise external finance?
- 9) What has been the rate of inflation (and so what dividend increase is needed to maintain the purchasing power of last year's dividends)?
- 10) What has been the capital gain/loss in the share price over the last year?

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CHAPTER I



Alternatives to cash dividends

Bonus or scrip dividends

Shareholders are given extra shares in lieu of a cash dividend.

Share repurchase (or buyback)

The company buys back shares from its shareholders, thus paying out cash but reducing the number of shares in issue.

Alternatives to cash dividends

Bonus or scrip dividends

A recent quirk that we first saw in the recession of the late 1980s and early 1990s was the introduction of scrip or bonus dividends.

Companies during the recession were often struggling to survive and their project cash flows were low. They did not therefore have sufficient cash to maintain dividends at previous levels.

Their directors realized that if a dividend cut was declared a large fall in share price would result which they were anxious to avoid. Therefore, instead of paying the dividend in cash, they gave bonus or scrip shares in lieu and recorded their value as the dividend figure in the profit and loss account. As well as diffusing the liquidity problems they were experiencing, it also proved more tax efficient for the company (arising from the advance corporation tax system, now abolished). Scrip dividends are still widely used. If the issue is small, it will not dilute the share price, but is beneficial for the investor in that it can be converted to cash if so desired. Scrips are good if a company wishes to preserve its liquidity. Barker, in the Harvard Business Review, suggested (and the view is supported with evidence) that the effect of a scrip on the share price depends upon whether it is used in isolation or in conjunction with cash. Without cash, share prices tend to fall after a scrip issue; in combination with cash, share prices tend to rise.

Share re-purchase

In past, share re-purchase had been illegal in Pakistan, but it is now possible and it represents an alternative form of distribution to shareholders, other than the usual dividend payments.

If share re-purchase is restricted to amounts which could otherwise be used to pay

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dividends then, in the absence of tax differences, share re-purchase gives corporate financial management almost no additional opportunities compared with the payment of dividends.

Both options reduce equity and return funds to equity holders. The difference is that a dividend is an equal cash return to all shareholders, whereas share repurchase is a cash return of a larger amount, but only to some shares. In this case, the only additional opportunity is that share repurchase for subsequent resale results in a temporary, rather than a permanent dividend. However, even here its effect is similar to a conventional dividend payment followed by a rights issue.

Benefits of share re-purchase

Having said this, the tax treatment of share repurchase and the tax rates of shareholders may well favour share repurchase as a method of providing cash to a firm's equity holders. There are also further benefits that share re-purchase can bring:

- Ability to alter leverage. Share re-purchase may assist in ensuring that any desired increase in gearing can be carried out rapidly. However, providing the desired adjustment requires share re-purchase of less than required earnings, there is no greater opportunity available to financial management than already exists with the payment of dividends.
- Reduction in the size of the company. Where circumstances indicate a reduction in company size is desirable this can be achieved easily with share re-purchase. Permanent reduction is facilitated by re-purchase and subsequent cancellation of the shares.
- Financing problems may be eased. The ideal finance for a risky investment is equity, but if the investment has a medium or short-term life there may be a reluctance to use equity, with a potentially infinite life, to fund such a project. The possibility of a share repurchase would make equity a variable life method of finance.

The dangers of share re-purchase

- Unrestricted re-purchase, without any liquidity requirements, could lead to the privileged return of money to some shareholders at the potential expense of lenders, creditors and remaining shareholders.
- A change in leverage is likely to alter the riskiness of debt with, again, a potential wealth transfer between debt and equity capital.

Stock split

Split of Rs. 10 ordinary shares into two shares of Rs. 5 may result in great

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marketability. Increase in market value (due to more marketability) will result in increase in shareholder's wealth.

Test your understanding 2 – Public v private sector

Public sector organizations do not have the requirement to produce 'profit' in the same sense as the private sector. However, they are expected to work within budgets and recognize aspects of financial management familiar to the private sector.

The following are four examples of differences between the public and private sector:

- 1) A company that operates a chain of private hospitals uses a discount rate of 16% to evaluate its investment decisions and generally expects an accounting rate of return of 25%. A government funded hospital trust is required to achieve a return of only 6% on assets.
- 2) Private sector companies are moving towards a more flexible approach to budgeting. Organizations in the public sector are moving in the opposite direction i.e., towards a more rigid approach to budgeting, enforced by the Treasury (up to three years).
- 3) Public sector pay is subject to government controls and has for many years failed to keep pace with inflation. Market forces determine wages and salaries in the private sector.
- 4) Private sector companies can borrow in the market to finance their operations, subject only to normal business cautions such as gearing ratios, investor preferences and current economic conditions. The public sector is either not allowed or severely discouraged from borrowing to fund operations.

Required:

Discuss the causes and consequences of three of the four scenarios outlined above, using examples to illustrate your answer where appropriate.

Note: Overseas candidates may use examples of organizations in their own country.

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7 Exam Style Questions



Test your understanding 1 – Stakeholders

Quotation 1

The directors of all businesses must consider the wishes of all potential stakeholders for whose support they are competing: not just owners but employees, suppliers, customers, lenders, regulators and the community in which their business operates.

Quotation 2

'Stakeholder theory is incompatible with business and its objectives and should be firmly resisted.'

Required:

Discuss the opposing arguments in the two quotations given above, and explain how these views might be reconciled.



Test your understanding 3 – Deewan Ltd.

Deewan Ltd. is a large international company with widespread interests in advertising, media and various consultancy activities associated with sales promotion and marketing. In recent years the company's earnings and dividend payments, in real terms, have grown on average by 15% and 12% per year respectively. The company is likely to have substantial cash surpluses in the coming year, but a number of investment opportunities are being considered for the subsequent two years. The senior managers of the company are reviewing their likely funding requirements for the next two to three years and the possible consequences for dividend policy.

At present the company has a debt: equity ratio of 1 : 5, measured in market value terms. It does not want to increase this ratio at the present time but might need to borrow to pay a maintained dividend in the future.

The senior managers of the company are discussing a range of issues concerning financial strategy in general and dividend policy in particular.

Required:

Assume you are an independent financial advisor to the board of Deewan Ltd. Write a report to the board which discusses the following issues:



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- The repurchase of some of the company's shares in the coming year using the forecast surplus cash, the aim being to reduce the amount of cash needed to pay dividends in subsequent years. Other implications of share repurchase for the company's financial strategy should also be considered.
- The advisability of borrowing money to pay dividends in years 2 and 3.
- The likely effect on the company's cost of equity if the company decides on share repurchase and / or further borrowing.

Test your understanding answers

Test your understanding 1 – Stakeholders

A sensible starting point is to list the various stakeholders and show how their interests may conflict, before reconciling the two statements.

A firm is a collection of contributors, all of whom have a stake in its ongoing success and survival. In a narrow sense, their respective interests are bound to conflict if pushed to the limit.

Owners - want maximum dividends and share price.

Lenders - want maximum security for their investment.

Managers - want maximum pay and other forms of remuneration.

Other employees - want maximum pay for minimum effort plus optimal health and safety standards.

- Customers - want maximum quality at minimum price plus maximum credit.
- Suppliers - want minimum settlement delay.
- Government - wants maximum tax take.
- Society - wants maximum environmental safeguards, contributions to charity and local community projects.

If pushed to the limit, most of these aims are likely to bankrupt the business. If shareholders' aims are pursued neglecting all else, it requires screwing down wages and conditions to minimal levels, racking up prices to take maximum advantage of short-term opportunities, never paying suppliers until threatened with legal action, and so on.

Such behaviour is not just antisocial, it is antisurvival. It will attract critical attention from the government and other bodies, resulting in penalties, fines and ongoing scrutiny which will damage the firm's reputation and market position irretrievably.

The SWM aim is not a short-term profit maximising aim. It aims to create sustainable and permanent value for owners. It is thoroughly consistent with treating customers and employees well and building up an image as a respected contributor to society.

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It is thus easy to reconcile the two statements: firms that treat their stakeholders badly are unlikely to survive into the long term. To 'consider the wishes of all potential stakeholders' does not require maximizing everyone's particular interests but striking a balance between them to the ultimate and ongoing benefit of all. This is simply good business.

**Test your understanding 2 – Public v private sector****1) Rates of return**

Capital is a scarce resource that firms must use efficiently. As a minimum, firms should achieve a return that compensates for the opportunity costs incurred by investors and which also allows for risk. The 16% discount rate applied to future cash flows presumably is based on the risk free rate plus a risk premium based upon the firm's Beta coefficient and the risk premium on the market. The required return should be flexible, frequently adjusted in line with changing market conditions i.e. interest rates and shareholder requirements.

If the firm's objectives are logically structured, the accounting return of 25% mentioned (but not defined) is consistent with achieving a DCF return of 16%. Firms often publish their target ARR's but seldom disclose the discount rates they use.

Failure to achieve the target return is likely to lead to demands for changes in policies and/or management. Because of this high degree of accountability in capital usage, funds are more likely to be directed to optimal uses.

The 6% return on assets (again not defined) is a target imposed on the NHS hospital to force efficient resources use. Returns are the charges imposed on budget holding GPs who refer patients for treatment, and an element of income from private treatment. The 6% criterion has applied for several years and is supposed to reflect the opportunity cost imposed on society by diverting resources from the private to the public sector. It ignores taxation and is a real return, i.e., inflation adjusted. Failure to achieve this return does not invite such severe consequences as in the private sector, nor is it used as a method of capital allocation. Allocation of funds is by political process and rationing.

(2) Budgets

Budgeting has traditionally been applied in a directive top-down fashion: the Board and its advisers determine the targets for the year and require lower management levels to explain how it will meet the targets imposed. The bureaucratic top-down approach had its merits in manufacturing organizations where the inter-linkages between departments were linear, and objectives were understood and accepted.

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However, as advanced economies become more service-orientated and knowledge-based, new managerial control structures become more appropriate. Budgeting becomes increasingly devolved to business units responsible for separate products and markets, and more attuned to emerging opportunities. This reflects the demise of the middle manager as firms become 'flatter' and more 'hollow'. So, long as individual units meet their cash flow and return on assets objectives, they are allowed to become far more autonomous. Empowerment or devolvement of responsibility for the annual budget frees senior managers to concentrate on longer term strategic issues e.g., acquisitions and strategic alliances. Some firms have even abandoned budgeting totally as a management tool, trading loss of detailed control for greater flexibility and responsiveness to external developments. Indeed, no or devolved budgeting is seen as a way of encouraging and managing change, whereas the traditional top-down model often stifled change.

In the public sector, particularly in services, formal budgeting is very much in its infancy. Senior managers have to produce a balanced budget, in line with resources granted out of taxation income, and have little scope for raising extra capital apart from limited borrowing powers and asset sales. Public sector budgeting still reflects a bureaucratic style of management with rigid notions of external accountability. Budgeting is thus a way of controlling change and tends to slow the ability of employees to respond to developments in the external environment, in particular, to the changing needs of service users.

(3) Pay

To compete effectively, managers need to command resources matched to the requirements of the firm's strategy. If its present capabilities fall short of resource requirements, it must pay the going market rates to buy in more resources, or train existing staff accordingly, otherwise they will miss out on market opportunities.

Pay in the public sector is based on years-of-service-related scales with jump points corresponding to promotion between grades. There is little or no payment by results which stifles initiative and responsibility. The level of public sector pay is typically unresponsive to market realities, insofar as job content comparisons are meaningful. Indeed, they are frequently held down as an instrument of government policy. Capping public sector pay is supposed to demonstrate responsibility to other employers and also helps restrain public expenditure and the Borrowing Requirement: key tools in controlling inflation. The result is widespread loss of morale, reduced job commitment and resignation by people seeking better pay and

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conditions (but often with lower job security) e.g., teachers and nurses. The resulting chronic de-skilling is particularly prevalent in information technology and finance.

(4) Borrowing

Financial markets exist to match the needs of 'deficit units' (seekers of finance) with 'surplus units' (providers of finance). A variety of forms of raising finance is available, each appropriate to the risk-return preferences of the investor. At any time, there exists a clear 'risk-return trade-off' which summarises these opportunities, and thus specifies the return required by purchasers of different financial securities or 'claims' over firms' cash flow. The benchmark rate is the yield on government securities; beyond this, the higher the risk, the greater the required return. Firms can thus choose which form of finance is most appropriate for their particular needs at any time. Private firms borrow when conditions are not right to raise other forms of finance e.g. the stock market may have been saturated with a spate of rights issues, or they want to lower their weighted average cost of capital. Whatever the reason, they know that interest must be paid as a prior charge against profits before owners receive a dividend, and that failure to meet interest obligations invites the risk of insolvency.

The public sector receives finance primarily from tax revenue. As the ability to raise taxes between Budgets is limited, the government's fiscal stance can be derailed by a shortfall in economic growth that stunts tax revenues, necessitating borrowing to plug the gap. The present Chancellor adheres to the 'Golden Rules' of public finance that borrowing should only be undertaken for long-term capital projects, and the budget should be roughly balanced over the economic cycle. He is further constrained by wanting to meet the Euro membership criterion that total public sector debt should not exceed 60% of GDP.

At the level of the individual public sector organization, borrowing opportunities are minimal, although the Private Finance Initiative has emerged to encourage partnerships between public and private organizations. However, these take time to organize and require close control to ensure accountability and avoid fraud. This means that, whereas in the private sector a firm can usually obtain finance for a sound project, thus responding to perceived market opportunities, in the public sector investment is typically constrained by the ebb and flow of taxation revenue and planning and implementation delays.



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Test your understanding 3 – Deewan Ltd.**Report**

To: Board of Directors, Deewan Ltd.

From: Independent financial advisor

Date: 03-07-20X8

Re: Dividend policy and other financing issues

You are currently considering the current and future position of the company as regards dividend payments and financing over the next two to three years, in the light of your current cash surplus and the investment opportunities available to you from next year. This report addresses the following issues:

- the implications of share repurchase to reduce future dividend payments;
- borrowing funds to finance dividends;
- the possible effects on cost of equity if either or both of the above actions are taken.

i) Share repurchase

You are likely to have substantial cash surpluses in the coming year. Your first decision is to decide how much to distribute, bearing in mind both your investment financing requirements in the future and the possible reactions of shareholders and other market players. In the current climate, it is expected that 'spare' cash, in excess of that required for specific profitable investment opportunities, should be returned to the shareholders to do with as they wish.

You have some investment opportunities open to you in the near future. Whether or not you have to retain some of the current surplus cash to fund these will depend upon the extent to which you expect there to be spare funds generated in the next two or three years.

Once the amount to be distributed (if any) has been decided upon, you then need to decide whether to return it to all the shareholders as a dividend, or to some of them in the form of a share repurchase. The latter option will result in only a small number of shareholders likely to be the large institutional investors receiving cash, although their proportionate holding, and therefore entitlement to future dividends, will be reduced. Other shareholders will have to sell shares, incurring transaction costs, to 'manufacture' dividends should they need them.

It should be noted that a share repurchase is administratively more complex in that it

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requires prior approval from a general meeting of shareholders (assuming the Articles of Association provide that it can happen at all).

The two types of distribution will also affect share prices differently. When a dividend is declared, the value of the shares falls from cum-div to ex-div, the shareholders having had some of their capital investment realised as cash.

In theory, if the share repurchase is made at current market price, a share repurchase should leave the individual share price unchanged (there has been a reduction in total market value in proportion to the total number of shares in issue).

It should also be noted that a share repurchase would result in a higher future EPS figure than if a normal dividend had been paid. However this should not affect the market's perception of the health of the company, as it is purely a result of the same earnings being spread over a smaller number of shares.

Overall, it would appear that there is no particularly strong argument for a share repurchase in preference to a dividend payment to all shareholders. Whilst you may see this as a means of reducing future dividend payments, it is likely that the remaining shareholders, who would be holding a greater proportion of shares than previously, would expect a higher dividend per share. If this expectation is not met, share prices may be affected adversely.

(i) Borrowing to pay dividends

If it is decided to distribute an amount in the current year that cannot be maintained (with planned growth) in future years out of operational cash flows, then additional funds will need to be borrowed.

This will raise the company's gearing level above the current 1:5 debt:equity ratio, with two consequences. First, the company will be funded by a greater proportion of cheap finance, particularly as debt interest is tax deductible. Second, shareholders may perceive a greater risk as being attached to their dividends, as more of the earnings are attributed to fixed interest payments. It is a question of finding the optimum balance between these two effects.

(iii) Effects on cost of equity

The probable effect of increasing the gearing level will be, as discussed in (ii) above, to increase the required return by (cost of) equity.

Borrowing will directly affect the gearing level, by increasing the debt element. The payment of a dividend or a share repurchase will also increase the gearing level, by lowering the value of the equity (as discussed in (i) above, a dividend

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results in a lower share price with the number of shares being maintained; a share repurchase results in a maintained share price with a lower number of shares). Thus both actions may result in a higher cost of equity.

Overall recommendations

It is advised that any surplus cash over and above the needs of all positive NPV investments should be paid out in the form of a dividend. This 'residual' dividend policy may lead to fluctuating dividends, however, and institutional investors generally prefer a steady dividend pattern; you will need to keep a careful eye on your share price to ensure it is not being adversely affected in the long term.

Should you need to borrow in the future, you should find this to your advantage, as your current gearing level is quite low, and the benefits of cheaper debt should outweigh any increase in cost of equity.

2

Sources of Finance and Forecasting

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Sources of Finance and Forecasting

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Understand capital markets, rights issues and share prices and investment returns
- Comprehend medium-term finance and long-term debt
- Apprehend convertible securities and warrants
- Explicate international debt finance and leasing as a source of finance
- Elucidate lease or buy decision
- Know about treasury functions
- Learn hedging financial risk
- Get acquainted with use of financial derivatives
- Understand cash forecasts and financial statement forecast

Sources of Finance and Forecasting

1 Overview of Chapter

**Sources of finance**

A company might raise funds from the following sources:

1) The capital markets

- new share issues, for example, by companies acquiring a stock market listing for the first time;
- rights issues;
- issues of market able debt.

A company must be a public limited company and must be quoted / listed on stock exchange in order to be able to raise finance from the capital markets.

2) Retained earnings

This is the most common way for companies to finance new investments. It is simple, there are no issue costs, but it is limited by the amount of internally generated funds available.

3) Bank borrowings long-term loans or short-term loans.

4) Venture capital funds

This is high risk finance provided by specialist organizations. The main problem is that the providers of venture capital funding tend to demand significant equity participation in a company and will also want to influence the policy of the company.

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- 5) The international money and capital markets e.g., Euro currency. The term Euro currency refers to the issue of currency in any thing other than domestic currency. The most common reason for a company to raise Euro currency is in order to undertake an overseas investment.
- 6) Government and similar sources.

In general, finance can be raised from Equity or Debt sources.

Criteria for selecting sources of finance

To decide whether debt or equity should be used to fund a new project, the following factors will be considered:

- cost of the different sources of finance
- duration for how long is finance required?
- security often needed for debt finance
- gearing level
- what sources of finance are available?

More details on financing criteria

Cost

Each source of finance has a different cost. With debt capital, a company must pay interest on the debt, and to raise new debt finance it must pay a current rate of interest to persuade investors to provide capital. The cost of interest is an allowable expense for tax purposes, so the cost of debt capital to a company is the interest cost less the tax relief on the interest. This fact, and the fact that the providers of debt finance have lower risk than the providers of equity finance tend to make debt finance cheaper than equity.

The cost of equity capital is the **return** that ordinary shareholders expect on their investment, in the form of current dividends and expectations of dividend and share price growth in the future. Although a company does not have a legal obligation to pay dividends to its shareholders, it must provide a satisfactory return to support the **share price**. Without the prospect of good returns, investors will not subscribe for new equity when the company needs to raise new capital.

It is important here to appreciate that debt finance tends to be cheaper than equity. This is because providers of debt take less risks than providers of equity and, therefore, earn less return. Interest on debt finance is also normally corporation tax deductible, returns to equity are not. The period of the finance will also affect the cost

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as long-term finance tends to be more expensive than short-term finance.

Duration (Short-term, medium-term or long-term)

Equity capital is long-term 'permanent' capital. Most debt capital, on the other hand, is obtained for a fixed term. The length of borrowing can range from very short-term (overdraft facility) to long-term. Bank loans are generally for no longer than the medium-term (say, five to seven years) whereas debt finance raised by issuing bonds can be for a much longer term.

When a company is deciding whether to obtain long-term or short-term capital, it should apply the rule: 'Long-term assets should be financed by long-term funds'. Short-term assets, such as inventories and receivables, should normally be financed by a mixture of short-term and long-term funds.

Thus, we would expect to see working capital financed partly by short-term facilities such as trade payables and a bank overdraft, whilst noncurrent assets should be funded by long-term sources of finance. This rule might be broken to gain access to cheap short-term funds, particularly short-term trade payables (which have no obvious cost) but the risks involved should be appreciated.

Security

Security is often required for debt finance. This could be derived from existing assets or new assets to be acquired. Assets such as land and buildings hold their value better and are easier for a lender to sell than, say, plant and machinery.

Gearing

Gearing is the ratio of debt to equity finance. A high gearing ratio can be very risky. Although high gearing involves the use of cheap debt finance, high levels of debt also create an obligation to meet interest payments and debt principal repayment schedules. If these are not met the company could end up in liquidation. A company should try to achieve a satisfactory balance between equity finance and medium and long-term debt for its long-term funding, to benefit from the lower cost of debt finance without exposing itself to the risks arising from excessive debt obligations.

Availability

Not all companies have access to all sources of finance. Small companies traditionally have problems in raising both equity and long-term debt finance. Remember that many firms do not have an unlimited choice of funding arrangements.

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2 Equity Finance

Equity is another name for shares or ownership rights in a business.

Capital markets

Capital markets (or stock markets) must fulfil both primary and secondary functions.

Primary functions

- a source of new capital for companies
- a means by which investors can buy into the equity of a company.

Secondary functions

- a means by which shareholders can liquidate their investments at a fair price for cash
- a means by which the performance of a company can be measured (and hence its management) over time.

A stock exchange listing

Advantages of a listing on the full stock exchange

To existing shareholders:

- they can sell some of their shares;
- greater marketability raises value;
- no valuation problems.

To the company:

- new funds can be obtained;
- better credit standing;
- takeovers can be financed by equity issues;
- easier to raise future finance;
- perceived risk reduction: fall in cost of equity;
- extra status may generate new business.

Disadvantages of a listing

- costs borne by company;
- company must comply with SE regulations;

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- dilution of control;
- public scrutiny of profits / results.

Methods of issuing new shares

The most common method of issuing shares is a rights issue. If a company already has a listing on a stock market then the company will almost certainly raise new funds by means of a rights issue, or possibly occasionally by means of a placing. An offer for sale or an offer for sale by tender is more suitable when a company seeks a listing on the stock exchange for the first time.

Rights issue

- Offering the new shares for sale to existing shareholders, in proportion to the size of their shareholding.
- The right to buy new shares ahead of outside investors is known as the 'pre-emption rights' of shareholders.
- Preemption rights are protected by law, and can only be waived with the consent of shareholders.
- They are far cheaper than a public share issue.
- They may be made at the discretion of the directors without the consent of the shareholders or the stock exchange.

An issue price must be set which is

- low enough to secure acceptance of shareholders; but
- not too low, so as to avoid excessive dilution of the earnings per share.

Market price after issue

- After the announcement of a rights issue there is a tendency for share prices to fall.
- The temporary fall is due to uncertainty about:
 - consequences of the issue;
 - future profits; and
 - future dividends.
- After the actual issue the market price will normally fall again because:
 - there are more shares in issue (adverse affect on earnings per share); and

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- new shares were issued at market price discount.
- 'cum rights'

When rights issue is announced, all existing shareholders have the right to subscribe for new shares, and so there are rights ('cum rights') attached to the shares, and the shares are traded 'cum rights'.

Ex rights

On the first day of dealings in the newly issued shares, the rights no longer exist and the old shares are now traded 'ex rights' (without rights attached).

Theoretical prices / values

- a) Theoretical 'ex rights' price is the theoretical price that the class of shares will trade at on the first trading day after issue. It is calculated as follows:

$$\frac{(N \times \text{cum rights price}) + \text{Issue price}}{N+1}$$

N+1

- b) Theoretical 'value of rights' per share is calculated as:

$$(\text{Theoretical ex rights price} - \text{issue price}) / N$$

where N = no of rights required to buy 1 share

Example 1 – Flower Ltd.

- a) Flower Ltd. has 100,000 Rs. 10 ordinary shares quoted at Rs. 45 ex div. It is considering a 1 for 5 rights issue at Rs. 42 per share.

Required:

Calculate the theoretical ex rights share price.

- b) Assume that Flower Ltd. intends to use the funds raised to finance a project with an NPV of Rs. 300,000.

Required:

Calculate the theoretical ex rights share price if the project is undertaken.

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Courses of action open to share holder

Possible actions for a shareholder are:

- exercise the rights (that is buy the shares at the rights price);
- renounce the rights and sell them on the market;
- renounce part of the rights and take up the remainder;
- do nothing. (Shareholders may be protected from the consequences of inaction by the company selling the rights on behalf of inactive shareholders).

Implications of a rights issue

- a) From viewpoint of the shareholders:

- have option of buying shares at preferential price;
- have option of withdrawing cash by selling their rights;
- are able to maintain their existing relative voting position (by exercising the rights).

- b) From viewpoint of the company:

- is simple and cheap to implement;
- is usually successful;
- often provides favourable publicity.

B Offer for sale at a fixed price

Shares are offered for sale to investors, through an issuing house at a fixed price set by the company.

C Offer for sale by tender

Investors are invited to tender for new shares issued at their own suggested price. All shares are subsequently sold at the best price at which they would be taken up.

D Placing

Shares are placed directly with certain investors (normally institutions) on a pre-arranged basis.

Preference shares

- A form of equity that pays a fixed dividend.

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- It is paid in preference to (before) ordinary shares, hence, the name.
- It is not tax efficient, any return being paid out of post tax income.
- Not very popular, it is the worst of both worlds i.e.,
 - it is not tax efficient;
 - it offers no opportunity for capital gain (fixed return).

3 Debt Finance

The loan of funds to a business without conferring ownership rights. The key features of debt financing arise from this 'arm's length relationship':

- It is paid out of pretax profits as an expense of the business.
- It carries a risk of default if interest and principal payments are not met.

Security charges

The lender of funds will normally require some form of security against which the funds are advanced. This means that, in the event of default, the lender will be able to take assets in exchange of the amounts owing. There are two types of 'charge' or security that may be offered/required:

- 1) **Fixed charge** - The debt is secured against a specific asset, normally land or buildings. This form of security is preferred because, in the event of liquidation, it puts the lender at the 'front of the queue' of creditors.
- 2) **Floating charge** - The debt is secured against the general assets of the business. This form of security is not as strong; again it confers a measure of security on liquidation as a 'preferred creditor', meaning the lender is higher in the list of creditors than otherwise.

Covenants

A further means of limiting the risk to the lender is to restrict the actions of the directors through the means of covenants. These are specific requirements or limitations laid down as a condition of taking on debt financing. They may include:

- 1) **Dividend restrictions** - Limitations on the level of dividends a company is permitted to pay. This is designed to prevent excessive dividend payments which may seriously weaken the company's future cash flows and thereby place the lender at greater risk.
- 2) **Financial ratios** - Specified levels below which certain ratios may not fall, e.g., debt to net assets ratio, current ratio.

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- 3) **Financial reports** - Regular accounts and financial reports to be provided to the lender to monitor progress.
- 4) **Issue of further debt** - The amount and type of debt that can be issued may be restricted. Subordinated loan stock (i.e., stock ranking below the existing unsecured loan stock) can usually still be issued.

Types of debt

Debt may be raised from two general sources: banks or investors.

Bank finance

For companies that are unlisted and for many listed companies the first part of call for borrowing money would be the banks. These could be the high street banks or, more likely for larger companies, the large number of merchant banks concentrating on 'securitised lending'. The key advantage of borrowing from banks is the confidential nature of the arrangement.

Terms and conditions are negotiable dependant on term amount and the credit rating of the company wishing to make the borrowing.

Traded investments

As an alternative to borrowing funds from a bank the company, if listed on the stock exchange, may issue debt to investors over the long-term. Typical features may include:

The debt is denominated in units of Rs. 100; this is the value eventually redeemed on maturity. It is often the value on issue (the cost to the investor) but the debt may be issued at a discount (for less).

- Interest is paid (normally at a fixed rather than floating rate) on the nominal value of the loan.
- The debt has a lower risk than ordinary shares.

Types of issued debt

They include:

- **Debentures** Debt secured with a charge against assets (either fixed or floating).
- **Unsecured loans** No security meaning the debt is more risky requiring a higher return. They normally require covenants to give some measure of

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safety to the debt holder.

- **Mezzanine finance** High risk finance issued when other sources are unavailable. A typical use is to fund a management buyout.
- **Euro bonds** The issue of debt in a currency other than that of the country. This form of finance is only available to the largest international corporations.

The yield on debt

A common exam question requirement is to calculate the "yield" to the lender of debt finance.

An investor who purchases a traded debt instrument (e.g., debenture, bond) receives a return, known as a "yield", in the form of the annual interest (or "coupon") payments and, if the debt is redeemable, the final redemption payment. This return is also known as the "Yield To Maturity" (YTM), or "redemption yield" on the bond, and it is defined as:

YTM = effective average annual percentage return to the investor, relative to the current market value of the bond.

If the bond is irredeemable, the calculation is very simple. However, the calculations are more complex if the bond is redeemable, or if it is denominated in a foreign currency.

Yield on irredeemable debt

For irredeemable debt,

$YTM = (\text{annual interest received} / \text{current market value of debt}) \times 100\%$

Example 2

Globe Ltd. has some 5% coupon, Rs. 100 nominal value, irredeemable bonds in issue, which have a current market value of Rs. 95.

Required:

Calculate the yield to maturity for these bonds.

Yield on redeemable debt

For redeemable debt,

YTM = the IRR of the bond price, the annual interest received, and the final

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redemption amount.

This ensures that the yield calculation incorporates a return in the form of the final redemption amount as well as the annual interest amounts.

Example 3

Globe Ltd. also has some 7% coupon, Rs. 100 nominal value bonds in issue, which are redeemable at a 10% premium in 5 years. The current market value of the bonds is Rs. 98.

Required:

Calculate the yield to maturity for these bonds.

Yield to maturity for foreign currency bonds

The calculation of Yield To Maturity (YTM) is complicated further when we look at foreign currency loans. As above, let's start by considering the impact on irredeemable bonds, then move on to look at redeemables.

Irredeemable foreign currency bonds

Assume that Globe Ltd. now issues some US\$100 irredeemable bonds at par, with a coupon rate of 5%. If the exchange rate between the US\$ and Rs. is expected to stay constant, the YTM calculation is exactly the same as it was before. However, a problem arises when the exchange rate is expected to change.

For example, if the US \$ is expected to strengthen by 3% per annum against the Rs. sterling, paying the interest in US\$ each year will effectively cost Globe Ltd. 3% more per annum as time goes by, on top of the 5% coupon rate payable.

Thus, the YTM on the irredeemable US \$ bonds would be:

$[(1.05 \times 1.03)^1] = 8.15\%$ per annum.

Redeemable foreign currency bonds

Now, let's calculate the YTM if Globe Ltd. issues some \$ 100, 5% coupon bonds at par, redeemable in 5 years at \$110, and the US\$ is expected to strengthen by 3% per annum against the Rs. Assume that the current (spot) exchange rate is Rs./US \$ = 100 (that is, \$ 1 = Rs. 100).

Following the example above on redeemable bonds, we know that the YTM is the

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IRR of the current market value, the interest payments and the redemption amount. The complication in this case is that the cash flows will first need to be converted into Rs. (Globe Ltd.'s home currency), using exchange rates which change each year, as follows:

\$	Ex rate (\$1 = Rs.)	Rs.
t0 Current MV	(100)100	(10,000)
t1 Interest	5 103	515
t2 Interest	5 106.9	534.5
t3 Interest	5 109.27	546.35
t4 Interest	5 112.55	562.75
t5 Interest and redemption	115 115.93	13,332

Hence, the IRR (the YTM) can be calculated as follows:

Rs.	DF 8%	PV	DF 10%	PV
t0 (10,000)	1	(10,000)	1	(10,000)
t1 515	0.926	476.89	0.909	468.135
t2 534.5	0.857	458.066	0.826	441.497
t3 546.35	0.794	433.80	0.751	410.31
t4 562.75	0.735	413.621	0.683	384.358
t5 13,332	0.681	9,079.09	0.621	8,279.17
	861.467		(16.53)	

Hence, $IRR = 8\% + [2\% \times 861.467 / (861.467 + 16.53)] = 9.96\%$

Advantages and disadvantages of using debt

Advantages

- Debt has low cost in comparison with equity.
- Debt attracts tax benefits.
- Voting power of company is not offered with debt.

Disadvantages

- Company needs to have some assets for security of debt.
- More dependence on debt decreases the interest cover ratio.
- Company has to repay the debt as they are redeemable.

4 Other Sources of Finance

Sale and lease back

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- Selling good quality fixed assets such as high street buildings and
- Leasing them back over many years (25+).
- Funds are released without any loss of use of assets.
- Any potential capital gain on assets is forgone.
- A popular means of funding for retail organizations with substantial high street property e.g., Tesco, Marks and Spencer.

Grants

- Often related to technology, job creation or regional policy.
- Of particular importance to small and medium sized businesses (i.e., unlisted)
- Their key advantage is that they do not need to be paid back.
- Remember the European dimension with grants also available through the European Union.

Retained earnings

The single most important source of finance, most businesses use retained earnings as the basis of their financing needs.

Warrants

- An option to buy shares at a specified point in the future for a specified (exercise) price.
- The warrant offers a potential capital gain where the share price may rise above the exercise price.
- The holder has the option to buy the share.
- The warrant has many uses including:
 - as additional consideration when issuing debt to make it more attractive;
 - as a means of offering incentives to staff.

Convertible loan stock

- Similar in effect to attaching a warrant to a debt instrument.
- The convertible debt is where the debt itself can be converted into shares at a predetermined price at a date or range of dates in the future.
- This has the effect of giving the debt holder a potential capital gain over and above the return from the debt interest.
- If the value of the shares is greater than that of the debt on the exercise date,

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then conversion will be made by the investor.

- If, however, the share value is lower than the debt value, the investor may retain the debt to maturity.

5 The Lease v Buy Decision

Leasing is an alternative way of obtaining the use of items of equipment for companies which for varying reasons may wish to avoid acquiring them outright.

Terminology

a) Operating lease

Usually for a short period, where substantially all the risks and rewards of ownership remain with the lessor.

b) Finance lease

Usually for a long period, where substantially all the risks and rewards of ownership pass to the lessee.

The type of lease that we need to consider in more detail is a finance lease because this is an alternative to borrowing some money in the long term in order to purchase an asset.

Reasons for leasing

- The full lease rental is allowable against tax. Interest on debt financing is allowable against tax but the capital repayment is not.
- It is a readily available form of finance, especially for plant and equipment or motor vehicles. It is, therefore, very convenient for companies to enter into such arrangements.
- It removes the need for a significant capital outlay at the beginning of a project's life i.e., it avoids the need to find the capital at the outset.
- It may be cheaper in financial terms than conventional debt financing i.e., the effective interest rate on leasing may be less than the interest payable on a loan.

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Lease v buy evaluation

If an asset is needed for a major new investment, and the asset can be leased under a finance lease then a critical decision is:

- should the asset be leased; or
- should the asset be purchased and the purchase cost financed by debt issue?

In the exam you may need to evaluate the lease against borrowing to buy option to determine which would be better in financial terms. The traditional approach to the evaluation is to determine the present value cost of leasing and compare this to the present value cost of borrowing to buy.

Note:

- Tax relief on interest payments on debt is always taken into account by obtaining a post tax cost of debt.
- Assume lease payments are always allowable in full against chargeable profits unless told otherwise (see notes after the next example).

Example 4 – Pen Ltd.

Pen Ltd. wishes to invest in new equipment costing Rs. 130,000. The equipment has a life of four years and no scrap proceeds are expected to be available after this period. Writing down allowances are available at 25% on a reducing balance basis. The company can borrow at 12% pre-tax.

The equipment could alternatively be leased for a cost of Rs. 40,000 per annum payable in arrears over four years. Assume that the full lease payment is a tax deductible expense. Tax is 33% payable one year in arrears.

Required:

Determine whether the company should lease or purchase the asset.

Further calculations on lease interest

In the above example, we were told specifically that the full lease payment was to be treated as a tax deductible expense.

In some questions, you will be told to assume that just the interest element of the lease payment is tax deductible. In this case, the first step is to calculate the interest element, using either the actuarial method, or the sum of digits method.

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The following illustration shows how both methods work.

Illustration 1

Assume that KL Company has the option to buy an asset for Rs. 100,000, or to lease it by paying Rs. 29,500 per year in arrears for 4 years. Clearly, the interest element in the lease amounts to $(4 \times \text{Rs. } 29,500) - \text{Rs. } 100,000 = \text{Rs. } 18,000$ in total. This interest can be allocated to years using either the actuarial method, or the sum of digits method.

Actuarial method

Here the implied interest rate is found by using an IRR approach.

As a short cut, the 4 year annuity factor at the IRR can be found by dividing the cost of the asset by the annual interest payment (i.e., $100,000/29,500$). This gives a 4 year annuity factor of 3.390, which (from tables) is very close to the 7% factor. Hence, the implied interest rate in the lease is (approximately) 7%.

Now, the interest can be allocated to individual years using the following table:

	Rs.			
	Year 1	Year 2	Year 3	Year 4
Opening balance	100,000	77,500	53,425	27,665
+ Interest (7% x Op Bal)	7,000	5,425	3,740	1,937
Lease payment	(29,500)	(29,500)	(29,500)	(29,500)
Closing balance	77,500	53,425	27,665	102

Note: The closing balance at the end of year 4 should be zero. The difference is due to rounding.

The lease interest payments have now been allocated to years, so can be used to calculate the tax relief each year.

Sum of digits method

This is a simpler way of allocating interest, based on the sum of digits formula:

$$n(n+1)/2$$

In this example, the lease payments are to be made over 4 periods, so the sum of digits is 10 (working: $4 \times 5/2 = 10$)

Hence, the interest allocation is:

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Year 1	$4/10 \times \text{Rs. } 18,000$	Rs. 7,200
Year 2	$3/10 \times \text{Rs. } 18,000$	Rs. 5,400
Year 3	$2/10 \times \text{Rs. } 18,000$	Rs. 3,600
Year 4	$1/10 \times \text{Rs. } 18,000$	Rs. 1,800

Once again, the tax relief on the lease interest can now be calculated easily.

6 The Role of the Treasury Function

An entity's treasury function has responsibility for "the provision and use of finance."

The main functions of a treasury department include:

- establishment of corporate financial objectives.
- management the entity's liquid assets (e.g., cash and marketable securities)
- management of the entity's funding determination of policies, identifying sources and types of funds
- currency management (in a multinational) dealing in foreign currencies and hedging currency risks. (See details below)

Profit centre or cost centre

- Should the Treasury functions be a cost centre or a profit centre?
- What is the company's objective?
- What is the department's objective?

It is generally thought better for treasury departments to operate as cost centres as this reduces the level of risk given the high level of liquid assets in treasury

Centralization v decentralization

Centralized advantages

- Greater liquidity / volumes;
- Bulk borrowing;
- Foreign currency risk reduced;
- Experts available.

Centralized disadvantages

- Transfer responsibility / control away from local managers;
- Creates bureaucracies;
- Performance evaluation of foreign managers difficult;
- Impractical to have no cash balances at subsidiary level.

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Financial risk can be hedged in following way

i) Hedging with forwards

The forward market is where you can buy and sell a currency / commodity, at a fixed future date for a predetermined rate, i.e., the forward rate of exchange.

ii) Money market hedge

The money markets are markets for wholesale (large-scale) lending and borrowing, or trading in short-term financial instruments. Many companies are able to borrow or deposit funds through their bank in the money markets.

iii) Financial derivatives

a) Future

Futures are like a forward contract in that:

- the company's position is fixed by the rate of exchange in the futures contract;
- it is a binding contract.

A futures contract differs from a forward contract in the following ways:

- futures are for standardized amounts;
- futures can be traded in market.

Because each contract is for a standard amount and with a fixed maturity date, they rarely cover the exact exposure.

b) Options

Options are similar to forwards but with one key difference. They give the right but not the obligation to buy or sell currency etc., at some point in the future at a predetermined rate.

7 Forecasting—Profits, Cash Flows and the SFP

Planning

All businesses need to plan. They need to identify exactly what their business will look like financially should they choose to go ahead with a particular strategy.

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Objective of planning: to allow an organization to influence its own future by thinking and acting in advance.

A very popular exam area is the requirement to calculate a forecast income statement, statement of financial position and cash flow. It is looked at in this section because many of the exam questions ask for a forecast and follow up with some form of raising capital written aspect. Although the forecasting of the income statement will not cause difficulty, the approach and presentation needs thought and some practice.

Forecasting income statement and statement of financial position values

This is a very simple process. For example, if sales are currently Rs. 10 m and growth is forecast to be 5%, future sales can be forecast as:

Year 1: Rs. 10 m x 1.05	Rs. 10.5 m
Year 2: Rs. 10 m x (1.05) ²	Rs. 11.025 m

Tax adjustments

This is the main source of difficulty in many questions. The tax should not be charged directly on the accounting profits. Instead, the firm's depreciation should be added back and then the capital allowances deducted to give taxable profit, to which the tax rate can be applied.

Example 5 – Tax adjustments

Fallow Ltd.'s depreciation on its plant and machinery next year will be Rs. 2 m on a straight line basis. For tax purposes, capital allowances can be claimed at a rate of 25% p.a. (reducing balance basis). The current book value, and tax written down value, of the plant is Rs. 10 m. The expected accounting profit for the coming year is Rs. 8 m. Corporation tax is 30%.

Required:

Calculate the expected tax charge for next year.

8 Exam style questions

Test your understanding 1 – ABC Ltd.

The directors of ABC Ltd. a conglomerate listed on a stock exchange, are appraising one of their wholly-owned subsidiaries, XYZ Ltd. with a view to disinvestment. The

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subsidiary is primarily involved in the manufacture and distribution of car care products.

Financial data for XYZ Ltd. are shown in the table below.

Required:

- a) Calculate five ratios for each of the two years 20X1 and 20X2 which you consider to be appropriate for the evaluation of the subsidiary's efficiency, profitability and liquidity over the two year period. Your selection of ratios should ensure measurement of the company's performance in all three areas.

(10 marks)

- b) Prepare a report for the management of ABC Ltd. This report should discuss the following:

- the performance of the subsidiary during the past two years, using the ratios calculated in part (a) to guide your comments;
- the limitations of the type of historical analysis you have just provided;
- suggestions for the parent company's future course of action in respect of the subsidiary, including comment on an appropriate procedure for valuing the company;
- other, nonfinancial information which would be useful to the directors of ABC Ltd. before they make any decision.

(15 marks)

(Total: 25 marks)

Summary accounts for XYZ Ltd.**Statement of financial position at 31 December**

	20X2 Rs. '000'	20X1 Rs. '000'
Non-current assets (plant & equip)	2,650	2,255
Other long-term assets (Note 1)	750	675
Cash and marketable securities	195	162
Receivables	765	476
Inventory and work in progress	1,250	893
Other current assets	150	91
Total assets	5,760	4,552

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Shareholders' funds	2,520	1,726
Long-term debt	2,250	1,976
Other long-term liabilities (Note 2)	275	206
Current liabilities	715	644
Total equity & liabilities	5,760	4,552

Extracts from the income statements for the years ended 31 December

	20X2 Rs. '000'	20X1 Rs. '000'
Turnover	6,575	5,918
Cost of goods sold	5,918	5,444
Other expenses	658	592
Other income	23	20
Earnings before finance charges and tax	22	(98)
Finance Charges	395	339
Tax on ordinary activities (Note 3)	(120)	(149)
Net loss	(253)	(288)

Notes:

- Other long-term assets are motor vehicles and office equipment.
- Other long-term liabilities are finance leases.
- The tax shown in the 20X1 income statement extract will be recovered in 20X2.

Other financial information

	Rs. '000'
Depreciation 20X2	175
Net realisable value of inventory	1,091
Net realisable value of plant and equipment	3,907
Inventory and work in progress at 1 January, 20X1	850
Receivables at 1 January, 20X1	435

Test your understanding 2—GSD Ltd.

GSD Ltd. is a private company owned by the two families that started the business in 20X0. The company produces organic food products for distribution in the domestic market using food products from farms. The company is experiencing a period of rapid growth, with revenue expected to rise by 15% in each of the following five years.

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The company is hoping to retain a profit margin (profit before interest and taxes divided by revenue) of 30% throughout the next five years. The ratio of working capital to revenue is expected to remain constant, where working capital is inventories plus trade receivables less trade payables.

Interest is paid on the overdraft and bank loan at 6% per annum. Interest on the bank loan and overdraft is calculated on the balance outstanding at the beginning of the year. Corporation tax is paid one year in arrears at a rate of 30%, with a 100% tax allowance for capital expenditure in the year in which it is incurred. In arriving at operating profit, depreciation is charged at 25% on a reducing balance basis based on year end balances.

Extracts from the management accounts of GSD Ltd. on 31 December, 20X4 are as follows:

**Statement of financial position
as at 31 December, 20X4**

Property, plant and equipment	15
Working capital	9
	<hr/>
	24
	<hr/>
Share capital (Rs. 10 ordinary)	10
Retained earnings	4
Long-term borrowings (bank loan)	8
Short-term borrowings (overdraft)	1
Current tax payable	1
	<hr/>
	24

Income statement for the year ended 31 December, 20X4

Revenue	45.0
Profit before interest and taxes	13.5
Dividend paid in 20X4	Rs. 10 a share

Capital expenditure plans are for expenditure on property, plant and equipment of Rs. 10 m in 20X5, Rs. 10 m in 20X6 and Rs. 7 m in each of years 20X7 to 20X9. No disposals of property, plant and equipment are expected in this period.

Shareholders expect a year on year increase in dividends of 5%. Any funds deficit in the year will be funded by overdraft and any surplus funds used to reduce the overdraft. However, with the increased demands on the funds of the business to

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finance growth, the directors are concerned that they may exceed the overdraft limit of Rs. 1.5 m. They may, therefore, need to negotiate an increase in the bank loan, although the bank has indicated that it would not accept gearing higher than 70% based on book values where gearing is defined as long and short-term borrowings (including overdraft) divided by equity. The shareholders have indicated that they do not wish to inject any additional capital into the business.

Required:

- Construct the statement of financial statement, income statement and a cash flow analysis of the company for each of the years 20X5 and 20X6 and advise the company on the extent of any additional funding requirement in that period. In your answer, round figures to the nearest Rs. 100,000.
(16marks)
- Discuss the interrelationships between financing, investment and dividend strategies with reference to the liquidity requirements of GSD Ltd. Include in your discussion how each could be adapted to meet the company's liquidity requirements in the years 20X5 and 20X6 and provide a recommendation.
(9marks)

(Total: 25 marks)

Further big illustration of forecasting

Question

Back ground to the company

Clifton Ltd. operates a chain of fast food outlets. Some are company owned and some are operated under franchise. Two colleagues who were made redundant from one of the major fast food companies started the company 15 years ago. Initially they opened outlets in smaller towns and cities where there was limited competition. The company experienced rapid growth in the first ten years of operations. Over the past five years, growth has stabilized and the company may now be facing a downturn in business caused primarily by increased competition.

Financing history and current situation

The original owners obtained a listing on the stock market eight years ago when 40% of the 20 million Re. 1 shares in issue were offered for sale at Rs. 2.60 per share. Further capital was raised four years ago by means of a 1 for 4 rights issue. As a result of a series of share disposals, the original owners' combined

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shareholding has fallen to 35% of the shares currently in issue. Institutional investors now own the majority, although a number of employees are shareholders as a result of the company's share option scheme. A summary of the company's most recent financial statements is shown in Table 1 below. The company's shareholders have, historically, required a return on their equity of 15%.

Financing alternatives

At a recent meeting between the company's directors, financial analysts and institutional investors, it was suggested that the company should consider a programme of expansion by extending the franchise to other locations if it is to return to growth. However, it is unlikely to be able to undertake major expansion out of cash surpluses and the company must now consider raising new finance. Two alternatives are being considered:

Alternative 1

A rights issue of 1 for 5 at Rs. 5.

Alternative 2

A floating rate loan of Rs. 25 million at an initial rate of 8% per annum. The loan would be for eight years, repayable on maturity and secured against the freehold land and buildings owned by Clifton Ltd. However, the bank has imposed a condition that the company's gearing, measured by the book value of total debt to total debt plus equity is no more than 50% throughout the period of the loan. If this condition is infringed, then the bank has the right to call in the loan at three months' notice. Clifton Ltd. can purchase a four years interest cap at 10% for an immediate premium of 2% of the initial amount of the loan. This expense will be amortised over the life of the cap. (Tutorial note: Take the interest to be 8.5%.)

Profit improvement scheme

The directors recognize that raising new capital, especially if it is by means of a rights issue, will need to be justified in terms of benefits to shareholders. The costs and benefits of the proposed expansion yet to be fully evaluated but as a broad objective the directors aim to increase turnover by 10% per annum for the foreseeable future. It is expected that direct costs other than depreciation will, on average, increase by only 8% per annum as a result of a cost reduction programme and new supplier contracts. Indirect expenses are expected to hold constant as a result of internal restructuring. Other relevant information is as follows:

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- The ratios of receivables to sales and payables to direct costs (excluding depreciation) will remain the same as in the year to 30 April, 2000.
- Depreciation on assets existing at 30 April, 2000 is forecast to be Rs. 9 million in the year ending 30 April, 2001 and Rs. 7 million the year after that. New fixed assets will be purchased to the value of Rs. 25 million in the year to 30 April, 2001 and Rs. 20 million in the year to 30 April, 2002. Depreciation on these new assets will be 20% per annum straight line starting in the year of purchase. Assume capital allowances are available at the same rate.

Note: This is a simplification, for examination purposes, of the existing tax situation.

- Rs. 10 million of additional stock will also be purchased in the year to 30 April, 2001. Assume this is the only change in the stock level for 2000/2001.
- Tax is payable at a marginal rate of 30% per annum in the year in which the liability arises.
- Dividends are payable the year after they are declared. Assume the company maintains the 1999/2000 payout ratio in 2000/2001.

Share buy back proposal

The finance director of Clifton Ltd. is particularly skeptical of alternative 1, a rights issue, and believes a debt alternative is much to be preferred at the present time. He argues that debt is cheaper than equity but also that, given the depressed current price of the company's shares, the company should be considering a share buyback rather than a share issue. If money were raised by a loan, he recommends that some of it should be used to buy back the maximum amount of shares permitted by law.

Table 1 Summary financial statements

Income Statement for year to 30 April, 2000

	Rs. '000'
Turnover	135,000
Direct costs (Note 1)	85,500
Indirect costs	20,000
Finance charges	2,500
Profit before tax	27,000
Tax on profit at 30%	8,100
Profit after tax	18,900
Dividends declared	11,340

Sources of Finance and Forecasting

Statement of financial position at 30 April, 2000

	Rs. '000'	Rs. '000'
Assets		
Non-current assets	117,000	
Current assets		
Inventory	17,500	
Receivables	24,500	
Cash at bank	5,250	
		47,250
Total assets		164,250
Equity and liabilities		
Capital and reserves		
Ordinary share capital (Re. 1 shares)	25,000	
Reserves (Note 3)	81,410	
		106,410
Noncurrent liabilities		
10% debentures 2005		25,000
Current liabilities		
Payables	21,500	
Others (Note 2)	11,340	
		32,840
Total equity and liabilities		164,250

Notes:

- 1) Includes depreciation of Rs. 9,500,000.
- 2) Other current liabilities are dividends payable.
- 3) Includes revaluation reserve of Rs. 25,000,000.
- 4) Share price movements during the year:
High Rs. 6.30 Low Rs. 5.50 As at today (23 May, 2000) Rs. 5.6

Required:

Parts (b), (c) and (d) of the question relate specifically to the scenario.

Answers to part (a) should be in general terms, although the scenario details may be referred to in your answers.

- a) Discuss the issues to be considered by the treasurer of a profitable but low growth company when determining financing strategies in a period of near zero inflation and, as a consequence, low and falling interest rates.

(8 marks)

Sources of Finance and Forecasting

- b) For the two financing alternatives being considered by the directors of Clifton Ltd. provide forecast:

- i) Income statements for the year to 30 April, 2001;
- ii) Statement of financial positions at 30 April, 2001; and
- iii) cash flows for the year to 30 April, 2001.

Note1: Ignore transaction costs on the issuing of new capital and returns on surplus cash invested short-term.

Note2: You are not required to adopt the standard format for the cash flow forecasts, but may do so if you wish.

(14 marks)

- c) Assume you are a management accountant with Clifton Ltd. Write a report to the directors that evaluates the proposed methods of financing. You should:

- i) base your evaluation on the forecast you have provided in part (b) of the question but include whatever additional calculations you think necessary and appropriate to aid the evaluation;
- ii) discuss the advantages and disadvantages of the two methods of financing being evaluated and comment briefly on alternative types of finance which might be considered suitable in the circumstances;
- iii) comment on any additional information which would be useful before the directors can make an informed decision.

(30 marks)

- d) If new finance is raised by loan, discuss the advantages, disadvantages and practical problems of implementing a share buyback scheme as suggested by the finance director.

Note: You are not required to discuss the legal aspects of share buy backs.

(8 marks)

(Total: 60 marks)

Solution

Tutorial note:

Required: A scenario question involving a firm wanting to raise new long-term funds to finance expansion. A lot of basic accounting is required production of financial statements and also ratio analysis. The data generated has to be used to illustrate the report section which, as

Sources of Finance and Forecasting

usual, carries a major part of the marks available.

Not**required:**

- Do not cover buy backs: this is in part (d). Do not over do your treatment of dividend policy.
- No need to follow full standard format but most will find it familiar.
- Do not include short-term financing methods.
- The question is very clear it specifies loan finance.

The company is not using spare cash.

- A word of warning. The scenario suggests that the firm may be cash rich. Normally, a share buy back would be considered but this is required in part (d). You will not get double credit, so omit this from this part.

The firm is profitable but facing a slow growth future. This suggests increasing cash balances and lack of investment opportunities, raising the issue of how to deal with the surplus balances. The guiding principle should be to achieve a combination of dividend policy and capital structure that maximizes shareholder value.

Distribution of higher dividends

Most firms attempt to establish a stable dividend policy so that investors can have confidence in their future income stream. In this way, they can cater to a particular clientele of investors whose preferences are aligned with the firm's policy.

A higher level of payout may conflict with these preferences. People who are investing for the long-term may not want to receive higher current income, and will face costs in reinvesting excess liquidity. Also, this change may impose tax penalties on high income tax payers.

Although in the short-term a higher payout can be represented as a one-off special dividend, if it is to become established policy, it needs to be carefully explained to investors to enable them to readjust their portfolios as necessary.

Reduce debt

As well as reducing cash outflows, lowering debt is psychologically appealing but it is tax inefficient. The firm is profitable in a stable environment which suggests it has the ongoing taxable capacity to construct and maintain a tax shield. Moreover, unless the firm is quite highly geared already, lowering debt will increase the weighted average cost of capital, given that debt is invariably cheaper than equity.

Sources of Finance and Forecasting

Re-financing

If interest rates are low and falling, it is probably sensible to refinance. Existing debt probably carries a higher rate of interest than prevailing rates, so savings can be made by repaying it (assuming there is a call option enabling premature redemption), and borrowing afresh at today's lower rates. If these are expected to fall further, then this may be done at a floating rate, but if the firm expects no further reductions, then it may be prudent to refinance at a fixed rate to lock in today's low rates as a hedge against higher future rates.

Careful examination of the current yield curve will aid this decision e.g., a falling yield curve may argue for floating rate borrowing, pending a fall in future rates.

Conclusion

While interest rates are low and cash flows reliable, there is a strong case for actually increasing gearing and paying out higher dividends.

- Remember to format these statements as neatly as possible to help the examiner to see more clearly where (if) you make mistakes.

Notice that the income statements are identical down to operating profit. Under exam conditions, to save time, there is no need to repeat this section although it is shown for completeness.

i) Income Statements for the year ending 30 April, 2001

	With rights issue		With loan	
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Sales (W1)	148,500	148,500		
Direct costs (W2)		(82,080)		(82,080)
Depreciation (W3)		(14,000)		(14,000)
Indirect costs		(20,000)		(20,000)
Cost of sales		(116,080)		(116,080)
Operating profit		32,420		32,420
Finance charges (W4)		(2,500)		(4,625)
Profit before tax		29,920		27,795
Tax @ 30%		(8,976)		(8,339)
Profit after tax		20,944		19,456

Sources of Finance and Forecasting

Dividends	(12,566)	(11,674)
Retained profits	8,378	7,782

W1: year 2000 + 10% increase = Rs. 148,500

W2: year 2000 + 8% increase = Rs. 82,080

W3: Rs. 9,000 + Rs. 5,000 = Rs. 14,000

W4: finance charges with loan = as before + (Rs. 25,000 × 0.085) =
Rs. 2,125 including the cap

ii) Statement of financial positions as at 30 April, 2001

	With rights issue		With loan	
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Assets				
Non-current assets (W1)		128,000		128,000
Current assets (W2)				
Inventory	27,500		27,500	
Receivables	26,950		26,950	
Cash (W3)	18,124		16,636	
	72,574		71,086	
Total assets		200,574		199,086
Equity and liabilities				
Capital & reserves				
Ordinary shares		30,000		25,000
Reserves:				
Revenue (W5)		64,788		64,192
Revaluation		25,000		25,000
Share premium (W6)		20,000		
Non-current liabilities				
Long-term debt		25,000		50,000
Current liabilities				
Trade payables (W4)	23,220		23,220	11,674
		34,894		
Total equity and liabilities		200,574		199,086

W1: year 2000 + capital expenditure of Rs. 25,000 less depreciation of Rs. 14,000

W2: inventory: year 2000 + Rs. 10,000; receivables: year 2000 + 10%

W3: as per cash flow statement in (iii)

W4: trade creditors: year 2000 + 8%

Sources of Finance and Forecasting

W5: year 2000 + retained profits of Rs. 8,378 or Rs. 7,782

W6: (no. of shares @ 1for5 =) 5,000 × premium per share of (Rs. 5-

Rs. 1 par value).

- iii) This solution adheres to the IAS 7 format but quicker methods are possible. The common part of the statement has not been replicated.

Cash flow statements for the year ended 30 April, 2001

	With rights issue		With loan	
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Operating cash flow				
Operating profit	32,420			
Depreciation	14,000			
Increase in inventory	(10,000)			
Increase in receivables	(2,450)			
Increase in payables	1,720			
	<u>35,690</u>			
Servicing of finance				
Finance charges	(2,500)		(4,625)	
Tax paid			(8,976)	(8,339)
Equity dividends	(11,340)	(11,340)		
Cash flow before financing	(12,126)	(13,614)		
Financing				
Share issue		25,000		--
Long-term loan	--	25,000		
Net increase in cash	12,874	11,386		
Opening balance	5,250		5,250	
Closing balance	18,124		16,636	

- c) This is quite a lengthy report, involving an element of ratio analysis. Do not go too far on the ratios they are time consuming to calculate it is best to focus on profitability and gearing (plus liquidity if you have time). The answer does not really fit into the (i) (iii) rubric of the question so you need to develop your own format.

Sources of Finance and Forecasting

Report

To: Board of Directors

From: Management Accountant

Date: 23 May, 2000

Subject: Financing alternatives

1) Introduction

I have been asked to submit a report evaluating two proposed methods of financing a rights issue and a new long-term loan. I have discussed the advantages and disadvantages of each, paying particular regard to their respective impacts on our accounting statements and shareholder value. Please read this report in conjunction with the appended financial projections. Please also note that these projections incorporate the anticipated impact of our proposed revenue enhancement and cost reduction programmes.

2) Impact on financial statements

It is usual to focus primarily on profitability ratios, especially Return on Investment (ROI). I have looked at two ROI measures, return on assets which reflects basic operating efficiency and Return on Equity which measures what we generate for owners. You will appreciate that expansion often depresses ROI in the short term due to setting up costs, etc., profits fall while the investment has increased.

Return On Equity (ROE)

Our shareholders demand a 15% return on their investment at book value. At present, we achieve $(Rs. 18,900 / Rs. 106,410) = 17.8\%$. Under the rights issue, this would drop to $(Rs. 20,944 / Rs. 139,788) = 15\%$, right on the margin of expected performance. Under the loan, ROE would become $(Rs. 19,456 / Rs. 114,192) = 17.0\%$, again a reduction, but still well in excess of the target.

Return On Assets (ROA)

At present, ROA (net of cash) is $(Rs. 29,500 / Rs. 159,000) = 18.6\%$. As this is independent of method of financing, this would fall to $(Rs. 32,420 / Rs. 182,450) = 17.8\%$.

Sources of Finance and Forecasting

Earnings Per Share (EPS)

In 2000, EPS was $(Rs. 18,900 / 25,000) = 75.6p$ (adjusted for the rights discount, this drops to 74.2p).

Under the rights issue, the unadjusted EPS drops by 8% to $(Rs. 20,944 / 30,000) = 69.8p$.

Under the loan alternative, despite the lower PAT, due to higher costs of debt service, EPS rises to $(Rs. 19,456 / 25,000) = 77.8p$.

Gearing

Two measures of gearing are examined, capital gearing (long-term debt / equity) as shown on the statement of financial position and interest cover as shown on the income statement.

- Capital gearing. At present, this is quite modest at $(Rs. 25,000 / Rs. 106,410) = 23.5\%$. Obviously, a rights issue will lower this to $(Rs. 25,000 / Rs. 139,788) = 17.9\%$. The loan issue will increase gearing quite sharply to $(Rs. 50,000 / Rs. 114,192) = 43.8\%$, but this is still not an alarming level, especially in view of our strong asset backing.
- Finance charges cover. At present, our finance charges cover is very high at $(Rs. 29,500 / Rs. 2,500) = 11.8$ times. The rights issue will improve this to $(Rs. 32,420 / Rs. 2,500) = 13$ times but the loan issue will lower it to $(Rs. 32,420 / Rs. 4,625) = 7$ times. This is still a very safe level of cover, and likely to rise as more benefits of our profit improvement programme begin to emerge in future years.

3) Merits / demerits of the rights issue

A rights issue is appealing for the following reasons:

- unless existing shareholders sell their rights on the market, it involves no change in voting control;
- as risk capital, there is no legal obligation to service this finance i.e., pay a dividend. This gives some leeway in years of poor profitability when, although usually resisted, a dividend cut is possible.

On the downside

- the rights issue involves earnings dilution. The 'damage' is essentially illusory but, because EPS and share price fall, it may have a negative psychological impact;

Sources of Finance and Forecasting

- in addition, if announced maladroitly, it can damage the share price by raising questions about our true motives for the issue.

4) Merits / demerits of long-term borrowing

- If the decision to borrow is announced skillfully, this may have an immediate beneficial effect on our share price as it signals confidence in our continuing ability to meet ongoing interest payments.
- The cost of debts even at the maximum capped interest rate of 10%, is well below the 15% cost of equity. Borrowing will thus raise the return to shareholders if the funds can be invested to earn a return in excess of the post tax return on debt, currently $8.5\% (1 - 30\%) = 6\%$, which is not demanding.
- As my figures suggest, borrowing will raise EPS, so long as the new expenditures bear fruit. A delay in reaping the benefits of our investment will worsen the EPS picture. Nevertheless, we will benefit from a greater tax shield so long as we have sufficient taxable capacity. Even at the lower expected interest cover, there is a high degree of safety built in.
- Borrowing exerts a gearing effect on earnings in both directions, thus, magnifying the risks incurred by shareholders, for which they may seek higher returns.
- As and when our business turns upwards, financial gearing will increase shareholder profits by a greater proportion than the sales increase. On the downside;
- borrowing adds to our fixed costs raising our breakeven volume. Failure to meet the interest charge invites the risk of legal proceedings, possibly resulting in liquidation;
- to protect their interests, lenders may impose certain restrictions on management freedom of action (yet to be specified).

5) Other financing possibilities

Other options we may consider include:

Hire purchase this is where a finance company purchases the asset and we will make monthly payments covering both the interest and capital repayments. The ownership of the asset will transfer to us on the final payment. **Leasing** this is similar to hire purchase but we will never be the owner of the asset. Leasing can either be an operating lease (just like hiring an asset) or a finance lease.

Sources of Finance and Forecasting

6) Other factors

- It is necessary to conduct a longer-term cash flow projection one year is simply insufficient. This should encompass a variety of scenarios.
- We need to ask how the external environment might change contrary to our interests e.g., a health scare affecting the demand for fast food.
- We need to consider how our competitors are likely to respond to our new marketing initiatives.

I will be happy to elaborate on these issues. If you require any further information, please contact me in advance of this.

Signed: Management accountant

- d) Buy backs have become increasingly popular as a way of trying to increase shareholder value. Some observers believe they have only a cosmetic impact.

A buy back can be executed using spare cash or, as in the case of Clifton, using newly borrowed funds.

The advantages

- The aim of a share buy back is to increase the share price. As well as exerting upward pressure on price by increased buying in the market, the technical effect is to lower the number of shares in issue and increase the EPS, so long as the borrowing costs are less than the savings in future dividends.
- It is an appealing tactic when directors consider the share price to be under valued.
- It lowers the weighted average cost of capital (at least in terms of book value), thus broadening the range of worthwhile investment projects.
- By raising the share price, it may deter an actual or potential acquirer.

The disadvantages

- Low returns on deposit.

Sources of Finance and Forecasting

Test your understanding answers

Example 1 – Flower Ltd.

(a) The theoretical ex rights price is:

$$\frac{(N \times \text{cum rights price}) + \text{Issue price}}{N+1}$$

$$= \frac{(5 \times \text{Rs. } 45) + \text{Rs. } 42}{6} = \text{Rs. } 44.5$$

b) The NPV of the project is Rs. 300,000, so in an efficient market, this will be the gain in wealth of the shareholders if the project is undertaken.

The total number of shares in issue is now

$$100,000 + (1/5 \times 1 \text{ million}) = 120,000 \text{ million}$$

Thus, the theoretical share price after the rights issue, and after undertaking the project is

$$\text{Rs. } 44.5 + (\text{Rs. } 300,000 / 120,000 \text{ million}) = \text{Rs. } 47$$

Example 2

$$\text{YTM} = (\text{annual interest} / \text{current market value}) \times 100\%$$

$$= (5/95) \times 100\% = 5.26\%$$

Note that the coupon rate is applied to the nominal value to calculate the annual interest, but otherwise, the nominal value is not used in the calculation.

Example 3

The yield to maturity for these redeemable bonds is found by taking the IRR of the current market value (Rs. 98 at t0), the annual interest (Rs. 7 per annum from t1 to t5), and the redemption amount (Rs. 110 at t5), as follows:

Time	Rs.	DF 5%	PV	DF 10%	PV
t0	(98)		1	(98)	1(98)
t1 t5	7	4.329	30.30	3.79126.54	
t5	100		0.784	86.24	0.62168.31
		18.54		(3.15)	

Sources of Finance and Forecasting

$$\text{Hence, IRR} = 5\% + [5\% \times 18.54 / (18.54 + 3.15)] = 9.27\%$$

Example 4 – Ravi Ltd.

The discount rate is the post tax cost of debt $\therefore 12\% (1 - 0.33) = 8.04\% \approx 8\%$.

Assumptions:

- 1) Asset is purchased on first day of year 1.
- 2) Tax is delayed by 1 year.

Buy asset

Writing down allowances

Tax @ 33%			Date
0	130,000		
1 WDA	32,500/97,500	10,725	2
2 WDA	24,375/73,125	8,044	3
3 WDA	18,281/54,844	6,033	4
4 SCRAP	0		
Balancing allowance	54,844	18,099	5

Year	Cash flow (130,000)	PVF @ 8%	PV (130,000)
0	-	1	-
1	-	-	-
2	10,725	0.857	9,191
3	8,044	0.794	6,387
4	6,033	0.735	4,434
5	18,099	0.681	12,325
			(97,663)

Year	Lease	Tax Net	PVF @ 8%	PV
1	(40,000)	(40,000)	(0.926)	(37,040)
2	(40,000)	13,200(26,800)	0.857	(22,968)
3	(40,000)	13,200(26,800)	0.794	(21,279)
4	(40,000)	13,200(26,800)	0.735	(19,698)
5	13,200	13,200	0.68	18,989
				(91,996)

Sources of Finance and Forecasting

Decision

On purely financial grounds it is better to lease rather than buy the asset.

Example 5 – Tax adjustments

	Rs. in m
Forecast accounting profit	8.00
Add: Accounting depreciation	2.00
	<hr/> 10.00
Less: Capital allowances	25% x Rs. 10(2.50)
	<hr/> 7.50
Taxable profit	7.50
Forecast tax	30% x Rs. 7.50 m
	<hr/> Rs2.25m

Lease asset

Test your understanding 1 – ABC Ltd.

Key answer tips

Part (a) There are many other alternative ratios which could have been calculated (other than those below), as long as between them the five ratios cover the efficiency, profitability and liquidity of the company. It would also be possible to calculate different figures for each ratio, depending on whether the other financial information was used, whether year end or average statement of financial position figures were used, etc.,. What is important is that you show clearly how you have derived each of your chosen ratios, and that you do not overrun the time allowed for this part of the question.

- a) The following ratios can be calculated from the figures in the summary accounts:

Efficiency ratio

	20X2	20X1
Receivables days = $\frac{\text{Receivables x}}{\text{Sales}}$	$\frac{365765 \times 365}{6575}$	$\frac{476 \times 365}{5918}$
	= 42 days	= 29 days

Sources of Finance and Forecasting

Profit ability ratios

Return on Capital Employed =	EBFC & T	22	(98)
	<hr/>	<hr/>	<hr/>
	Capital employed	2,520+2,250	1,726+1,976
		= 0.0046	= (0.0265)
Earnings percentage	EBFC & T	22	(98)
	<hr/>	<hr/>	<hr/>

Liquidity ratios

Current ratio =	Current assets	2,360	1,622
	Current liabilities	715	644
		= 3.3 : 2.5	
Quick ratio	Current assets less inventory	2,360-1,250	1,622-893
	Current liabilities	715	644
		= 1.6 : 1	= 1.13 : 1

Report

To: The Management of ABC Ltd.

From: The management accountant

Date: XX20XX

Subject: Proposed disinvestment of XYZ Ltd.

Introduction

This report has been prepared to appraise the financial performance of our wholly-owned subsidiary XYZ Ltd. with a view to recommending whether the company should be divested. The analysis has used XYZ Ltd.'s summary accounts for 20X1 and 20X2.

Analysis of recent performance

The period 20X1 to 20X2 saw turnover increase by 11% while cost of sales

Sources of Finance and Forecasting

Decision

On purely financial grounds it is better to lease rather than buy the asset.

Example 5 – Tax adjustments

	Rs. in m
Forecast accounting profit	8.00
Add: Accounting depreciation	2.00
	10.00
Less: Capital allowances	25% x Rs. 10(2.50)
Taxable profit	7.50
Forecast tax	30% x Rs. 7.50 m
	Rs2.25m

Lease asset

Test your understanding 1 – ABC Ltd.

Key answer tips

Part (a) There are many other alternative ratios which could have been calculated (other than those below), as long as between them the five ratios cover the efficiency, profitability and liquidity of the company. It would also be possible to calculate different figures for each ratio, depending on whether the other financial information was used, whether year end or average statement of financial position figures were used, etc.,. What is important is that you show clearly how you have derived each of your chosen ratios, and that you do not overrun the time allowed for this part of the question.

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Sources of Finance and Forecasting

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Analysis of recent performance

The period 20X1 to 20X2 saw turnover increase by 11% while cost of sales

Sources of Finance and Forecasting

increased by 9%, resulting in an improvement in underlying profitability. However, over the same period receivables rose by 61% and inventory by 40% in cost terms, both large increases requiring explanation. The increase in receivables days may imply that the credit control function needs strengthening to chase up over due debts. The increase in inventory levels may imply that the company is finding it harder to sell its products. The increase in working capital referred to above has been financed by an increase in long-term debt (Rs. 274,000) and increased shareholders' funds (Rs. 794,000). Since the company reported a loss in 20X1 but shareholders' funds have risen, it is clear that a new capital injection has been made. Since XYZ Ltd. is a wholly owned subsidiary of ABC Ltd. it appears likely that ABC has bought new shares in XYZ during 20X2. The cash subscribed appears to be Rs. 794,000 + Rs. 253,000 = Rs. 1,047 m. Given that ABC has subscribed an extra Rs. 1 m share capital in XYZ in the year just ended, it seems premature to be considering selling the company so soon after this investment.

The company's liquidity ratios have improved from 20X1 to 20X2, reflecting the new injection of funds identified above. Current liabilities are now comfortably covered by quickly realisable current assets.

Gearing has fallen over the period as a result of the new equity injection exceeding the increase in net borrowings.

$$\text{At 31 Dec, 20X2, gearing} = \frac{2,250 - 195}{2,250 + 2,250} = 43\%$$

$$\text{At 31 Dec, 20X1, gearing} = \frac{1,976 - 162}{1,726 + 1,976} = 49\%$$

The company was struggling to pay its finance charge in 20X1 out of available profits; although the profitability situation has improved slightly in 20X2, finance charges payable still exceeds available profits so that a net loss is reported.

Limitations of historical analysis

The analysis above has been carried out on the summary accounts of XYZ Ltd. for 20X1 and 20X2 which were presumably drawn up under the historical cost convention. In a period of changing prices such accounts can become misleading, for instance with the depreciation charge being calculated on the out of date historical cost of the fixed assets. Capital gearing ratios such as calculated above do not give the true picture; it would be more helpful if the summary accounts could be

Sources of Finance and Forecasting

restated under a current cost basis. There is the further conflict that a decision is to be made about the future based on an analysis of the past. The summary accounts give a historical record of what has happened over the last two years, but give no evidence of the company's likely future prospects.

The decision as to whether XYZ Ltd. should be divested should be taken on the basis of future opportunities and threats to which the company will be exposed.

A final weakness of analysis from accounts is that conventional accounting statements do not recognize a number of important assets that a company might have – a trained workforce, a new product about to be launched on to the market which has been fully researched, other sorts of inherent goodwill. It is impossible to look at the full picture of a company's situation while these assets have been ignored.

Future course of action

Given that ABC has subscribed an extra Rs. 1 m of share capital of XYZ within the past 12 months, it seems premature to be considering divesting the company. It is perhaps more reasonable to allow the newly invested funds to settle down and reap the benefits for which, presumably, the investment was made.

However, if ABC insists on divestment, there is a choice between closing the business (and selling the assets piecemeal) or selling the business as a going concern. If the assets are to be sold piecemeal, their relevant values are their net realizable values, e.g., stocks Rs. 1.091m and plant and equipment Rs. 3.907 m. An aggregate total of the net assets valued at net realizable value would be the minimum acceptable offer.

In the more likely situation of selling the business as a going concern, the value of the business forgone if sold would be the aggregate of the forecast cash flows arising to ABC from XYZ, discounted at ABC's cost of capital. Such a computation requires many estimates to be made, including future growth of XYZ's business and of the car care products business sector as a whole. It may only be possible to identify a range of possible values, but even if it contains a degree of estimation the exercise will still be valuable.

Other valuable non-financial information

Several valuable items of non-financial information have already been identified above which would be useful to the directors of ABC before they make any decision:

- the financial results of XYZ on a current cost basis, i.e., after the effects of

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increased by 9%, resulting in an improvement in underlying profitability. However, over the same period receivables rose by 61% and inventory by 40% in cost terms, both large increases requiring explanation. The increase in receivables days may imply that the credit control function needs strengthening to chase up over due debts. The increase in inventory levels may imply that the company is finding it harder to sell its products. The increase in working capital referred to above has been financed by an increase in long-term debt (Rs. 274,000) and increased shareholders' funds (Rs. 794,000). Since the company reported a loss in 20X1 but shareholders' funds have risen, it is clear that a new capital injection has been made. Since XYZ Ltd. is a wholly owned subsidiary of ABC Ltd. it appears likely that ABC has bought new shares in XYZ during 20X2. The cash subscribed appears to be Rs. 794,000 + Rs. 253,000 = Rs. 1,047 m. Given that ABC has subscribed an extra Rs. 1 m share capital in XYZ in the year just ended, it seems premature to be considering selling the company so soon after this investment.

The company's liquidity ratios have improved from 20X1 to 20X2, reflecting the new injection of funds identified above. Current liabilities are now comfortably covered by quickly realisable current assets.

Gearing has fallen over the period as a result of the new equity injection exceeding the increase in net borrowings.

$$\text{At 31 Dec, 20X2, gearing} = \frac{2,250 - 195}{2,250 + 2,250} = 43\%$$

$$\text{At 31 Dec, 20X1, gearing} = \frac{1,976 - 162}{1,726 + 1,976} = 49\%$$

The company was struggling to pay its finance charge in 20X1 out of available profits; although the profitability situation has improved slightly in 20X2, finance charges payable still exceeds available profits so that a net loss is reported.

Limitations of historical analysis

The analysis above has been carried out on the summary accounts of XYZ Ltd. for 20X1 and 20X2 which were presumably drawn up under the historical cost convention. In a period of changing prices such accounts can become misleading, for instance with the depreciation charge being calculated on the out of date historical cost of the fixed assets. Capital gearing ratios such as calculated above do not give the true picture; it would be more helpful if the summary accounts could be

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restated under a current cost basis. There is the further conflict that a decision is to be made about the future based on an analysis of the past. The summary accounts give a historical record of what has happened over the last two years, but give no evidence of the company's likely future prospects.

The decision as to whether XYZ Ltd. should be divested should be taken on the basis of future opportunities and threats to which the company will be exposed.

A final weakness of analysis from accounts is that conventional accounting statements do not recognize a number of important assets that a company might have a trained workforce, a new product about to be launched on to the market which has been fully researched, other sorts of inherent goodwill. It is impossible to look at the full picture of a company's situation while these assets have been ignored.

Future course of action

Given that ABC has subscribed an extra Rs. 1 m of share capital of XYZ within the past 12 months, it seems premature to be considering divesting the company. It is perhaps more reasonable to allow the newly invested funds to settle down and reap the benefits for which, presumably, the investment was made.

However, if ABC insists on divestment, there is a choice between closing the business (and selling the assets piecemeal) or selling the business as a going concern. If the assets are to be sold piecemeal, their relevant values are their net realizable values, e.g., stocks Rs. 1.091m and plant and equipment Rs. 3.907 m. An aggregate total of the net assets valued at net realizable value would be the minimum acceptable offer.

In the more likely situation of selling the business as a going concern, the value of the business forgone if sold would be the aggregate of the forecast cash flows arising to ABC from XYZ, discounted at ABC's cost of capital. Such a computation requires many estimates to be made, including future growth of XYZ's business and of the car care products business sector as a whole. It may only be possible to identify a range of possible values, but even if it contains a degree of estimation the exercise will still be valuable.

Other valuable non-financial information

Several valuable items of non-financial information have already been identified above which would be useful to the directors of ABC before they make any decision:

- i) the financial results of XYZ on a current cost basis, i.e., after the effects of

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- price changes have been eliminated;
- ii) whether the company has significant intangible assets not currently recognized in the accounts;
 - iii) the future prospects for the company and its place in its business sector if it is retained within the ABC group;
 - iv) whether a prospective purchaser of the company has already been identified;
 - v) the effect on the morale of the remaining workforce if the company is closed or sold.

Please let me know if I can be of any further assistance to you in this or any other matter.

Signed: The management accountant

Test your understanding 2—GSD Ltd.

	20X4 Rs. in m	20X5 Rs. in m	20X6 Rs. in m
Income statements			
Revenue (15% increase pa)	45.0	51.8	59.5
Profit before interest and tax (30% of 13.515.517.9 revenue)			
Interest on bank loan	(6% × Rs. 8 m)(0.5)	(0.5)	
Interest on overdraft (6% × opening balance, see below)(0.1)	(0.2)		
Profit before tax 14.9	17.2		
Tax (W1)(3.4)	(4.3)		
Profit after tax 11.5	12.9		

	20X5 Rs. in m	20X6 Rs. in m
Cash flow analysis		
Profit before interest and tax	15.5	17.9
Add back depreciation (W2) 6.37.2		
Deduct increase in working capital (W3)	(1.4)	(1.5)
Cash flow from operations	20.4	23.6
Interest paid on bank loan (6% × Rs. 8 m)	(0.5)	(0.5)
Dividends paid (5% increase pa)	(10.5)	(11.0)
Tax paid (W1)	(1.0)	(3.4)
Capital expenditure	(10.0)	(10.0)

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Net cash flow for the year	(1.7)	(1.5)
Cash b/f	(1.0)	(2.7)
Cash c/f	(2.7)	(4.2)
Statement of financial positions	20X5 Rs. in m	20X6 Rs. in m
Property, plant and equipment (W2)	18.7	21.5
Working capital (20% × revenue)	10.4	11.9
	29.1	33.4
Share capital	10.0	10.0
Retained earnings (W4)	5.0	6.9
	15.0	16.9
Long-term borrowings (bank loan)	8.0	8.0
Short-term borrowings (overdraft, from cash flow analysis)	2.7	4.2
Current tax payable	3.4	4.3
	29.1	33.4

Workings	20X5 Rs. in m	20X6 Rs. in m
(W1) Tax expense	15.5	17.9
Profit before interest and tax	6.3	7.2
Add back depreciation (W2)	(10.0)	(10.0)
Deduct capital allowances	(0.5)	(0.5)
Interest on bank loan	(0.1)	(0.2)
Interest on overdraft (6% × opening balance)		
Taxable profit	11.2	14.4
Tax expense at 30%	3.4	4.3

(W2) Property, plant and equipment	20X5 Rs. in m	20X6 Rs. in m
Balance b/f	15.0	18.7
Capital expenditure	10.0	10.0
Net total 25.028.7		
Depreciation at 25%	(6.3)	(7.2)
Balance c/f	18.7	21.5

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	20X5 Rs. in m	20X6 Rs. in m	Rs. in m
(W3) Movements in working capital			
Working capital b/f	9		
Working capital c/f (9/45 × 51.8)	10.4		
	—		
Increase in year		1.4	
Working capital b/f	10.4		
	—		
Working capital c/f (9/45 × 59.5)	11.9		
	—		
Increase in year			1.5
(W4) Retained earnings			
Balance b/f	4.0	5.0	
Profit for the year	11.5	12.9	
Dividends	(10.5)	(11.0)	
	—	—	
Balance c/f	5.0	6.9	
	—	—	

Advice to the company

The overdraft limit is Rs. 1.5 m, whereas the above forecasts show a forecast overdraft of Rs. 2.7 m at the end of 20X5 and Rs. 4.2 m at the end of 20X6, if the long-term bank loan is kept constant. This is not acceptable, so the company must approach the bank and seek to increase the bank loan by the excess Rs. 4.2 m – Rs. 1.5 m = Rs. 2.7 m. Forecast total borrowings at 31 December, 20X6 are Rs. 12.2 m. Forecast equity at 31 December, 20X6 is Rs. 16.9 m.

The forecast gearing ratio at
31 December, 20X6 is $\frac{12.2}{16.9} \times 100\% = 72\%$,

which is above the bank's limit. Some amendments to the company's plans are necessary, as discussed in part (b).

b) Introduction

GSD Ltd. has a problem in that its current rapid growth plan leads to forecast borrowings at 31 December, 20X6 that are above what the bank is willing to finance. The company must therefore consider its financing, investment and dividend strategies which could individually or together solve the problem.

Sources of Finance and Forecasting

The Rs. 2.7 m additional funding requirement forecast for the end of 20X6 could be met by obtaining new finance, deferring its investment plans (i.e., the planned capital expenditure) or by reducing the level of dividends paid. Consider each of these options in turn.

Obtaining new finance

It is unfortunate that the shareholders have indicated that they are unwilling to inject additional capital into the business. They must know that the company is growing rapidly and that large amounts of capital expenditure are necessary, and they appear happy to receive large dividends from the profits that are being generated. They should be approached again and reminded that there will not be any dividends in the future if the company collapses through lack of finance. The shareholders should be invited to play their part in financing the growth of the company by being willing to subscribe for new shares.

If the shareholders are adamant that they will not inject additional capital, then it is back to the bank to discuss matters with them. Perhaps they can be persuaded to adjust the gearing limit to, say, 75%. The company has forecast net cash outflows in

Cash flow forecast for 20X7

	Rs. in m
Profit before interest and tax (17.9 × 1.15)	20.6
Add back depreciation (25% × (21.5 + 7.0))	7.1
Deduct increase in working capital (13.7 – 11.9)	(1.8)
	—
Cash flow from operations	25.9
Interest paid (6% × 12.2)	(0.7)
Dividends paid	(11.6)
Tax paid	(4.3)
Capital expenditure	(7.0)
	—
Net cash flow for the year	2.3
	—

Thus the bank can be assured that the maximum debt position is at

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20X5 and 20X6, but a forecast net cash inflow in 20X7, as proved below. Thus, the bank can be assured that the maximum debt position is at the end of 20X6, with positive cash flows thereafter easing the situation. Given this, the bank is likely to accept the adjusted gearing limit that is being requested of them.

Deferring capital expenditure

It would probably be possible in theory to scale back the plans for capital expenditure over the next few years, but this would presumably reduce the company's growth rate, and allow competitors in to satisfy demand that GSD can not satisfy. This may have serious long-term implications.

A more attractive idea is to look at alternative methods of paying for the capital expenditure. At present the company appears to be buying the new assets for cash and paying immediately. It is this that is having a particularly adverse effect on the forecast cash flows. If another method of paying can be arranged, such as paying over a number of years in instalments or acquiring the assets by hire purchase or leasing, then there will not be the same up front negative cash impact.

Reducing the dividend

GSD is a private company, so there is no need to consider the impact on the share price of cutting the dividend. Whether it is an acceptable option depends on the attitudes of the individual shareholders. If they personally have large regular cash outgoings that they have been satisfying from the dividend income from GSD, then they will not want the dividend level to be cut. If this is not the case, they may be willing to see a reduction in dividend in the short term, while the company is growing so fast and requiring funds for capital expenditure.

Recommendation

A new share issue or a temporary reduction in dividend would avoid the problem in 20X6, although the shareholders would have to be willing to go along with these suggestions. If they are not willing, then the bank should be approached to increase the bank loan, and methods of delaying payments for the capital expenditure should be investigated.

It seems probable that some solution can be found to the impending liquidity problem. In strategic terms it would not be a good idea to scale back the growth plans, since this would enable competitors to grab market share which it would be difficult to seize back in the future.

3

The Weighted Average Cost of Capital

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The Weighted Average Cost of Capital

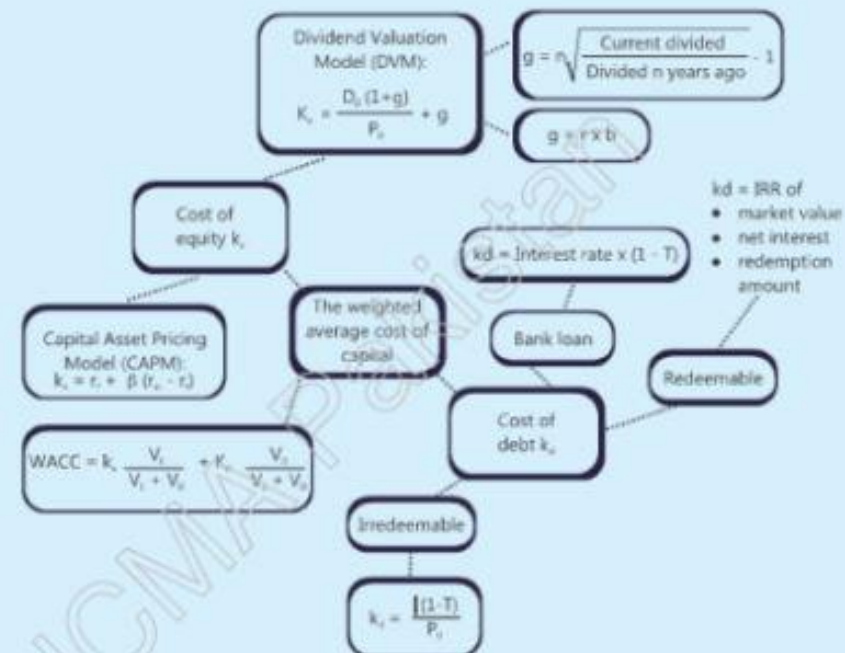
Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Comprehend financing and the cost of capital
- Understand dividend valuation model
- Apprehend risk, reward and CAPM
- Calculate cost of debt
- Compute weighted average cost of capital

The Weighted Average Cost of Capital

1 Overview of Chapter



2 Introduction to the Weighted Average Cost of Capital (WACC)

In order to calculate the NPV of a project, a company will need to determine an appropriate discount rate. In many cases, the company's WACC, which reflects the returns required by investors, will be used as a discount rate.

The WACC is derived by first estimating the cost of each source of finance separately (e.g., ordinary shares, debt, preference shares) and then taking a weighted average of these individual costs, using the following formula:

$$K_0 = K_{eq} \times \frac{V_E}{V_E + V_D} + K_D \times \frac{V_D}{V_E + V_D}$$

3 The Cost of Equity – ke

The cost of equity is the rate of return that ordinary shareholders expect to receive on their investment. The two main methods of computing ke are:

The Weighted Average Cost of Capital

- the dividend valuation model (DVM)
- the capital asset pricing model (CAPM)

4 The Cost of Equity – Dividend Valuation Model

The DVM states that the current share price is determined by the future dividends, discounted at the investors' required rate of return.

$$P_s = \frac{d}{k_e}$$

where k_e = cost of equity

d = is the constant dividend

P_s = the ex div market price of the share

This is a variant of the formula for a perpetuity.

We can rearrange the formula to get the one below:

The dividend valuation model with constant dividends

$$k_e = \frac{d}{P_s}$$

Cum div and ex div share prices

The ex dividend ("ex div") value of a share is the value just after a dividend has been paid. Occasionally in questions, you may be given a share price just before the payment of a dividend (a "cum div" price). In this case, the value of the upcoming dividend should be deducted from the cum div price to give the ex div price.

For example, if a dividend of Rs. 2 is due to be paid on a share which has a cum div value of Rs. 34.5, the ex div share price to be entered into the DVM formula is Rs. 34.5 Rs. 2 = Rs. 32.5.

Example 1

The ordinary shares of a company are quoted at Rs. 20 per share ex div. A dividend of Rs. 1.6 per share has just been paid and there is expected to be no growth in dividends.

Required:

What is the cost of equity?

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Example 2

The ordinary shares of Jibran Ltd. are quoted at Rs. 40 per share. A dividend of Rs. 3 is about to be paid. There is expected to be no growth in dividends.

Required:

What is the cost of equity?

Example 3

The cost of equity capital is 12%. The current dividend for a share of a company is Rs. 4. There is expected to be no growth in the value of the dividend.

Required:

What is the value of the share (P_0)?

Introducing growth

The dividend valuation model with constant growth

$$k_e = \frac{d_1}{P_s} + g \quad \text{or} \quad k_e = \frac{d_s (1 + g)}{P_s} + g$$

where g = a constant rate of growth in dividends

d_1 = dividend to be paid in one year's time

d_s = current dividend

Estimating growth

There are two main methods of determining growth (although the examiner will usually give the growth rate in the question if you need it):

1) The averaging method

$$g = \sqrt[n]{\frac{d_n}{d_s}} - 1$$

Where d_s = current dividend
 d_n = dividend n year ago

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Example 4

Kashmir Ltd. paid a dividend of Rs. 3 per share four years ago, and the current dividend is Rs. 4.4. The current share price is Rs. 100 ex div.

Required:

- Estimate the rate of growth in dividends.
- Calculate the cost of equity.



Example 5

A company paid a dividend of Rs. 0.8 per share eight years ago, and the current dividend is Rs. 1.3. The current share price is Rs. 27.6 ex div.

Required:

Calculate the cost of equity.

2) Gordon's growth model

$$g = rb$$

where r = return on reinvested funds
 b = proportion of funds retained



Example 6

The ordinary shares of a company are quoted at Rs. 70 cum div. A dividend of Rs. 5 is just about to be paid. The company has an annual accounting rate of return of 12% and each year pays out 70% of its profits after tax as dividends.

Required:

Estimate the cost of equity.

Assumptions of Gordon's growth model

Gordon's growth model was developed by economist Myron Gordon. It attempts to derive a future growth rate, rather than the previous approach of extrapolating the historical growth rate.

Gordon argued that an increase in the level of investment by company will give rise to an increase in future dividends. The two key elements in determining future dividend growth will be the rate of reinvestment by the company and the return generated by the investments.

The Weighted Average Cost of Capital

There are a number of assumptions required to apply this model:

- The entity must be all equity financed;
- Retained profits are the only source of additional investment;
- A constant proportion of each year's earnings is retained for reinvestment;
- Projects financed from retained earnings earn a constant rate of return.

Valuation with multiple growth rates

Calculating the value of share with multiple dividend growth rates involves the following steps:

Step 1: Calculate the value of share in the year in which change in growth rate is expected

Step 2: Calculate the dividend for each year before change in growth rate

Step 3: Calculate the present value of all amounts determined in step 1 and step 2

Illustration 1

ABC Ltd. paid a dividend of Rs. 25 this year. Dividend is expected to grow at 3% for next three years and at 2% afterwards.

Required:

Calculate current value per share if shareholders require annual return of 14%.

Solution

Step 1:

Calculate dividend of the year in which growth rates changes: Rs. 25 (1.03)³ = Rs. 27.3

$$\text{Market value in year 3} = P_3 = \frac{d_3(1+g)}{(Ke - g)}$$

$$P_3 = \text{Rs. } 27.3(1.02) / (.14 - .02) \\ = \text{Rs. } 27.8 / 0.12 = \text{Rs. } 232$$

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Step 2:

Year	Dividend with 3% growth
1	25.8
2	26.5
3	27.3

Step 3:

P_0 = Present value of first 3 dividends + present value of P_3

Year	Dividend	Discount factor @ 14%	Present Value (14%)
	Rs.		Rs.
Y1	25.8	0.877	22.6
Y2	26.5	0.769	20.5
Y3	27.3	0.675	18.5
Value in Y3	232	0.675	156.6
Total Value			218.5

The cost of preference shares

Preference shares usually pay a constant level of dividend, which is quoted as a percentage of nominal value. Hence, the cost of preference shares (k_p) can be calculated using a formula very similar to the one covered earlier for k_e in a no growth situation. The formula is:

$$k_p = \frac{d}{P_0}$$

d = is the constant dividend

P_0 = the ex div market price of the share

k_p = the cost of preference shares

5 The Cost of Equity – Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is an alternative to the Dividend Valuation Model, which can be used to calculate the cost of equity. The CAPM derives cost of equity based on the risk perception of the investor.

The Weighted Average Cost of Capital

Systematic and unsystematic risk

There are two elements that make up the risk associated with a company:

- Unsystematic (or specific) risk is the risk of the company's cash flows being affected by specific factors like strikes, R&D successes, systems failures, etc.
- Systematic (or market) risk is the risk of the company's cash flows being affected to some extent by general macroeconomic factors such as tax rates, unemployment or interest rates.



The impact of diversification

By holding a portfolio of investments, the unsystematic risk is diversified away but the systematic risk is not, so will be present in all portfolios.

For example, the return from a single investment in an ice-cream entity will be subject to changes in the weather – sunny weather producing good returns, cold weather poor returns. By itself the investment could be considered a high risk. If a second investment were made in an umbrella entity, which is also subject to weather changes, but in the opposite way, then the return from the portfolio of the two investments will have a much reduced risk level. This process is known as diversification, and when continued can reduce portfolio risk to a minimum.

If an investor enlarges his portfolio to include approximately 25 shares the unsystematic risk is reduced to close to zero, the implication being that we may eliminate the unsystematic portion of overall risk by spreading investment over a sufficiently diversified portfolio.

The Weighted Average Cost of Capital



The capital asset pricing model (CAPM) enables us to calculate the required return for a well-diversified investor who is not subject to unsystematic risk.

If we can measure the systematic risk of a company or investment, the CAPM will enable us to calculate the level of required return.

β (beta) factor

The method adopted by CAPM to measure systematic risk is an index, β (beta). The β factor is the measure of a share's volatility in terms of market risk.

The β factor of the market as a whole is 1. Market risk makes market returns volatile and the β factor is simply a yardstick against which the risk of other investments can be measured.

The β factor is critical to applying the CAPM; it illustrates the relationship of an individual security to the market as a whole, or conversely the market return given the return on an individual security.

Beta values fall into four categories, with the following meanings:

- i) $\beta > 1$ The shares have more systematic risk than the stock market average.
- ii) $\beta = 1$ The shares have the same systematic risk as the stock market average.
- iii) $\beta < 1$ The shares have less systematic risk than the stock market average.
- iv) $\beta = 0$ The shares have no risk at all.

A share's beta value can be interpreted quite precisely:

$\beta = 1.25$: The shares have 25% more systematic risk than the average level on the stock market.

$\beta = 0.80$: The shares have 20% less systematic risks than the average. (i.e., they only have 80% of the average level).

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The security market line

The security market line (SML) gives the relationship between systematic risk and return. We know two relationships:

- 1) **The risk-free security**
This carries no risk and, therefore, no systematic risk and therefore has a beta of zero.
- 2) **The market portfolio**
This represents the ultimate in diversification and therefore contains only systematic risk. It has a beta of 1.

The results may be plotted:



R_f is the point on the graph where the line intersects the axis, and then the higher systematic risk, the higher the required rate of return. The SML and the relationship between required return and risk can be shown using the following formula:

$$k_e = R_f + [R_m - R_f] \beta$$

where,

k_e = required return from individual security

β = Beta factor of individual security

R_f = risk-free rate of interest

R_m = return on market portfolio

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Note: In exams, the question will sometimes refer to the market premium – this is the difference between R_m and R_f . It is the long term market premium that should be used in CAPM if this is different from current market rates.

Calculating beta factors

Beta factors for a company are calculated statistically from past observed returns; for example the London Business School 'risk measurement service' is published quarterly, using monthly returns from the previous five years to calculate each quoted share's beta.

Such an analysis begs two questions:

- Is it reasonable to use a beta factor, calculated from the past, as the basis of decision-making about the future?
- Are beta values observed to be stable over time?

If beta values were not observed to be almost stationary over time, the whole theory would collapse. Luckily the evidence is that both US and UK shares do exhibit stable betas, the stability being stronger for highly diversified shares such as investment trusts than for more focused companies. Naturally beta will only be stable if the company's systematic risk remains the same, i.e., the company carries on the same areas of business in the long term.

Since betas are calculated statistically, the calculated beta value will be more reliable the more separate data went into its calculation. Therefore the longer the period underlying the calculations the better. However, if the beta will be used to estimate a required rate of return for a future project, it is important that the company's risk class in future will be more or less unchanged by accepting the project. Many businesses deal with this apparent paradox by using a sector average beta rather than using their own calculated beta.

Example 7

Data for three shares

	A	B	C
Beta	1.5	0.7	1
Risk-free rate	5%		

Expected return on the market portfolio 12%.

The Weighted Average Cost of Capital

Required:

Calculate the required return for each investment.

Illustration 2

In Example 7 above, we calculated the required return for each investment separately.

Now assume that an investor intends to set up a portfolio, where he invests 50% of his funds into A's shares, and 25% each into B's and C's.

The individual company betas are exactly the same as in Example 7 above, and the risk free rate is still 5% and the expected return on the market portfolio is 12%.

Required:

Calculate the required return from the new portfolio.

Solution

The beta factor for the portfolio will be the weighted average of the individual companies' beta factors, as follows:

$$\beta(\text{portfolio}) = (50\% \times 1.5) + (25\% \times 0.7) + (25\% \times 1) = 1.175$$

$$\text{So, the required return from the portfolio is: } 5\% + (12\% - 5\%) \times 1.175 = 13.2\%$$

The CAPM gives a required return for a given level of risk (measured by the beta factor).

Therefore, if we can estimate the level of risk associated with a new investment project (the beta of the project), we can use CAPM to give a required return to shareholders.

This required return to shareholders is essentially the cost of equity which should be used to derive an appropriate WACC to use as a discount rate.

Alpha values

If the CAPM stated that we should expect, on average, an annual return of 16.5%, this does not mean that the shares will produce a return (dividend yield plus capital gain) of 16.5% each year. Remember, shares are a risky investment which produces an uncertain annual return.

The Weighted Average Cost of Capital

Suppose in one particular year, Company A shares produce an actual return of 18%. The shares are said to have produced a positive 'abnormal' return of 1.5% that is, 1.5% higher than the expected return.

The alpha value of a share is simply its average abnormal return. Suppose Company A shares have an alpha value of +2%, this implies that in the recent past the shares have, on average, produced a return of $16.5\% + 2\% = 18.5\%$.

Alpha values can be either positive or negative, and in a perfect world they should be zero. In other words the average return that the shares actually do produce should be the same as the return indicated by CAPM. However, the world isn't perfect and so that will not always happen. Hence we get positive and negative alpha values.

Criticisms of the CAPM

- 1) CAPM is a single period model. This means that the values calculated are only valid for a finite period of time and will need to be recalculated or updated at regular intervals.
- 2) CAPM assumes no transaction costs associated with trading securities.
- 3) Any beta value calculated will be based on historic data which may not be appropriate currently. This is particularly so if the company has changed the capital structure of the business or the type of business it is trading in.
- 4) The market return may change considerably over short periods of time.
- 5) CAPM assumes an efficient investment market where it is possible to diversify away risk. This is not necessarily the case, meaning that some unsystematic risk may remain.
- 6) Additionally, the idea that all unsystematic risk is diversified away will not hold true if stocks change in terms of volatility. As stocks change over time it is very likely that the portfolio becomes less than optimal.
- 7) CAPM assumes all stocks relate to going concerns, this may not be the case.

Arbitrage Pricing Theory (APT)

Arbitrage pricing theory (APT) is an alternative pricing model to CAPM, developed by Ross in 1976. It attempts to explain the risk – return relationship using several independent factors rather than a single index.

CAPM is a single index model in that the expected return form a security is a function of only one factor, its beta value:

$$R_s = R_f + \beta (R_m - R_f)$$

However, APT is a multi – index model in that the expected return form a security is a

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linear function of several independent factors:

$$R_s = a + \beta_1 f_1 + \beta_2 f_2 + \dots$$

Where R_s = the expected return form a security

$a, \beta_1, \beta_2, \dots$ are constants

f_1, f_2, \dots are the various factors that influence security returns

For example, f_1 could be the return on the market (as in CAPM), f_2 could be an industry index specific to the sector in which the company operates, f_3 could be an interest rate index, etc...

Ross showed that, if shares are assumed to form an efficient market, an equilibrium is reached when:

$$R_s = R_f + \beta_1 (R_m - R_f) + \beta_2 (R_{i2} - R_f) + \dots$$

Where R_s = the expected return form a security

R_f = the risk-free rate

β = constants expressing the security's sensitivity to each factor

factor i and zero sensitivity to any other factor

Research undertaken to date suggests that there are a small number of factors, or economic forces, that systematically affect the returns on assets. These are:

- Inflation or deflation;
- long-run growth in profitability in the company;
- Industrial production;
- Term structure of interest rates;
- Default premium on bonds;
- Price of oil.

Each factor must be independent of the other factors.

APT assumes that the process of arbitrage would ensure that two assets offering identical returns and risks will sell for the same price.

Intuitively, APT appears to improve on CAPM, as return is determined by a number

The Weighted Average Cost of Capital

of independent factors are, as the model does not specify them. Determining what those factors are, as the model does not specify them, and forecasting their value. There have been few tests of APT, probably because of the difficulties in determining which variables to include in the model and how to weight them.

APT has gained in popularity as empirical tests of CAMP in practice have raised significant doubts as to CAPM's validity. However, it is fair to say that empirical testing of APT has to date been only limited, so its effectiveness remains to be proved. CAPM is certainly similar than APT, being a single index rather than a multi-index model, so CAPM will remain popular for some time.

6 The Cost of Debt - k_d

The cost of debt is the rate of return that debt providers require on the funds that they provide.

The value of debt is assumed to be the present value of its future cash flows.

Features

- 1) Debt is tax deductible and hence interest payments are made net of tax.
- 2) Debt is always quoted in Rs. 100 nominal units or blocks.
- 3) Interest paid on the debt is stated as a percentage of nominal value. This is known as the coupon rate. It is not the same as the cost of debt. The amount of interest payable on the debt is fixed. The interest is calculated as the coupon rate multiplied by the nominal value of the debt.
- 4) Debt can be:
 - i) irredeemable;
 - ii) redeemable at par (nominal value) or at a premium or discount.
- 5) Interest can be either fixed or floating (variable).

k_d for irredeemable debt

Irredeemable debt is debt issued by the company where there is no intention to repay the principal. The company will simply pay interest on the debt for ever.

$$k_d = \frac{i(1-T)}{P_s}$$

where, i = interest paid

The Weighted Average Cost of Capital

T = marginal rate of tax

P_s = ex interest market price of the loan stock

Note: that if the current market price is the par value of Rs. 100, then the cost of debt is simply the after tax interest rate i.e., $i(1-T)$.

Example 8

The 10% irredeemable debentures of a company are quoted at Rs. 130 ex int. Corporation tax is payable at 30%.

Required:

What is the net of tax cost of debt?
 k_d for redeemable debt

The k_d for redeemable debt is given by the IRR of the relevant cash flows. The relevant cash flows would be (assuming that there is no one year delay in the tax saving):

Year	Cash flow	Rs.
0	Market value of the loan	(P_s)
1 to n	Annual net interest payments	$i(1-T)$
n	Redemption value of loan	RV

There are four steps to ensuring an accurate computation:

- 1) Identify the cash flows;
- 2) Estimate the IRR;
- 3) Calculate two NPVs (preferably one ve and one +ve);
- 4) Calculate the IRR.

Example 9

A company has 10% debentures quoted at Rs. 95.00 ex int redeemable at par in five years' time. Corporation tax is paid at 31%.

Required:

What is the net of tax cost of debt?

Note: The cost of bank loans and debt trading at par can be calculated more simply by taking the net of tax interest payment.

$$k_d = i(1-t)$$

The Weighted Average Cost of Capital

The cost of convertible debt

Convertible debentures are like redeemables, but they offer the investor a choice of cash or shares on the redemption date.

In practice, particularly if the value of the cash and shares option is very similar, some investors will choose cash for liquidity reasons, whereas other investors may choose shares, hoping for large dividend returns in the future.

In order to calculate the cost of convertible debt, we make a simplifying assumption that all investors will make the same decision.

Illustration 3

Consider a Rs. 100 debenture which is redeemable at par in 5 years, or convertible into 10 shares at that time. The current share price is Rs. 8.60 and historically, dividends (and hence share prices) have grown at 5% per annum.

To decide which option is likely to be chosen by investors, we compare:

- the value of the cash option, Rs. 100; with
- the value of the conversion option, i.e., $10 \times (\text{Rs. } 8.60 \times 1.055) = \text{Rs. } 109.76$

Hence, it is assumed that all investors will choose the conversion option, and the cost of the convertible debt is calculated in a similar way to the cost of redeemable debt, i.e., it is the IRR of:

Year	Cash flow	Rs.
0	Market value of the loan	(P ₀)
1 to n	Annual net interest payments	$i(1 - T)$
n	The higher of the cash and the conversion option	C

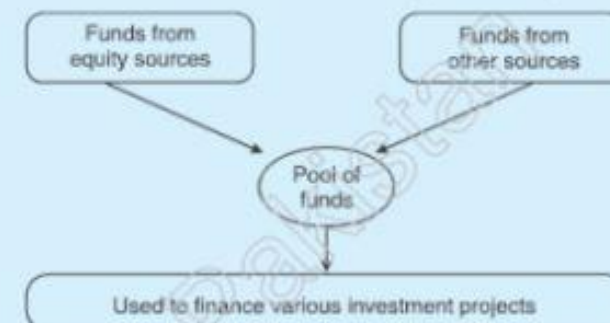
7 Weighted Average Cost of Capital (WACC)

The weighted average cost of capital (WACC) is the average of cost of the company's finance (equity, debentures, bank loans, and preference shares) weighted according to the proportion each element bears to the total pool of funds.

A company's WACC can be regarded as its opportunity cost of capital/marginal cost of capital, and this cost of capital can be used to evaluate the company's investment projects.

The Weighted Average Cost of Capital

In the analysis so far carried out, each source of finance has been examined in isolation. However, the practical business situation is that there is a continuous raising of funds from various sources. These funds are used, partly in existing operations and partly to finance new projects. There is not normally any separation between funds from different sources and their application to specific projects.



In order to provide a measure for evaluating these projects, the cost of the pool of funds is required. This is variously referred to as the combined or weighted average cost of capital (WACC).

The general approach is to calculate the cost of each source of finance, then to weight these according to their importance in the financing mix.

Procedure for calculating the WACC

The calculation involves a series of steps:

Step 1 Calculate weights for each source of capital;

Step 2 Estimate the cost of each source of capital;

Step 3 Multiply the proportion of the total of each source of capital by the cost of that source of capital.

Step 4 Sum the results of step 3 to give the weighted average cost of capital.

Formula to calculate WACC

$$k_w = k_e \left[\frac{V_e}{V_e + V_d} \right] + k_d \left[\frac{V_d}{V_e + V_d} \right]$$

The Weighted Average Cost of Capital

Alternative WAC formula

Using market values for a firm with equity, debt and preference shares in its capital structure, the WACC would be:

$$K_o = \frac{K_e V_e + K_p V_p + K_d V_d}{V_e + V_p + V_d}$$

Where V_e , V_p and V_d are the market values of equity, preference shares and debt respectively.

Example 10

Rahat Ltd. has a capital structure as follows:

	Cost of Capital %	Book value Rs. in m	Market value Rs. in m
Bank loans	6	5	5
Debenture loans	10	8	5
Ordinary shares	15	18	30

Required:

Calculate Rahat's WACC, using market values as weights.

Problems with the computation of WACC

Which sources of finance to include

The above examples have concentrated on the cost of long-term finance. Firms also raise finance from short-term sources, e.g., overdrafts, short-term loans, trade credit etc.,. It is possible to calculate a cost for short-term finance and we need to decide whether it should be included in our calculations. The usual argument is that the weighted average cost of capital is a tool for appraising long-term investments and as these should only be financed by long-term funds then the costs of short-term funds should be excluded. However, if it is clear that short-term finance is being used to fund long-term projects, then it should be included.

Loans without market values

Bank loans do not have market values in the same way as debentures. All we can do in this case is to take the book value of loans as an approximation of market value.

The Weighted Average Cost of Capital

Cost of capital for small companies

There are important factors which are relevant to the cost of capital of small companies:

- If the company is unquoted, then obtaining the cost of finance is much more difficult.
- The lack of liquidity offered by the company's securities, plus the smaller size of the company, tend to make finance more expensive.

8 When Can WACC be Used as a Discount Rate?

The WACC can be used as a discount rate when using net present value or internal rate of return calculations. This is only appropriate if the following are met:

- 1) The capital structure is constant. If the capital structure changes the weightings in the WACC will also change.
- 2) The new investment does not carry a different risk profile to the existing company's operations.
- 3) The new investment is marginal to the company. If we are only looking at a small investment then we would not expect any of k_e , k_d or the WACC to change materially. If the investment is substantial it will necessarily change the values.

These issues are covered in detail in the later chapter on investment and financing interactions.

More details on the use of WACC as discount rate

When discounting cash flows to present value, it is important to match the discount rate used to the cash flows being discounted.

Cost of equity

For example, the cost of equity capital should be used for valuing income flows (such as dividends, or earnings) which are attributable to the equity investor.

The NPV result is the value of equity.

WACC

The weighted average cost of capital is used when discounting after tax cash flows but before deducting finance charges such as interest. The WACC is the cost of

The Weighted Average Cost of Capital

capital required on the whole capital employed (debt plus equity capital invested in the company). This is therefore the appropriate discount rate to use to discount the cash flows attributable to all contributors to capital employed in the entity. For example, when valuing a project or a division of a company which does not have its own debt capital or finance charges.

The NPV result obtained is the value of the total capital employed in the entity – giving the total value of debt plus equity for a company.

Alternatives to the use of existing WACC as a discount rate in project appraisal

We have now established that the existing WACC should only be used as a discount rate for a new investment project if the business risk and the capital structure are likely to stay constant. Alternatively,

If the business risk of the new project differs from the entity's existing business risk

A risk-adjusted WACC can be calculated, by recalculating the cost of equity to reflect the business risk of the new project. This often involves the technique of 'degearing' and 'regearing' beta factors, covered in the later 'Capital Structure' Chapter.

If the capital structure is expected to change when the new project is undertaken

The simplest way of incorporating a change in capital structure is to recalculate the WACC using the new capital structure weightings. This is appropriate if the new investment project can be effectively treated as a new business, with its own long-term gearing level.

Alternatively, if the capital structure is expected to change significantly, the Adjusted Present Value method of project appraisal could be used. This approach separates the investment element of the decision from the financing element and appraises them independently. APV is only recommended when there are complex funding arrangements (e.g., subsidized loan, temporary or permanent change to debt capacity or choice of capital structure). APV is covered in detail in the later 'Investment Appraisal – further techniques' Chapter.

Finally, the Marginal Cost of Capital (MCC) could be used. Again, this is appropriate if the capital structure is forecast to change significantly. It is found by calculating the

The Weighted Average Cost of Capital

total additional cost of financing a new project, and it attempts to reflect the true incremental cost associated with the new financing.

More details on the marginal cost of capital

As discussed above, the use of WACC assumes that the capital structure of an entity will remain unchanged and that any new investment will have a similar risk profile to existing investments.

If a large project is under consideration, and it would fundamentally affect the capital structure of an entity, these assumptions would mean that WACC is no longer the appropriate technique for investment appraisal. Use of WACC could lead to the acceptance of projects that reduce the entity's value.

The relevant cost of capital is now arguably the incremental cost that is the marginal cost reflecting the changes in the total cost of the capital structure before and after the introduction of the new capital.

In theory, the marginal cost of capital is just the difference between the total cost with the existing capital structure and the total cost with the new capital structure once the investment has been undertaken.

Consider an entity with the following cost of capital

	Post tax cost %	Value Rs. m	Cost x value
Equity	20	5	1.00
Preference	10	1	0.10
Debt	8	4	0.32
		<u>10</u>	<u>1.42</u>

So, WACC = $1.42/10 \times 100\% = 14.2\%$

It has a large investment project under consideration, to be financed by a major issue of funds which will alter the capital structure. The estimated project cost is Rs. 1,000,000 to be financed in equal proportions by a new share issue and a new issue of bonds.

The new capital structure will imply a new level of risk for holders of bonds and equity shares, causing the cost of capital for the company to change.

The new cost of capital may be as follows (if we assume that the cost of equity will rise to 22% and the new bonds will have a post-tax cost of 10%).

The Weighted Average Cost of Capital

	Post tax cost %	Value Rs. m	Cost x value
Equity	22	5.5	1.21
Preference	10	1.0	0.10
Bonds B	4.0	0.32	
New Bonds	10	0.5	0.05
		<u>11</u>	<u>1.68</u>

So, WACC = $(1.68/11 \times 100\%) = 15.3\%$

Marginal Cost of Capital = $(1.68 - 1.42) / (11 - 10) \times 100\% = 26\%$

The total cost of capital has increased by Rs. 260,000 as a result of raising Rs. 1,000,000 of funds. The incremental cost of capital is, therefore, 26%.

It might be thought that by raising Rs. 500,000 of equity with a cost of 22%, and Rs. 500,000 of bonds with a cost of 10%, the marginal cost of capital would be:

$$(0.50 \times 22) + (0.5 \times 10) = 16\%$$

but this would ignore the change in the cost of original capital.

The approach illustrated here is appropriate only if the investment project is large relative to the current size of the entity and undertaking the project causes an identifiable difference in the capital structure.

In practice, entities rarely raise funds from a particular source for a particular purpose, which makes this approach difficult to use.

Illustration 4 – The marginal cost of capital

Shams Ltd has a current capital structure of Rs. 5 m equity and Rs. 5 m debt finance. Its cost of equity is 13% and its post tax cost of debt is 6%.

It intends to raise Rs. 1 m of new debt finance to fund a new project. The new debt finance will have a post tax cost of 8%, and the cost of equity of Shams is expected to rise to 15% when the new project is undertaken.

Required:

Calculate the WACC of Shams before and after undertaking the project, and calculate the Marginal Cost of Capital.

The Weighted Average Cost of Capital

Solution

Current WACC

	Post tax cost %	Value Rs. in m	Cost x value
Equity	13	5	0.65
Debt	6	5	0.30
		<u>10</u>	<u>0.95</u>

So, WACC = $(0.95/10) \times 100\% = 9.5\%$

New WACC

	Post tax cost %	Value Rs. in m	Cost x value
Equity	15	5	0.75
Existing Debt	6	5	0.30
New Debt	8	1	0.08
		<u>11</u>	<u>1.13</u>

So, WACC = $(1.13/11) \times 100\% = 10.3\%$

Marginal Cost of Capital = $(1.13 - 0.95) / (11 - 10) \times 100\% = 18\%$

Exam Style Questions

Test your understanding 1 – L Ltd.

L Ltd. Statement of financial position as at 31st December, 20X5

	Rs. in m
Net assets	50
Capital and reserves	
Ordinary share capital (Rs. 10 shares)	15
Reserves	25
10%, irredeemable debentures	10
	<u>50</u>

The current share price is Rs. 26.4 cum div and a dividend of Rs. 2.4 has been paid for many years. The debentures are trading at 90 ex int. The corporation tax rate is 30%.



The Weighted Average Cost of Capital

Required:

Calculate the WACC at 31st December, 20X5.

Test your understanding 2 – Wahab Ltd.

Wahab Ltd. is a company which specializes in elocution courses based in Preston and Oxford.

The recently appointed finance director, Mr. Qasim, has asked for your assistance in obtaining a cost of capital which Wahab Ltd. can use in appraising its long-term investment opportunities. Mr. Qasim has provided you with the following information regarding the capital structure of the company.

- 1) 50,000 Rs. 10 ordinary shares valued @ Rs. 34.8. The annual dividend of Rs. 180,000, which represents 70% of the amount available for distribution, has just been paid. The company expects to achieve a return of 26% on its retained profits.
- 2) 10,000 9% preference shares of Rs. 10 each valued at Rs. 80,000 cum div.
- 3) Rs. 1 million 8% debentures which are redeemable in eight years' time at a premium of 5%. Mr. Qasim estimates that the debenture holders require a return of 11%.

Corporation tax is at a rate of 35%.

Required:

Calculate for Wahab Ltd. its:

- a) cost of equity share capital;
- b) cost of preference share capital;
- c) market value of debentures;
- d) cost of debentures;
- e) weighted average cost of capital (WACC).

Test your understanding 3 – Rock Ltd.

The capital structure of Rock Ltd. as at 1st January, 20X3 is as follows:

	Rs. in m
Issue ordinary shares (Rs. 50 shares)	500
6%, debenture 20X6	700
11%, bank term loan	500

The Weighted Average Cost of Capital

The ordinary shares have a current market price of Rs. 200 each. The dividend for 20X2 has just been paid. Dividends per share in the five preceding years were as follows:

20W8	Rs. 6.8
20W9	Rs. 7.2
20X0	Rs. 8.8
20X1	Rs. 9.6
20X2	Rs. 10.4

Dividends are paid once a year and are expected to grow in future at the same annual rate as they have since 20W8. The debenture stock has a market price of Rs. 90. Redemption will be at par in four years time. The company pays corporation tax at a rate of 30%.

Required:

Estimate the cost of capital of Rock Ltd.

Test your understanding 4 – WACC and financing discussion

The summarised statement of financial position (balance sheet) of D Ltd. at 30 June, 20X9 was as follows:

	Rs. '000'
Assets	
Noncurrent assets	15,350
Current assets	5,900
Total assets	21,250
Equity and liabilities	
Ordinary shares (Rs. 10)	2,000
7% Preference shares (Rs. 10)	1,000
Share premium	1,100
Retained earnings	6,550
Total equity	10,650
Long term liabilities: 5% debentures	8,000
Current liabilities	2,600
	21,250

The Weighted Average Cost of Capital

The current price of the ordinary shares is Rs. 54 ex-dividend. The dividend of Rs. 4 is payable during the next few days. The expected rate of growth of the dividend is 9% per annum. The current price of the preference shares is Rs. 7.7 and the dividend has recently been paid. The debenture interest has also been paid recently and the debentures are currently trading at Rs. 80 per Rs. 100 nominal. Corporate tax is at the rate of 30%.

Required:

- Calculate the gearing ratio for D Ltd. using:
 - book values
 - market values
- Calculate the entity's WACC, using the respective market values as weighting factors.

Assume that D Ltd. issued the debentures one year ago to finance a new investment.

- Discuss the reasons why D Ltd. may have issued debentures rather than preference shares to raise the required finance.
- Explain what services a merchant bank may have provided to D Ltd. in connection with the raising of this finance.

Test your understanding 5 – Management of risk

You are the company accountant with a medium-sized, privately-owned company. The company has surplus funds which it does not believe it will be able to invest in company operations for at least five years. The majority shareholders are also the directors of the company and they do not wish the surplus funds to be distributed as dividends. A board meeting has therefore been called to discuss the proposal that the funds be invested in a portfolio of medium-to long-term securities.

Three of the directors have recently attended a short course at the local university on 'Investment and the Management of Risk'. They make the following comments at the meeting, based on their interpretations of what they have learnt on the course:

'If we hold a portfolio of stocks, we need only consider the systematic risk of the securities'.

'As a cautious investor we must always consider total risk'.

'We should not buy anything if the expected return is less than that on the market as

The Weighted Average Cost of Capital

a whole, and certainly not if it is below the return on the risk free asset'.

Required:

- Explain to the members of the board the meaning of systematic, unsystematic and total risk and advise them, briefly, how all three types of risk can be measured.
- Discuss the directors' comments.

Multiple choice question (MCQs)

- Rate of return of a company is 20% and dividend payout ratio is 40%. What is expected growth in dividend?
 - 8%
 - 12%
 - 20%
 - None of the above
- A company issued a debt of Rs. 100 million. Debt will be redeemed in two years' time at Rs. 110.5. Annual interest of Rs. 5% will be paid to the debt holder. Calculate K_d :
 - 5%
 - 15%
 - 10%
 - None of the above

Example 1

$$k_d = \frac{\text{Rs. 1.6}}{\text{Rs. 20}} = 8\%$$

Example 2

$$k_e = \frac{\text{Rs. 3}}{\text{Rs. 40} - \text{Rs. 3}} = 8.1\%$$

The Weighted Average Cost of Capital

Example 3

$$P_0 = \frac{\text{Rs. 4}}{0.12} = \text{Rs. 33.3}$$

Example 4

$$a) g = (\text{Rs. 4.4}/\text{Rs. 3})^{1/3} - 1 = 10\%$$

$$b) k_s = \frac{\text{Rs. 4.4} \times 1.1}{\text{Rs. 100}} + 0.1 = 14.84\%$$

Example 5

$$a) g = (\text{Rs. 1.3}/0.8)^{1/8} - 1 = 6.26\%$$

$$b) k_s = \frac{\text{Rs. 1.3} \times 1.0625}{\text{Rs. 27.6}} + 0.0625 = 11.26\%$$

Example 6

$$a) g = 12\% \times 30\% = 3.6\%$$

$$b) k = \frac{\text{Rs. 5} \times 1.036}{\text{Rs. 70} - \text{Rs. 5}} + 0.036 = 11.57\%$$

Example 7

- a) 15.5%
- b) 9.9%
- c) 12%

The Weighted Average Cost of Capital

Example 8

$$k_s = \frac{\text{Rs. } 10(1 - 0.30)}{\text{Rs. 130}} = 5.4\%$$

Example 9

Cash flows

Year 0	Rs. 95
Year 1-5	Rs. 10 (1 - 0.31) = Rs. 6.90
Year 5	Rs. 100

Discounting

Year	Cash flow	Disc. fact. @	Present value	Disc. Fact @	Present value
0	(95.00)	6%	(95.00)	10%	(95.00)
1-5	6.90	4.212	29.06	3.791	26.16
5	100	0.747	74.7	0.621	62.10
Total			+8.76		6.74

$$\text{IRR} = 6\% + (10\% - 6\%) \times \frac{8.76}{(8.76 - 6.74)} = 8.26\%$$

The Weighted Average Cost of Capital



Example 10

The calculation is carried out as follows:

Source	Market value		Cost of capital	Weighted cost
	Rs.	Proportions	%	%
Bank loans	5	0.125	$\times 6 =$	0.75
Debenture loans	5	0.125	$\times 10 =$	1.25
Ordinary shares	30	0.75	$\times 15 =$	11.25
	—	—	—	—
	40	1.00		13.25
	—	—	—	—

WACC = 13.25%



Test your understanding 1 – L Ltd.

- $k_e = 2.4 / (26.4 - 2.4) = 10\%$
- $k_d = \text{Rs. } 10(1 - 0.30) / \text{Rs. } 90 = 7.78\%$
- Market values: Equity $15/10 \times \text{Rs. } 24 = \text{Rs. } 36 \text{ m}$
Debt $10 \times (90/100) = \text{Rs. } 9 \text{ m}$
Equity and Debt = Rs. 45 m
- $\text{WACC} = 10\% \times (36/45) + 7.78\% \times (9/45) = 9.56\%$



Test your understanding 2 – Wahab Ltd.

(a) Using the Dividend Valuation Model (DVM)

$$k_e = \frac{\text{Dividend in 1 year}}{\text{MV (Ex Div)}} + g$$

where g = growth rate = r_b , and

r = return on new investment = 0.26

b = proportion of retained earnings = 0.3

The Weighted Average Cost of Capital

hence, $g = 0.26 \times 0.3 = 0.078$.

Dividend in 1 year = Current dividend $\times (1 + g)$

$$= 180,000 \times 1.078$$

$$= \text{Rs. } 194,040$$

MV (Ex Div) = 50,000 \times Rs. 34.8

$$= \text{Rs. } 1,740,000$$

The market value is ex div since the dividend has just been paid.

$$k_e = \frac{194,040}{1,740,000} + 0.078$$

$$= 18.95\%, \text{ say } 19\%$$

b) Again using the DVM

$$k_p = \frac{9,000}{80,000 - 9,000} = 12.68\%, \text{ say } 12.7\%$$

c) The DVM gives the market value of debentures as the present value (at the debenture holder's required rate of return) of the payments to debenture holders gross of tax.

Time		Cash flow Rs.	DF @ 11%	PV @ 11% Rs.
1-8	Interest	80,000	5.146	411,680
8	Redemption	1,050,000	0.434	455,700
				<hr/>
	MV ex interest Debentures			867,380

d) The cost of debt k_d is equal to the discount rate which, when applied to the interest flows net of tax and the redemption costs, produces a PV of Rs. 867,380.

The Weighted Average Cost of Capital

i.e., the internal rate of return of the following flows:

Time		Cash flow Rs.	DF @ 7%	PV @ 7% Rs.
0	Market value	(867,380)	1	(867,380)
1-8	Net interest	52,000	5.971	310,492
8	Redemption	1,050,000	0.582	611,100
				<hr/> 54,212 <hr/>

We chose 7% as our first estimate of the IRR since $11\% \times (1-0.35) = 7.15\%$.

Since the result is positive, the second estimate is higher, say 8%.

Time	Cash flow PV@8% Rs.	DF @ 8%	PV Rs.
0	(867,380)	1	(867,380)
18	52,000	5.747	298,844
8	1,050,000	0.540	567,000
			<hr/> (1,536) <hr/>

Hence, IRR is approximately 8%.

e)

	Market value	Cost of capital	Weighted
cost	Rs.	%	%
Equity	1,740,000	19	12.34
Preference	71,000	12.7	4
Debentures	867,380	8	2.59
	<hr/>		<hr/>
Total	2,678,380		15.27
	<hr/>		<hr/>

The Weighted Average Cost of Capital

Weighted average cost of capital is approximately 15.3%.



Test your understanding 3 – Rock Ltd.

1) K_e

$$k_e = \frac{d_1(1+g)}{P_0} + g$$

$$g = \sqrt{\frac{10.4}{6.8}} - 1 = 11.2\%$$

$$k_e = \frac{10.4 \times 1.112}{200} + 0.112 = 17.0\%$$

(2) k_d – redeemable debt – IRR of Market Value, net interest and redemption amount:

	Cash flow	DF @ 10%	PV	DF @ 10%	PV
0 Market value	(90.0)	1.000	(90.00)	1.000	(90.00)
1-4 Interest payments	4.2	3.170	13.31	3.546	14.89
4 Capital repayment	100.0	0.683	68.30	0.823	82.30
NPV			<hr/> (8.39) <hr/>		<hr/> 7.19 <hr/>

$$IRR = 5\% + \left[\frac{7.19}{7.19 + 8.39} \times (10\% - 5\%) \right] = 7.5\%$$

3) Market Values

		Rs. in m
Equity	500/50 × 200	2,000
Debentures	700 × 0.90	630
Bank loan		500
		<hr/>
Total		3,130
		<hr/>

The Weighted Average Cost of Capital

(4) WACC

$$= \left(\frac{2000}{3130} \times 17.0\% \right) + \left(\frac{630}{3130} \times 7.3\% \right) + \left(\frac{500}{3130} \times 11\% \times (1 - 0.30) \right) = 13.6\%$$



Test your understanding 4 – WACC and financing discussion

a) Gearing = debt / (debt + equity)

Using book values, gearing = $8,000 / (8,000 + 10,650) = 43\%$
(assuming that the preference shares are irredeemable and therefore treated as equity).

Tutorial note: Gearing measured as (debt / equity) would be equally acceptable.
Show your workings clearly.

Market values

Ordinary shares 2 m × (1.35 / 0.25)	10,800,000
Preference shares 1 m × 0.77	770,000
Debentures 8m × 80%	6,400,000
	<hr/>
	17,970,000

So, gearing = $6,400 / (6,400 + 770 + 10,800) = 36\%$

b) Cost of equity

$$K_e = \frac{1.09}{54} + 0.09$$

= 17.1%

Cost of preference shares

$$K_p = \frac{0.7}{7.7} = 9.1\%$$

Cost of debentures

$$K_d (1-t) = \frac{5(1-0.30)}{80} = 4.4\%$$

So, the weighted average cost of capital is:

	Market value Rs.	Cost of capital %	Weighted %
Equity	10,800,000	17.1	10.3
Preference	770,000	9.1	0.4

The Weighted Average Cost of Capital

Debentures	6,400,000	4.4	1.6
Total	17,970,000		<hr/>
			12.3%

- c) The debentures are a cheaper source of finance than the preference shares. The interest is a tax-deductible expense, whereas the preference dividend is an appropriation from post-tax profits.

The debentures will be secured on the company's assets, which makes them more attractive to investors than preference shares.

Preference shares cannot be secured.

Debenture holders will rank before preference shareholders in a liquidation.

- d) A merchant bank may have provided the following services:

- advice on the type of capital to be issued, that is debt, equity or preference shares;
- advice on the form of debt issued, that is secured or unsecured, and on the use of sweeteners such as a conversion option or warrants;
- advising on the coupon rate, issue price and maturity of the debenture;
- marketing and administration of the issue;
- identifying potential investors;
- recommendations about any derivatives that may be available to hedge interest-rate exposure;
- ensuring that D Co. complied with any statutory and regulatory requirements relating to the new issue.

Test your understanding 1 – Management of risk

Memorandum

To: The Board of Directors

From: The Company Accountant

Date: X June 20XX

Subject: Investing funds in a portfolio of securities

- a) This memorandum starts with some definitions:



The Weighted Average Cost of Capital

Systematic risk is risk that cannot be eliminated by diversification.

Unsystematic risk is risk that can be eliminated by diversification.

Total risk is the sum of systematic and unsystematic risk.

These definitions can be explained as follows. There will be some uncertainty normally inherent in the future returns of any investment that is made. This uncertainty can be measured as the total risk of the investment by calculating the standard deviation of the investment's possible returns.

Some of this total risk can be diversified away by combining the investment with other different investments; this component of total risk is called unsystematic risk and relates to factors unique to the company itself or the business sector it is in.

The remainder of the total risk cannot be diversified away; this component of total risk is called systematic risk and relates to factors affecting the stock market as a whole e.g., the risk that interest rates rise.

Total risk is measured as the standard deviation of investment returns.

If future returns are unclear, the standard deviation of past returns over recent periods can be calculated as a measure of the investment's total risk.

Systematic risk is measured by looking at an investment's beta value. An investment with no systematic risk has a beta value of zero. An investment with the same systematic risk as the market as a whole has a beta of one. An investment with systematic risk twice that of the market as a whole has a beta of two, etc.

Unsystematic risk is normally measured as the difference between systematic risk and total risk i.e., as a balancing figure, although it is possible to calculate it separately.

- b) The expected return from any investment should compensate for its risk. If the investment is held alone, it is the total risk that is relevant. But if the investment is held as one unit in a widely diversified portfolio, the unsystematic risk will be eliminated, and it is only the systematic risk that is relevant.

Thus, it is acceptable to buy investments with expected returns less than the expected return on the market as a whole, as long as those investments possess less risk than the market as a whole. It might be felt prudent, for example, to hold a proportion of a portfolio in cash on deposit, effectively as a risk-free asset, although the expected return will be lower than the return expected for investing in shares on the stock market.

The Weighted Average Cost of Capital

It is even acceptable to buy investments with expected returns less than the risk-free rate of return, as long as those investments contribute sufficiently to the overall diversification of the portfolio held. Investments with negative beta values fall particularly into this category; their expected return is low but they offer substantial diversification opportunities.

Answers to MCQs:

- 1) b
2) c

4

Capital Structure

ICMA Pakistan

ICMA Pakistan

Capital Structure

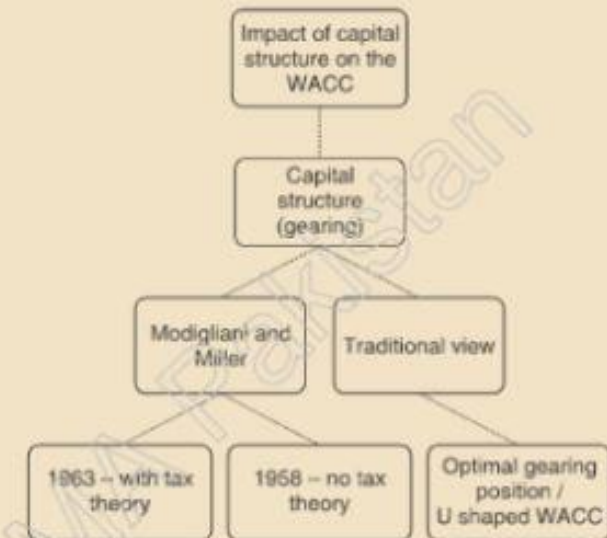
Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Learn capital structure decision
- Know about the effect of capital structure on ratios
- Understand theories of capital structure
- Comprehend project specific cost of capital

Capital Structure

1 Overview of Chapter



2 Changing Capital Structure

When a business changes its capital structure, there will be an impact on ratio analysis (especially the gearing ratio) and an impact on the business's WACC.

The impact of a change in capital structure on ratio analysis the gearing ratio

Two key measures of gearing:

$$\text{Capital gearing} = \frac{\text{Debt}}{(\text{Debt} + \text{Equity})} \times 100$$

OR

$$\frac{\text{Debt}}{\text{Equity}} \times 100$$

Note: Both of these measures are used in practice, but the first one is more commonly used.

Capital Structure

Clearly if a business changes its capital structure by raising new finance as either debt or equity, these gearing ratios will change.

Exam questions may test the calculation of gearing ratios before and after a change in capital structure.

Illustration 1 - Gearing ratio calculation

PPP is considering raising Rs. 250 million new finance to fund the acquisition of QQQ. QQQ is considered to have a value to PPP of Rs. 270 million.

Extracts from PPP's statement of financial position show:

	Rs. in m
Long-term borrowings	950
Share capital (Rs. 10 shares)	500
Retained reserves	400

The directors of PPP have not yet decided whether debt or equity finance should be used to fund the takeover. However, if equity is to be used, the new shares will be issued at a price of Rs. 26 per share. The current market share price is Rs. 29 per share.

Required:

Calculate the gearing ratio measured as (debt/(debt + equity)):

- before the acquisition of QQQ,
- after the acquisition, assuming that debt finance is used to fund the takeover,
- after the acquisition, assuming that equity finance is used to fund the takeover.

In all cases, present your calculations using both book values and market values.

Solution: Gearing based on book values

Pre acquisition $950 / (950 + (500 + 400)) = 51.4\%$

Post acquisition using debt $(950+250) / ((950+250) + (500+400+20 (W1))) = 56.6\%$

Post acquisition using equity $950 / (950 + (500 + 400 + 250 + 20 (W1))) = 44.8\%$

(W1) Since QQQ is worth Rs. 270 m to PPP but the purchase price is Rs. 250 m, the value of PPP's equity will increase by Rs. 20 m irrespective of how the purchase is financed.

Capital Structure

Gearing based on market values (W2)

Pre acquisition $950 / (950 + 1,450) = 39.6\%$

Post acquisition using debt $(950+250) / ((950+250) + (1,450+20)) = 44.9\%$

Post acquisition using equity $950 / (950 + (1,450 + 250 + 20)) = 35.6\%$

(W2) Market value of existing shares = Rs. $29 \times 50 \text{ m} = \text{Rs. } 1,450 \text{ m}$

Note: The issue price of the new shares (Rs. 26) is irrelevant when calculating the gearing ratios. Of course the issue price does affect the number of shares issued and therefore other ratios such as EPS (see further examples below), but gearing ratios are calculated based on total values of equity and debt so the issue price is not relevant here.

Impact on other ratios

A change of capital structure may also impact other ratios (such as earnings per share, earnings yield or interest cover) if the change in financing is associated with a new project which increases profits.

Illustration 2

Seed Co. is considering investment of Rs. 20 m which is expected to have an NPV of Rs. 8 m, and is expected to increase profit before interest and tax by Rs. 4 m per annum.

Extract from the most recent financial statements of Seed Co.:

Statement of financial position extracts	Rs. in m
Share capital (Rs. 1 shares)	16
Reserves	48
Long term borrowings	56

Income statement extracts	Rs. in m
Profit before interest and tax	15.0
Interest	(4.0)
Profit before tax	11.0
Tax at 30%	(3.3)
Profit after tax (earnings)	7.7

The current share price of Seed Co. is Rs 2.70 per share.

The directors of Seed Co. are considering two alternative ways of financing the new investment.

Capital Structure

- Borrow the Rs. 20 m at an interest rate 6% per annum,
- Raise the funds using a 1 for 2 rights issue at Rs. 2.50 per share.

Required:

- Prepare profit forecasts for Seed Co. for next year under both financing options, assuming that the new project goes ahead. Use the forecasts to calculate the impact of the project and each financing option on Seed Co.'s interest cover, earnings per share and earnings yield ratios.
- Based on the results of your calculations, discuss the likely reaction of the shareholders and the lenders to each of the possible financing options.

Solution

a) Pre project ratios

Interest cover = Rs. 15 m / Rs. 4 m = 3.75 times

Earnings per share (EPS) = Rs. 7.7 m / 16 m = 48.1 cents per share

Earnings yield = EPS / Share price = Re. 0.481 / Rs. 2.70 = 0.178, or 17.8%

Income statement forecasts	Rs. in m – debt used	Rs. in m – rights issue
Profit before interest and tax (Rs. 15 m + Rs. 4 m)	19.0	19.0
Interest (W1)	(5.2)	(4.2)
Profit before tax	13.8	15.0
Tax at 30%	(4.1)	(4.5)
Profit after tax (earnings)	9.7	10.5

(W1) Interest on the new debt is 6% of Rs. 20 m i.e., Rs. 1.2 m. Assume that interest on the existing borrowings stays constant.

Share price workings

Rights issue

If the rights issue goes ahead, the value of the shares after the rights issue will be the Theoretical Ex-Rights Price (TERP), which was introduced in Chapter 4.

$$\text{TERP} = [(N \times \text{cum rights price}) + \text{issue price}] / (N+1)$$

$$= [(2 \times 2.70) + 2.50] / 3 = \text{Rs. } 2.63$$

Capital Structure

However, since the rights issue will be used to fund the new project with an NPV of Rs. 8 m, the value of the project will also be reflected in the new share price, increasing the share price to

$$\text{Rs. } 2.63 + [\text{Rs. } 8 \text{ m} / (16 \text{ m shares} + 8 \text{ m new shares})] = \text{Rs. } 2.96$$

Debt finance

If debt finance is used to fund the new project, the share price should rise after the project has been taken on, to reflect the NPV of the new project.

$$\text{Expected share price} = \text{Rs. } 2.70 + (\text{Rs. } 8 \text{ m} / 16 \text{ m shares}) = \text{Rs. } 3.20$$

Post project ratios – using debt finance

$$\text{Interest cover} = 19 \text{ m} / \text{Rs. } 5.2 \text{ m} = 3.65 \text{ times}$$

$$\text{Earnings Per Share (EPS)} = \text{Rs. } 9.7 \text{ m} / 16 \text{ m} = 60.6 \text{ cents per share}$$

$$\text{Earnings yield} = \text{Re. } 0.606 / \text{Rs. } 3.20 = 0.189, \text{ or } 18.9\%$$

Post project ratios – using equity finance

$$\text{Interest cover} = \text{Rs. } 19 \text{ m} / \text{Rs. } 4 \text{ m} = 4.75 \text{ times}$$

$$\text{Earnings per share (EPS)} = \text{Rs. } 10.5 \text{ m} / (16 \text{ m} + 8 \text{ m}) = 43.8 \text{ cents per share}$$

$$\text{Earnings yield} = \text{Re. } 0.438 / \text{Rs. } 2.96 = 0.148, \text{ or } 14.8\%$$

b) Debt financing option

If debt is used to fund the new project, the shareholders are likely to see the change in EPS and earnings yield as positive.

The EPS increase from 48.1 cents per share to 60.6 cents per share, and the earnings yield increases from 17.8% to 18.9%. This indicates that Seed Co. will potentially be able to pay out a higher dividend to the shareholders in future.

On the other hand, the reduction in interest cover indicates that Seed Co. will face a higher level of risk if the debt financing option is used i.e., the chance of Seed Co. being unable to meet its interest obligations is higher. The higher risk to shareholders could lead to a fall in the share price if considered to be significant.

However, in practice it is unlikely that this issue will worry either the shareholders or the lenders greatly, given that the movement in interest cover is extremely small (3.75 to 3.65 times).

Capital Structure

Overall, it is likely that both shareholders and lenders will be quite happy with the EPS, earnings yield and interest cover ratios if the debt finance option is used (assuming that the expected Rs. 4 m increase in profit and Rs. 8 m NPV are achieved).

Equity finance option

The lenders will be happy if the rights issue goes ahead, because there will be no additional interest payable and yet profits will increase, so the interest cover ratio will rise significantly. This means that the chances of Seed Co. defaulting on its interest payments will be less if this options goes ahead.

All first glances, it appears that the shareholders will not be happy with this option, given that EPS reduces from 45.1 cents per share to 43.8 cents per share, and also given that earnings yield falls from 17.8% to 14.8%.

However, in this situation, where a 1 for 2 rights issue has been used, a shareholder's who owned 2 shares before the rights issue will now own 3 shares (assuming he took up his rights). The rights issue itself makes no difference to the shareholder's return or wealth. However, the positive NPV of the project undertaken causes the shareholder return and wealth to increase.

The increase in earnings attributable to each shareholder's shareholding will be viewed positively by shareholders, who might expect to see increased overall dividends in the future.

Once again, overall it is likely that both shareholders and lenders will be quite happy with the EPS, earnings yield and interest cover ratios if this financing option is used (assuming that the expected Rs. 4 m increase in profit and Rs. 8 m NPV are achieved).

The impact of capital structure on WACC and company value

When we consider the WACC formula which was introduced in the previous chapter, it is clear that if a company changes its capital structure (gearing level), the WACC will change, since the ratio of debt to equity is a key variable in the formula.

Also, since the value of a company is the present value of its cash flows discounted at the WACC, as the WACC changes so does the value.

Several studies have focused on this link between capital structure and company value. The key question is:

"What capital structure should the company aim for in order to maximise the company's value?"

Capital Structure

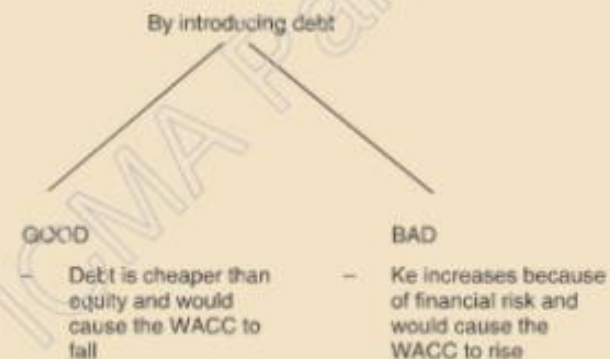
The main studies are:

- the traditional view;
- the Modigliani Miller view (or net operating income view), ignoring taxation;
- the Modigliani Miller view, taking into account the tax relief on debt interest payments.

These studies are based on different assumptions and come to different conclusions. They are covered below.

In order to understand the different views, it is vital to understand the two opposing forces which impact on the WACC as capital structure changes.

The two opposing factors which impact WACC



Impact on WACC of an increase in gearing

In general, the entity's cost of debt finance is cheaper than its cost of equity finance, for two reasons:

- Interest is an obligation which has to be paid out each year, whereas dividends are paid only if the company can afford them. This means that debt holders face less risk, so accept lower returns.
- Interest is a tax deductible expense, whereas dividends are paid out of post tax profits. This further reduces the cost of debt for the company.

Therefore, as the entity increases its gearing by raising more debt finance, the greater proportion of (cheaper) debt in the capital structure exerts a downward force on the WACC.

Capital Structure

Upward force on the WACC

As the gearing level increases, the extra interest payments to debt holders mean that the likelihood of the entity being able to afford to pay dividends to shareholders reduces. This increases the risk perception of the shareholders, so they demand higher return to compensate for the increased risk.

This increase in the cost of equity exerts an upward force on the WACC.

Net effect

Clearly, the two factors identified have opposing impacts on the weighted average cost of capital. The key questions are:

- Which of the two forces is stronger?
- What is the net effect of these two factors?

There is no simple answer to these questions. In fact, the different gearing theories propose different answers to the questions, based on different assumptions.

However, an understanding of these two factors, and these key questions, is crucial to a sound understanding of the capital structure theories covered in this Chapter.

Impact of capital structures on the equity investor

High gearing exists when an entity has a large proportion of prior charge capital in relation to equity a low gearing exists when there is a small proportion of prior charge capital. High gearing increases the financial risk of the equity investor but the reward can be in the form of increased dividends when profits rise. If, however, profits falter, the equity investor can expect to be the first to feel the effect of the first to feel the effect of the reduction in profits.

Low gearing or no gearing may not necessarily be in the equity investor's best interests because the entity might then be failing to exploit the benefits with borrowing can bring.

Provided that the return generated from borrowed funds is greater than the cost of those funds, capital gearing could be increased. The extent to which it is prudent for an entity to increase its capital gearing will depend upon many variables such as the type of industry within which the entity operates, the cost of funds in the market, the availability of investment opportunities and the extent to which the company can continue to benefit from the 'tax shield'.

Capital Structure

The ordinary share price of highly geared entities will tend to be depressed in times of rising interest rates.

3 Traditional View

According to the 'traditional' view of gearing and the cost of capital, as an organization introduces debt into its capital structure the weighted average cost of capital will fall because initially the benefit of cheap debt finance more than outweighs any increases in the cost of equity required to compensate equity holders for higher financial risk.

As gearing continues to increase the equity holders will ask for increasingly higher returns. The cost of equity, therefore, rises as gearing increases. Eventually this increase in the cost of equity will start to outweigh the benefit of cheap debt finance, and the weighted average cost of capital will rise. At extreme levels of gearing the cost of debt will also start to rise (as debt holders become worried about the security of their loans) and this will also contribute to an increasing weighted average cost of capital.

The diagram below demonstrates this position in which:

- k_e is the cost of equity;
- k_d is the cost of debt;
- k_o is the overall or weighted average cost of capital.



Capital Structure

Traditional view of gearing and the cost of capital

X = optimal level of gearing, where k_0 is at a minimum.

The traditional view, therefore, claims that there is an optimal capital structure where the weighted average cost of capital is at a minimum. This is at point X in the above diagram.

At point X the overall return required by investors (debt and equity) is minimised.

It follows that at this point the combined market value of the firm's debt and equity securities will also be maximised. (If investors are offered the same Rs. return but the % return they require has fallen, market pressures will make the value of the securities rise).

Optimal capital structure



4 Capital Structure – Modigliani and Miller's View

In 1958, the two American economists, Professors Modigliani and Miller, challenged the traditional view of gearing and the cost of capital. Over a 20 year period they put forward a number of propositions as to why the traditional view of gearing might be wrong. They began by assuming that the effect of tax relief on debt interest could be ignored.

The Modigliani and Miller (M & M) first proposition was that companies which operate in the same type of business and which have similar operating risks must have the same total value, irrespective of their capital structures.

Capital Structure

Their view is based on the belief that the value of a company depends upon the future operating income generated by its assets. The way in which this income is split between returns to debt holders and returns to equity should make no difference to the total value of the firm (equity plus debt). Thus, the total value of the firm will not change with gearing. This means that its weighted average cost of capital will not change with gearing, and will be the same at all levels of gearing.

Their view is represented in the following diagrams.

Modigliani and Miller view (no taxation)



Capital Structure

If the weighted average cost of capital is to remain constant at all levels of gearing, it follows that any benefit from the use of cheaper debt finance must be exactly offset by the increase in the cost of equity. The essential point made by M & M is that, ignoring taxation, a firm should be indifferent between all possible capital structures. This is at odds with the beliefs of the traditionalists.

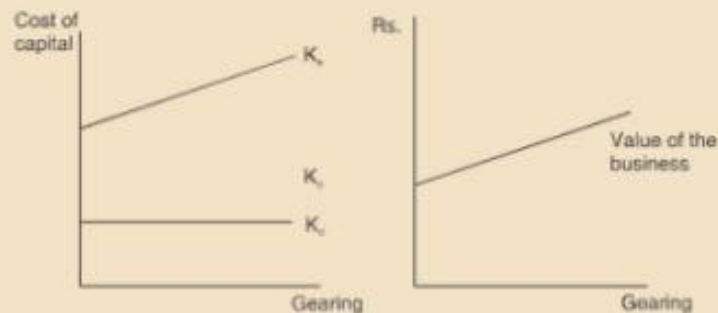
M & M support their case by demonstrating that market pressures will ensure that two companies identical in every aspect apart from their gearing level will have the same overall market value.

Modigliani and Miller with tax

In their original 'proposition 1' model M & M ignored taxation (tax relief on debt interest). In 1963 they amended their model to include corporation tax. This alteration changes the implication of their analysis significantly.

Previously they argued that companies that differ only in their capital structure should have the same total value of debt plus equity. This was because it was the size of a firm's operating earnings stream that determines its value, not the way in which it was split between returns to debt and equity holders. However, the corporation tax system carries a distortion under which returns to debt holders (interest) are tax deductible for the firm, whereas returns to equity holders are not. M & M, therefore, conclude that geared companies have an advantage over ungeared companies, i.e., they pay less tax and will, therefore, have a greater market value and a lower weighted average cost of capital.

Graph of M & M model with tax



Capital Structure

As gearing increases, the WACC steadily decreases.

If the other implications of the M & M view are accepted, the introduction of taxation suggests that the higher the level of taxation, the lower the combined cost of capital.

Modigliani and Miller (M & M) formulae

M & M developed the following formulae that can be applied to finding the value, cost of equity or WACC of firms that have a given level of business risk, but varying financial risk.

	With tax
Value of firm	$V_g = V_u + T_b$
Cost of equity	$k_{eg} = k_{eu} + (k_{eu} - k_d) V_D(1 - t) / V_E$
WACC	$k_{adj} = k_{eu}(1 - tL)$

where V = Value of firm (V_g = value of geared firm, V_u = value of ungeared firm)

k_e = Cost of equity (k_{eg} = cost of equity in geared firm, k_{eu} = cost of equity in ungeared firm)

k_d = Cost of debt (must be gross of tax)

V_u = MV of debt

V_g = MV of geared firm's equity

T, t = Corporation tax rate

WACC = weighted average cost of capital

The withouttax formulae are simply a special case of the withtax formulae, where $t = 0$.

Interpreting the M & M graphs and formulae

Without tax

Company value ($V_g = V_u$)

The graph showed a horizontal line for company value in the M & M without tax theory.

This is backed up by the formula, which shows that if $T = 0$, the values of an ungeared company and an equivalent unguaranteed company are the same.

Capital Structure

WACC ($K_w = K_u$)

The graph also showed a horizontal line for WACC in the M & M without tax theory.

Again, the formula backs this up. If $t = 0$, the formula reduces to $k_dj = k_{eu}$. This shows that the WACC of the geared company is always the same as the WACC of an equivalent unguaranteed company, irrespective of the level of gearing.

With tax

Company value ($V_g = V_u + TB$)

The graph showed an upward sloping line for company value in the M & M with tax theory.

This is backed up by the formula, which shows that the higher the value of B (value of debt), the greater the value of the entire company should be.

As the company increases its gearing, the value of the entire company (debt plus equity) increases.

Cost of equity ($k_e = k_u + (K_u - k_u) V_d(1-t)/V_e$)

The cost of equity slopes upwards as gearing increases under M & M's assumptions, because shareholders face higher risk so demand higher returns.

We can form the formula that the K_w increases as the amount of debt (V_d) increase relative to the value of equity (V_e).

Note that the inclusion of $(1-t)$ in the formula has the impact of reducing the slope of the line if the tax rate increases. Most importantly, this means that the cost of equity in the M & M with tax theory will always increase less steeply than in the without tax theory. This helps to explain why the upward force on WACC is smaller in the with tax theory, and, hence, why the downward force on the WACC caused by the (net of tax) cheap debt finance is the net stronger force in the with tax theory.

WACC ($K_w = K_u(1-tL)$)

The formula shows that WACC will reduce as gearing (measured by L) increases. This is seen on the graph as a downward sloping line.

Example 1 – M & M without tax

X Co. is identical in all operating and risk characteristics to Y Co. except that X Co. is

Capital Structure

all equity financed and Y Co. is financed by equity valued at Rs. 2.1 m and debt valued at Rs. 0.9 m based on market values. X Co. and Y Co. operate in a country where no tax is

- A perfect capital market in which there are no information costs or transaction costs.
- Investors are indifferent between personal and corporate gearing.
- Investors and companies can borrow at the same rate of interest.
- k_d remains constant at all levels of gearing.

The traditional view can be criticised as there is no underlying analysis to support it. Nor is there any evidence that the WACC is a U-shaped function in practice. This then leaves the problem of how companies are to determine their capital structure in practice. Management takes five factors into account in reaching a judgement on capital structure:

i) The risks of bankruptcy

Direct costs

These are costs associated with a company being in liquidation:

- distress sale price of the assets;
- liquidators' fees.

Indirect costs

These are costs associated with a company being in severe financial distress:

- loss of credit from suppliers;
 - loss of customers;
 - loss of key staff;
 - lack of future finance.
- The 'agency costs' (such as tight bank control) associated with gearing.
 - The company's ability to obtain interest tax relief by having sufficient off setting tax liability. (The problem of 'tax exhaustion'.)
 - Constraints imposed on the level of gearing, either by:
 - articles of association; or
 - loan agreement conditions.
 - The company's ability to borrow money: the company's 'debt capacity'.

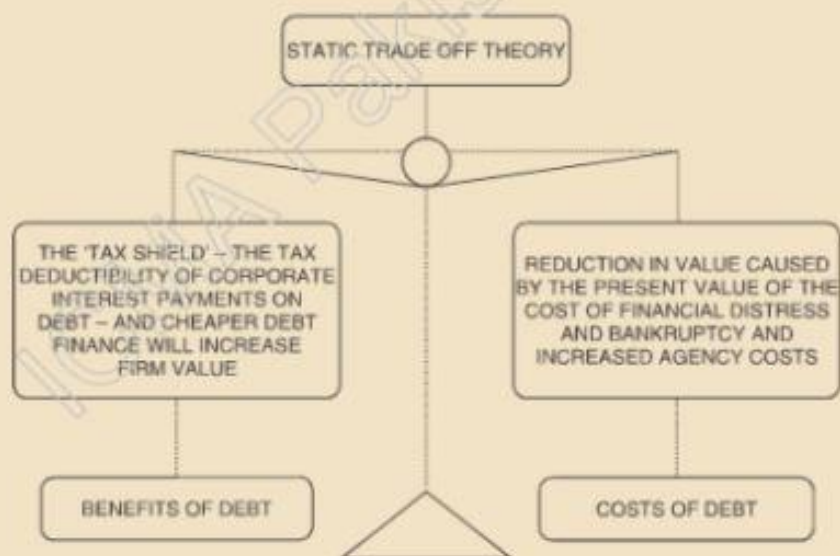
Capital Structure

5 Real World Approaches to the Gearing Question

Static trade-off theory

It is possible to revise M and M's theory to incorporate bankruptcy risk and so to arrive at the same conclusion as the traditional theory of gearing – i.e., that an optimal gearing level exists.

Given this, firms will strive to reach the optimum level by means of a trade-off. Static trade-off theory argues that firms in a stable (static) position will adjust their current level of gearing to achieve a target level:



Above target debt ratio the value of the firm is not optimal:

- Financial distress and agency costs exceed the benefits of debt.
- Firms decrease their debt levels.

Below the target debt ratio can still increase the value of the firm because:

- marginal value of the benefits of debt are still greater than the costs associated with the use of debt.

Capital Structure

- firms increase their debt.

NB: Research suggests that this theory is not backed up by empirical evidence.

Pecking order theory

Pecking order theory tries to explain why firms do not behave the way the static trade-off model would predict. It states that firms have a preferred hierarchy for financing decisions:



The implications for investment are that:

- the value of a project depends on how it is financed;
- some projects will be undertaken only if funded internally or with relatively safe debt but not if financed with risky debt or equity;
- companies with less cash and higher gearing will be more prone to under invest.

If a firm follows the pecking order:

- its gearing ratio results from a series of incremental decisions, not an attempt to reach a target;
 - High cash flow ⇒ Gearing ratio decreases
 - Low cash flow ⇒ Gearing ratio increases
- there may be good and bad times to issue equity depending on the degree of information asymmetry.

A compromise approach

The different theories can be reconciled to encourage firms to make the correct financing decisions:

- 1) Select a long run target gearing ratio.
- 2) Whilst far from target, decisions should be governed by static trade-off theory.
- 3) When close to target, pecking order theory will dictate source of funds.

Capital Structure

More on pecking order versus static trade-off

Pecking order theory was developed to suggest a reason for this observed inconsistency in practice between the static trade-off model and what companies actually appear to do.

Internally generated funds have the lowest issue costs, debt moderate issue costs and equity the highest. Firms issue as much as they can from internally generated funds first then move on to debt and finally equity.

Myers has suggested asymmetric information as an explanation for the heavy reliance on retentions. This may be a situation where managers, because of their access to more information about the firm, know that the value of the shares is greater than the current market value based on the weak and semi-strong market information.

In the case of a new project, managers forecast may be higher and more realistic than that of the market. If new shares were issued in this situation there is a possibility that they would be issued at too low a price, thus, transferring wealth from existing shareholders to new shareholders. In these circumstances there might be a natural preference for internally generated funds over new issues. If additional funds are required over and above internally generated funds, then debt would be the next alternative.

If management is against making equity issues when in possession of favourable inside information, market participants might assume that management would be more likely to favour new issues when they are in possession of unfavourable inside information. This leads to the suggestion that new issues might be regarded as a signal of bad news.

Managers may therefore wish to rely primarily on internally generated funds supplemented by borrowing, with issues of new equity as a last resort.

Myers and Majluf (1984) demonstrated that with asymmetric information, equity issues are interpreted by the market as bad news, since managers are only motivated to make equity issues when shares are overpriced. Bennett Stewart (1990) puts it differently: 'Raising equity conveys doubt. Investors suspect that management is attempting to shore up the firm's financial resources for rough times ahead by selling overvalued shares'.

Asquith and Mullins (1983) empirically observed that announcements of new equity issues are greeted by sharp declines in stock prices. Thus, equity issues are comparatively rare among large established companies.

Capital Structure

Dealing with 'gearing drift'

Profitable companies will tend to find that their gearing level gradually reduces over time as accumulated profits help to increase the value of equity. This is known as 'gearing drift'.

Gearing drift can cause a firm to move away from its optimal gearing position. The firm might have to occasionally increase gearing (by issuing debt, or paying a large dividend or buying back shares) to return to its optimal gearing position.

Signalling to investors

In a perfect capital market, investors fully understand the reasons why a firm chooses a particular source of finance.

However, in the real world it is important that the firm considers the signalling effect of raising new finance. Generally, it is thought that raising new finance gives a positive signal to the market: the firm is showing that it is confident that it has identified attractive new projects and that it will be able to afford to service the new finance in the future.

Investors and analysts may well assess the impact of the new finance on a firm's statement of profit or loss and balance sheet (statement of financial position) in order to help them assess the likely success of the firm after the new finance has been raised.

6 Risk Adjusted WACC – a Project Specific Cost of Capital

Introduction

An important application of the M & M theories and formulae is in the calculation of project specific discount rates.

In the earlier Chapter on 'Cost of Capital' it was noted that the existing cost of capital (WACC) of an entity is unsuitable as a project discount rate if the business risk of the new project and / or the entity's capital structure will change as a consequence of taking on the project.

Using the M & M theories and the CAPM model, a project specific discount rate (or risk adjusted WACC) can be calculated in these circumstances.

Asset betas, equity betas and debt betas

In order to understand the risk adjusted WACC method, we first need to expand our

Capital Structure

understanding of beta factors which were introduced earlier in the 'Cost of Capital' Chapter.

- The beta factor is a measure of the systematic risk of an investment relative to the market.
- This risk will be dependent on the level of business risk and the level of financial risk (gearing) associated with an investment.
- Hence, the beta factor for a geared company will be greater than the beta factor for an equivalent ungeared company.

The relationship between the beta factors for ungeared and geared companies is given by the following formula:

$$\beta_u = \beta_d \times \frac{V_E}{V_E + V_D(1-t)} + \beta_d \times \frac{V_D(1-t)}{V_E + V_D(1-t)}$$

where

β_s = the equity (geared) beta measures the systematic business risk and the systematic financial risk of a company's shares

β_u = the asset (ungeared) beta measures the systematic business risk only

β_d = the debt beta measures the risk associated with the debt finance.

Usually we assume that debt is risk free and hence the debt beta is zero. If this is the case, the second term in the given formula disappears and the formula becomes:

$$\beta_u = \beta_s \times \frac{V_E}{V_E + V_D(1-t)}$$

More on systematic risk

We know from the earlier 'Cost of Capital' Chapter that what is important is an investment's systematic risk.

Remember

- Shareholders are only interested in systematic risk because they hold well-diversified portfolios. Systematic risk of a project is measured by its beta.
- Shareholders in a geared company suffer two types of systematic risk i.e., business and financial risk.

Capital Structure

- The business risk of a company refers to the risk of the operating cash flows.
- Financial risk is the increased volatile of dividend payments to shareholders as gearing increases.

From the M & M analysis, we know that a share's systematic risk can be split up between the systematic business risk and the systematic financial risk.

Systematic business risk arises out of the risky nature of the company's business caused by:

- Revenue sensitivity;
- Proportion of fixed variable production costs.

Systematic financial risk arises out of how the company has financed itself – its gearing or capital structure.

Use of the formula

For example, suppose a question tells you that the ABC company has a gearing ratio (D : E) of 1 : 2; the shares have a beta value of 1.45 (the equity beta); and the corporation tax rate is 30%. Then:

$$\beta_u = 1.45 \times \frac{2}{2 + 1(1-0.30)} = 1.074$$

Note: If a question only states the beta, assume it is an equity beta. Also, if there is no mention of a debt beta, assume it is zero.

This indicates that shareholders in ABC have a beta value / systematic risk exposure of 1.45. Of this value, 1.074 arises out of the risky nature of the company's business (its business risk) and the rest (i.e., $1.45 - 1.074 = 0.376$) arises out of the financial risk caused by the company's capital structure.

Notice four very important implications of this analysis:

- 1) A company's equity beta will always be greater than its asset beta, except
- 2) If it is all equity financed (and so has no financial risk), when its equity beta and asset beta will be the same.
- 3) Companies in the same 'area of business' (i.e., same business risk) will have the same asset beta, but
- 4) Companies in the same area of business will not have the same equity beta unless they also happen to have the same capital structure.

As we shall see, the third of these points is particularly important.

Capital Structure

Risk adjusted WACC – Gearing and ungearing beta factors

There are two ways in which the gearing / degearing formula above can be used in order to derive a project specific cost of capital:

Method 1: Use the formula (if necessary) to derive the ungeared beta factor, then regear this beta to reflect the entity's capital structure. Then use CAPM to derive a risk adjusted cost of equity and use this k_E in the standard WACC formula to find risk adjusted WACC.

Method 2: Use the formula (if necessary) to derive the ungeared beta factor, then use CAPM to find an "ungeared cost of equity" (k_{EU}). Finally, use M & M's WACC formula (introduced earlier in this Chapter) to calculate the risk adjusted WACC.

Both methods will now be illustrated, to show that they give the same answer.

Illustration 3 – Risk adjusted WACC

Garvey Co. is planning to undertake a new project in a new business sector. Information for Garvey Co. and for Rocket Co. a listed company in the new business sector is as follows:

	Garvey Co.	Rocket Co.
Current geared (equity) beta	1.25	1.86
Current capital structure ratio (D:E by market value)	1:2	1:1

Garvey Co. intends to finance the project to maintain its existing gearing ratio.

The tax rate is 30% and the return on the stock market has been 12% per annum in recent years. Debt is assumed to be risk free and has a pre tax cost of 5% per annum.

Required:

Calculate a suitable cost of capital for the new project.

Solution

Method 1

Step 1

Rocket Co.'s ungeared / asset beta is calculated and then used as an estimate of the

Capital Structure

project's asset beta (because the project and Rocket Co. are in the same area of business and so will have the same asset beta). Since debt is risk free, use:

$$\beta_U = \beta_D \times \frac{V_E}{V_E + V_D(1-t)}$$

$$\beta_U = \beta_G \times \frac{1}{1 + \frac{1}{1(1-0.30)}} = 1.09$$

Step 2

A geared / equity beta for the project is calculated next. As we know, an equity beta reflects both systematic business risk and systematic financial risk. The project's equity beta will reflect the project's business risk and the capital structure of Garvey Co the company that is to undertake the project.

$$\beta_U = \beta_G \times \frac{V_E}{V_E + V_D(1-t)}$$

$$1.09 = \beta_G \times \frac{2}{2 + 1(1-0.30)}$$

$$\text{So } \beta_G = 1.47$$

Step 3

This equity beta is then input into the CAPM to give a cost of equity capital for the project (the return required on the shareholders' funds invested by Garvey Co. in the new project):

$$k_E = R_f + [R_M - R_f] \beta$$

$$k_E \text{ PROJECT} = 5\% + [12\% - 5\%] \times 1.47 = 15.3\%$$

Step 4

The risk adjusted WACC is now calculated using the standard WACC formula:

$$= 15.3\% \times (2/3) + 5\% \times (1/3) = 11.4\%$$

Method 2

Step 1

As above, the existing geared / equity beta of Rocket Co. is degearred, to give an ungeared / asset beta of 1.09.

Capital Structure

Step 2

Input this ungeared beta into the CAPM formula to give an ungeared cost of equity (k_{eu})
 $k_{eu} = 5\% + [12\% - 5\%] \times 1.09 = 12.6\%$

Step 3

Use the M & M WACC formula to find the risk adjusted WACC

$$k_{wacc} = k_{eu} (1 - tL) \\ = 12.6\% (1 - 30\% \times (1/3)) = 11.4\% \text{ as before}$$

Example 3

ABC is a cement company with a D : E ratio of 1 : 3. It wishes to evaluate a project in the telecoms industry and does not intend to change its capital structure.

XYZ is a 'typical' telecoms company. It has an equity beta of 1.25 and a D : E ratio of 1 : 2.

Assume that $R_f = 6\%$, $R_M = 14\%$, and the tax rate is 30%. It is assumed that corporate debt is risk-free (and so the debt beta is zero).

Required:

Calculate a risk adjusted WACC for the new project

7 Exam Style Questions



Test your understanding 1 – Metro Ltd.

The finance director of Metro Ltd. a company listed on the AIM (Alternative Investment Market), wishes to estimate what impact the introduction of debt finance is likely to have on the company's overall cost of capital. The company is currently financed only by equity.

Metro Ltd. Summarised capital structure

	Rs. '000'
Ordinary shares (Rs. 10 par value) 500	
Reserves	1,100
	<hr/>
	1,600
	<hr/>

Capital Structure

The company's current share price is Rs. 168, and up to Rs. 4 million of fixed rate irredeemable debt could be raised at an interest rate of 10% per annum. The corporate tax rate is 33%.

Metro's current earnings before interest and tax are Rs. 2.5 million. These earnings are not expected to change significantly for the foreseeable future.

The company is considering raising either:

- Rs. 2 million in debt finance;
- Rs. 4 million in debt finance

In either case the debt finance will be used to repurchase ordinary shares.

Required:

- Using Miller and Modigliani's model in a world with corporate tax, estimate the impact on Metro's cost of capital of raising:

- Rs. 2 million; and
- Rs. 4 million in debt finance.

State clearly any assumptions that you make.

- Briefly discuss whether or not the estimates produced in part (a) are likely to be accurate.

Test your understanding 2 – Rehan Ltd.

Rehan Ltd. manufactures machine tools. It has 200,000 ordinary Rs. 10 shares in issue, quoted at Rs. 16.8 each, and Rs. 1 million 10% secured debentures quoted at par. To finance expansion the directors of the company want to raise Rs. 1 million for additional working capital.

Cash flow from trading before interest and tax is currently Rs. 1 million per annum. It is expected to rise to Rs. 1.3 million per annum if the expansion programme goes ahead.

To simplify placing a valuation on the company's equity, you should assume that:

- the forecast level of cash flow, and a tax rate of 33%, will continue indefinitely;
- the required rate of return on the market value of equity, 18% post tax, will be unaffected by the new financing;
- there is no difference between taxable profits and cash flow.

Capital Structure

The company's directors are considering two forms of finance: equity via a rights issue at 15% discount to current share price, or 12% unsecured loan stock at par.

Required:

- Calculate for both financing options, the expected:
 - increase in the market value of equity;
 - debt: debt + equity ratio;
 - weighted average cost of capital.

(13 marks)

- Assume you are the financial manager for Rehan Ltd. Write a report to the board advising which of the two types of financing is to be preferred. Include in your report brief comments on nonfinancial factors which should be considered by the directors before deciding how to raise the Rs. 1 million finance.

(12 marks)

(Total: 25 marks)



Test your understanding 3 – Mehran Ltd.

Mehran Ltd. has annual earnings before interest and tax of Rs. 15 million. These earnings are expected to remain constant. The market price of the company's ordinary shares is Rs. 34.4 per share cum div and of debentures Rs. 105.50 per debenture ex interest. An interim dividend of Rs. 2.4 per share has been declared. Corporate tax is at the rate of 35% and all available earnings are distributed as dividends.

Mehran's long-term capital structure is shown below:

	Rs. '000'
Ordinary shares (Rs. 10 par value)	12,500
Reserves	24,300
	<hr/>
16% debenture 31.12. x 4 (Rs. 100 par value)	36,800
	23,697
	<hr/>
	60,497
	<hr/>

Required:

- Calculate the cost of capital of Mehran Ltd. according to the traditional theory of capital structure. Assume that it is now 31 December, 20X1. (8 marks)

Capital Structure

- Canal Ltd. is an all equity company with an equilibrium market value of Rs. 32.5 million and a cost of capital of 18% per year.

The company proposes to repurchase Rs. 5 million of equity and to replace it with 13% irredeemable loan stock.

Canal'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.

Explain and demonstrate how this change in capital structure will affect:

- the market value;
- the cost of equity; and
- the cost of capital

of Canal Ltd. using the assumptions of Modigliani and Miller.

(7 marks)

- Explain any weaknesses of both the traditional and Modigliani and Miller theories and discuss how useful they might be in the determination of the appropriate capital structure for a company.

(10 marks)

(Total: 25 marks)

Capital Structure

Capital Structure

Multiple choice questions (MCQs)

- 1) Weighted average cost of capital is constant at any gearing level, is the concept of:
- traditional view
 - M&M without tax
 - M&M with tax
 - none of the above
- 2) M&M assume that tax benefits will result in:
- increase in weighted average cost of capital
 - increase in value of business
 - decrease in weighted average cost of capital
 - decrease in value of business
- (i) and (ii)
 - (i) and (iv)
 - (ii) and (iii)
 - (iii) only



Test your understanding answers

Example 1 – M & M without tax

$$a) \quad V_0 = V_u + TB$$

so given that $T = 0$,

$$V_0 = V_u$$

so the value of X Co. is the same as the value of Y Co. (Rs. 2.1 m + Rs. 0.9 m) Rs. 3 m

- b) Assuming no growth in dividends, using the dividend valuation model,
 $k_{eu} = \text{Dividend} / V_u = 450,000 / 3,000,000 = 15\%$
- c) Cost of debt for Y Co. (assuming debt is irredeemable)

$$k_d = \text{Interest} / V_d = 72,000 / 900,000 = 8\%$$

Cost of equity for Y Co.

Using M & M's formula:

$$k_{eg} = k_{eu} + (k_{eu} - k_d) V_d(1 - t) / V_u$$

$$k_{eg} = 15\% + (15\% - 8\%) \times 0.9 / 2.1 = 18\%$$

(Alternatively, using the dividend valuation model,

$$k_{eg} = \text{Dividend} / V_E = 378,000 / 2,100,000 = 18\%)$$

As shown on the graphs, the geared company has a higher cost of equity.

- d) Weighted average cost of capital:

$$\text{WACC} = (18\% \times 2.1 / 3) + (8\% \times 0.9 / 3) = 15\%$$

Again, notice that this corresponds to the graphs seen above. In the no tax case, the WACC is constant irrespective of capital structure.

Example 2 – M & M with tax

$$a) \quad V_0 = V_u + TB$$

Capital Structure

so given that $T = 0.33$,

$$V_g = 3,000,000 + (33\% \times 900,000) = \text{Rs. } 3,297,000$$

so the value of the equity = $3,297,000 - 900,000$ (value of debt) = Rs. 2,397,000

(b) Assuming no growth in dividends, using the dividend valuation model,

$$k_{eu} = \text{Dividend} / V_E = 450,000 / 3,000,000 = 15\%$$

(c) Cost of debt for Y Co. (assuming debt is irredeemable)

$$k_d = \text{Interest} / V_D = 72,000 / 900,000 = 8\%$$

Cost of equity for Y Co.

Using M & M's formula:

$$k_{eg} = k_{eu} + (k_{eu} - k_d) V_D(1 - t) / V_E$$

$$k_{eg} = 15\% + (15\% - 8\%) \times 900,000 \times (1 - 0.33) / 2,397,000 = 16.76\%$$

As shown on the graphs, the geared company has a higher cost of equity.

(d) Weighted average cost of capital:

$$WACC = (16.76\% \times 2,397 / 3,297) + (8\% \times (1 - 0.33) 900 / 3,297) = 13.65\%$$

Alternatively, using M & M's formula:

$$k_{eg} = k_{eu}(1 - tL) = 15\% (1 - 33\% \times 900 / 3,297) = 13.65\%$$

Again, notice that this corresponds to the graphs seen above. In the with tax case, the WACC reduces as the level of debt in the capital structure increases.

With Rs. 4 million debt

$$V_{\text{geared}} = 8,400 + (4,000 \times 0.33) = 9,720$$

Total value of the company
Market value of debt

Value of equity

Rs. '000'
9,720
4,000
<hr/>
5,720

Capital Structure

Rs. 2 million debt

$$WACC = 19.94 \left(1 - \frac{2,000 \times 0.33}{7,000 + 2,000} \right) = 14.48\%$$

Rs. 4 million debt

$$WACC = 19.94 \left(1 - \frac{4,000 \times 0.33}{5,720 + 4,000} \right) = 17.23\%$$

- They rely on the assumptions of the Modigliani and Miller (M & M) model, many of which are unrealistic such as the capital market is perfectly efficient, debt is risk free, information is costless and readily available, there are no transaction costs, investors are rational and make the same forecasts about the performance of companies, and investors and companies can borrow at the risk-free rate.
- Only corporate taxation is considered and not the impact of other forms of taxation including personal taxation.
- M & M assumed that debt is permanent. Metro's debt has a five year time horizon.
- The estimates ignore possible costs that might be incurred as gearing increases, which would reduce share price and increase the cost of equity (and possibly debt). These include bankruptcy costs, agency costs and tax exhaustion.
- Inaccuracies exist in the measurement of the data required for the model.

Test your understanding 2 – Rahan Ltd.

a)

i)

	Rights issue	Loan stock
MV equity		
Extra dividends	Rs. 300,000 × 67%	Rs. (300,000 – 120,000) × 67%
	= Rs. 201,000	= Rs. 120,600
	Rs. 201,000	Rs. 120,000
PV at 11%	<hr/>	<hr/>
	0.18	0.18
	= Rs. 1,118,867	= Rs. 670,000

Capital Structure

The market value of equity will rise by Rs. 1.117 m under the rights issue financing option (yielding a net gain to share holders of Rs. 0.117 m after the rights price of Rs. 1 m) and by Rs. 0.67 m under the Loan stock option (which is also their gain).

ii) Debt: debt + equity ratio

Current MV equity = $200,000 \times \text{Rs. } 16.8 = \text{Rs. } 3.36 \text{ m}$

	Rights issue	Loan stock
Market values after expansion (Rs. in m)		
Equity	$3.36 + 1.117 = 4.477$	$3.36 + 0.67 = 4.03$
10% secured debentures	1.000	1.00
12% unsecured loan stock	—	1.00
	<hr/> 5.477	<hr/> 6.03
Debt: debt + equity ratio	1 : 5.477 (18.3%)	2 : 6.03 (33.2%)

iii) WACC

	Rights issue			Loan stock		
	MV (Rs. in m)	Cost %	WACC %	MV (Rs. in m)	Cost %	WACC %
Equity	4.477	18	14.71	4.03	18	12.03
10% secured	1.000	6.7	1.22	1.00	6.7	1.11
12% unsecured loan stock	—	—	—	1.00	8.04	1.33
	<hr/> 5.477	—	<hr/> 15.93	<hr/> 6.03	—	<hr/> 14.47

The WACC will be 15.93% under the rights issue option and 14.47% under the loan stock option.

b)

Report

To: Board of Directors, Rehan Ltd.

From: Financial manager

Date: XX/XX/XX

Capital Structure

Re: Finance options for expansion project

The company wishes to raise Rs. 1 m to fund our proposed expansion. This report initially assesses the two methods of finance currently being considered – a rights issue or issue of unsecured loan stock. I will then outline nonfinancial factors that I believe you should consider before making the final decision.

Evaluation of the two methods of finance

I have assessed the two proposed methods on the basis of their impact on the market value of equity, the gearing level and the WACC.

The results of my computations are as follows:

	Current	With project and right issue	With project and loan stock
MV equity (Rs. m) representing an increase of a gain to shareholders of	3.36	4.477	4.03
Gearing (debt: debt + equity) (22.90%)	01:04.4 (18.30%)	01:05.5 (33.20%)	01:03.0
WACC	15.41%	15.93%	14.47%

On the basis of these figures, to give maximum gain to our shareholders, the loan stock option should be chosen. This will also raise our gearing level and lower our WACC.

However, it should be noted that the impact of changes in gearing on the cost of equity has been ignored in this analysis. It is likely that an approximate 50% rise in gearing (from 22.9% to 33.2%) under the loan stock option will lead to an increase in the cost of equity above the current 18%, to compensate for the additional risk borne by the shareholders.

This will have the effect of lowering the value placed on the additional dividends by shareholders (thus reducing their gain) and limiting the fall in WACC (although, with tax relief on debt interest, this is still likely to be below the current cost).

Other considerations

First, alternative methods of finance that may be considered (particularly as to the

Capital Structure

fund working capital), include a bank overdraft, a medium-term loan or invoice discounting. Other nonfinancial factors:

- whether the issue of loan stock now will limit the availability of such finance in the future, when this longer term form of finance may be more appropriate;
- whether the rights issue is likely to be successful in the current market climate. If the company has a small number of shareholders, it may be possible to talk to them directly;
- whether the rights issue will be regarded as a positive move by the market or whether it might signal financial difficulties this can be preempted by ensuring shareholders are made fully aware of the reasons for the additional finance being needed;
- the extent to which you feel you can rely on the cash flow estimates built into the appraisal.



Test your understanding 3 – Mehran Ltd.

a) Cost of equity

All available earnings are distributed as dividends and earnings are expected to remain constant.

$$K_e = \frac{D}{V_e}, \text{ where } D \text{ is the annual dividend}$$

V_e is the ex dividend market value of equity

$V_e = (\text{Cum div share price} - \text{interim dividend}) \times \text{number of shares}$

$$= (\text{Rs. } 34.4 - \text{Rs. } 2.4) \times (12,500,000 \div 10)$$

$$= \text{Rs. } 40 \text{ million}$$

The dividends may be calculated as follows:

	Rs. '000'
Earnings before finance charges and tax	15,000
Debenture interest (Rs. 23,697,000 16%)	(3,792)
	<hr/>
	11,208
Tax @ 35%	(3,923)
	<hr/>
	7,285
	<hr/>

Capital Structure

$$K_e = \frac{7,285}{40,000} = 18.2\%$$

Cost of debt

The cost of debt is equivalent to the internal rate of return of the following cash flows:

31 Dec, 20X1	Market value ex int	(Rs. 105.50)
31 Dec, 20X1 X4	Finance charge less tax	Rs. 16 \times 0.65 = Rs. 10.40
31 Dec, 20X4	Redemption value	Rs. 100.

The net present values are calculated using discount rates of 8% and 10% as follows:

	At 8%	At 10%
10 (Rs. 105.50)	(Rs. 105.50) \times 1 = (Rs. 105.50)	(Rs. 105.50) \times 1 = Rs. 105.50
113 Rs. 10.40	Rs. 10.40 \times 2.577 = Rs. 26.80	Rs. 10.40 \times 2.487 = Rs. 25.86
13 Rs. 100	Rs. 100 \times 0.794 = Rs. 79.40	Rs. 100 \times 0.751 = Rs. 75.10
	<hr/>	<hr/>
	Rs. 0.70	(Rs. 4.54)
	<hr/>	<hr/>

The internal rate of return is given by:

$$8\% + \frac{0.70}{0.70 + 4.54} \times 2\% = 8.2\%$$

$$\therefore K_d = 8.2\%$$

Cost of capital

The market value of equity = Rs. 40 m from above.

The market value of debt = Rs. 23.697 m \times 1.055 = Rs. 25 m.

The weighted average cost of capital is, therefore, given by:

$$WACC = K_e \times \frac{40}{65} + K_d \times \frac{25}{65}$$

$$= 18.2\% \times \frac{40}{65} + 8.2\% \times \frac{25}{65} = 14.4\%$$

Capital Structure

b)

i) **Market value**

Modigliani and Miller's hypothesis including the effects of corporation tax suggests that:

$$V_g = V_u + TB$$

Where V_g is the value of the geared company

V_u is the value of an equivalent ungeared company

B is the market value of debt

T is the rate of corporation tax

In the case of Canal:

$$V_u = \text{Rs. } 32.5 \text{ million}$$

$$B = \text{Rs. } 5 \text{ million}$$

$$T = 35\%$$

$$V_g = \text{Rs. } 32.5 \text{ m} + \text{Rs. } 5 \text{ m } 35\% = \text{Rs. } 34.25 \text{ m}$$

The original value was Rs. 32.5 million.

This therefore represents an increase of Rs. 1.75 million.

ii) **Cost of equity**

Modigliani and Miller propose the following formula for calculating the cost of equity of a geared company:

$$\frac{V_d}{V_g} K_{eg} = K_{eu} + \left(K_{eu} - K_d \right) \times \frac{V_d}{V_g} \times (1 - t)$$

where K_{eg} is the cost of equity of the geared company

K_{eu} is the cost of equity of an equivalent ungeared company

K_d is the cost of debt before tax

V_d is the market value of debt

V_e is the market value of equity

t is the rate of corporation tax

$$K_{eu} = 18\% \text{ (given)}$$

Capital Structure

$$K_d = 13\%$$

$$V_d = \text{Rs. } 5 \text{ m}$$

$$V_e = V_g - D = \text{Rs. } 34.25 \text{ m} - \text{Rs. } 5 \text{ m} = \text{Rs. } 29.25 \text{ m}$$

$$\therefore K_{e_g} = 18\% + (18\% - 13\%) \times \frac{5}{29.25} \times (1 - 0.35) = 18.56\%$$

The cost of equity has increased by 0.56%, reflecting the increase in financial risk as a result of gearing.

iii) **Cost of capital**

Using Modigliani and Miller's formula:

$$K_{cc} = \left[1 - \frac{D}{D+V} \right]$$

$$= 18\% \left[1 - \frac{5 \times 0.35}{34.25} \right]$$

$$17.05\% =$$

Alternatively, the traditional weighted average cost of capital formula may be used, i.e.,

$$WACC = 18.56\% \times \frac{29.25}{34.25} + 13\% (1 - 0.35) \times \frac{5}{34.25}$$

$$= 17.08\%$$

The previous WACC was equal to K_{eu} , i.e., 18%. It has therefore decreased by 0.92%, reflecting the tax benefits of increased gearing.

c) The traditional view of capital structure theory is intuitive only; it is not based on any empirical evidence or computation and therefore its major weakness.

It argues that there exists an optimal capital structure where the overall cost of capital is minimized and thus the company value is maximized. This is based on the following propositions:

- As gearing increases the cost of equity rises due to the increase in financial risk.

Capital Structure

risk, but this is outweighed by the cost of debt and so the overall cost of capital decreases;

- as gearing continues to increase the cost of equity rises more sharply, such that this effect is greater than the effect of the lower cost of debt and the cost of capital rises;
- therefore there exists a minimum optimal cost of capital.

The theory is useful in as much as it highlights the fact that financing and capital structure may affect a company's value but it gives no suggestion as to where that optimal level lies.

Modigliani and Miller's theory, however, was initially based on empirical evidence and followed by quantification. Their hypothesis which includes the effects of corporate taxes (an adjustment to their original model) suggests that the optimal capital structure comprises 99.9% debt. Since this policy is not adopted by companies there must be certain flaws in this theory, the most important of which was later corrected by Miller himself, i.e., the effect of personal taxes.

Other common criticisms of the model include the following:

- the use of unrealistic assumptions, for instance:
- there are no transaction costs;
- information is freely available;
- individuals can borrow on the same terms as companies;
- individuals are prepared to exchange personal gearing for corporate gearing;
- costs associated with high levels of gearing are not considered.

These may include the following:

1) Bankruptcy costs

As gearing reaches high levels the probability of bankruptcy increases and if bankruptcy occurs there will be associated costs. These include the liquidation fees and the loss on the disposal of assets in a forced sales situation.

2) Tax exhaustion

The benefit derived from increasing the level of gearing relates to the tax relief obtained by companies on returns paid to debt, i.e., interest. However, at very high levels of gearing there is the possibility that the company will not have sufficient taxable profits from which to deduct the debt interest. In this situation the advantage of gearing up will be lost.

Capital Structure

3 Agency costs

These relate to constraints imposed on the company by providers of finance through restrictive covenants contained within terms of agreement. Such constraints are aimed to protect the interest of (primarily) the debt holders when a company finds itself in a potentially difficult situation close to bankruptcy.

As a result of the above and the effect of personal taxes, it is clear that benefits related to increased gearing do not continue indefinitely. The final position is not well defined, but it may be possible that there exists a point where the cost of capital is minimised before the additional costs of high gearing outweigh the benefits. Thus, if managers are able to quantify such costs and benefits, this adapted theory may be of use to them in identifying an appropriate level of gearing to adopt.

Answers to MCQs:

- 1) b
- 2) c

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Chapter Learning Objectives

Upon completion of this chapter you will be able to:

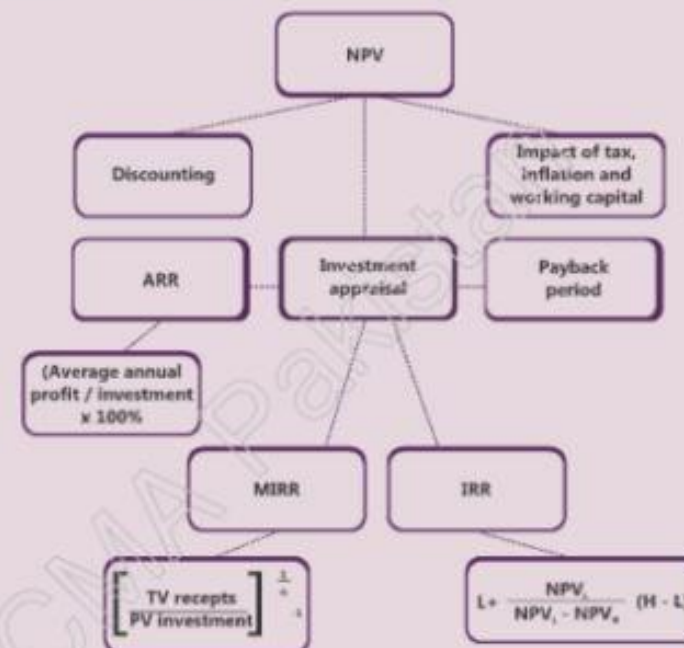
- Understand capital investment appraisal
- Compute Accounting Rate of Return (ARR)
- Elucidate Net Present Value (NPV)
- Explicate Internal Rate of Return (IRR)
- Calculate Modified Internal Rate of Return (MIRR)

CHAPTER 5

CHAPTER 5

Investment Appraisal

1 Overview of Chapter



2 Investment Appraisal

The investment decision was identified in the previous chapter as one of the three key elements of financial strategy.

An entity will only be able to provide appropriate returns to investors if it can identify suitable projects which provide appropriate returns to the entity itself.

It is, therefore, critically important that the financial manager understands how to appraise different investments and decide whether they are acceptable to the firm.

An introduction to investment appraisal

In this Chapter, we discuss various methods of evaluating investment projects. These methods are, in the main, concerned with quantitative aspects, but first you need to be clear that methods of evaluation are by no means the only factors to be taken into account in investment appraisal.

Investment Appraisal

Consideration of stakeholders

Thus, we might define investment appraisal as being concerned with maximizing shareholder wealth, but we must be careful to qualify this concept by making it subject to constraints associated with issues of social responsibility, such as effective controls over pollution.

So, shareholder's wealth in this context needs to be linked with the wider view of stakeholder theory, whereby many other interested parties apart from shareholders- for example, suppliers, lenders, employees, managers, as well as the general public – need to be taken into account in assessing a project's viability.

Incidentally, in the case of 'not-for-profit' entities, we should follow a similar path, but by substituting maximizing benefits in place of shareholder's wealth.

We must also be clear that maximizing wealth is not the same as maximizing profit from a project by minimizing costs regardless of the wider implications of doing so. Shareholders will be served by action being taken to ensure that a project will meet an economic want while maintaining a good and respected image of the entity, and indeed projects which damage that image can negate the benefits of otherwise effective marketing and promotional activities.

Investment appraisal data requirements

Clearly, then qualitative aspects of a proposal are very important, and this leads us on to the data content needed to evaluate a project effectively.

Bear in mind that the cash inflows and outflows involved are simply the standard means of translating into a common base of numbers all the underlying quantitative and qualitative assumptions which are the real determinants of a project's viability. The management accountant needs to consider carefully the strengths and weaknesses of these assumptions before finally converting them to cash flows.

The investment appraisal methods

It is useful to use a number of different methods for evaluating a project, especially for a major project, as different methods may well throw valuable light on various and different aspects of a project's value, bearing in mind the strengths and limitations of each method, as set out throughout this chapter.

This Chapter covers the five main investment appraisal methods:

- payback period;

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- Accounting Rate of Return (ARR);
- Net Present Value (NPV);
- Internal Rate of Return;
- Modified Internal Rate of Return (MIRR).

In the next Chapter, we shall explore the use of the methods in various specific circumstances.

3 Basic Investment Appraisal Methods

Payback period

Definition

This method involves calculating the period of time likely to recoup the initial outlay on a project, and then comparing this with the 'acceptable period'. If the payback period is less than 'acceptable', and there are no other constraints, for example, capital rationing, the project will be accepted.

Also alternative projects can be ranked according to the length of expected payback period.

Limitations of payback period

- Ignores timing of cash flows within the payback period, the cash flows after the payback period and, therefore, the total project return.
- Ignores the time value of money.
- Is unable to distinguish between projects with the same payback period.
- Tends to favour short-term (often smaller) projects over longer-term projects.
- Takes account of the risk of the timing of cash flows but not the variability of those cash flows.

Strengths of payback period

- Simple to calculate and understand important when management resources are limited. Also helpful in communicating information about minimum requirements to managers responsible for submitting projects.
- Can be used for first-stage screening in eliminating obviously inappropriate projects prior to more detailed evaluation.
- Bias in favour of short-term projects which means that it tends to minimize both financial and business risks.
- Can be used when there is a capital rationing situation to identify those projects which generate additional cash for investment quickly.

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Accounting Rate of Return (ARR)

Definition

This is a method of estimating the rate of return from an investment without discounting or compounding. The investment inflows are totaled and the investment costs subtracted to derive the profit.

The profit is divided by the number of years invested (to establish the average annual profit), then by the investment cost (or average investment cost) to establish an annual rate of return, e.g.,

$$\frac{\text{Average annual profit}}{\text{Project investment}} \times 100$$

where average investment = the average book value of the capital employed in the project (i.e., the average of the initial investment and the residual value).

Note: in some cases, the initial investment will be used instead of average investment.

Explanation of ARR formula

Accounting rate of return (ARR) is calculated in basically the same way as 'return on investment' as (profit / investment), but whether 'profit' is before or interest charges and whether 'investment' is the initial outlay or is averaged over the life of the project is unclear.

This lack of clarity seems strange.

The point of this technique is that it is based on the same principles as the published financial statements. Entities (and managers) are often evaluated by the 'return on investment' or 'return on capital employed' ratio derived from the published income statement and balance sheet. (The two ratios are identical, merely reflecting the two sides of the balance sheet; 'capital employed' reflects the financing of the business, 'investment' reflects the use of that finance.) It is therefore logical that it should be calculated in a way which makes it comparable with these ratios. As the balance sheet contains written-down asset values one would expect ARR to be calculated as (profit / average written down investment).

This accords with common sense, because if profit is after depreciation, then one would expect that depreciation to affect the value of the investment.

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Limitations

- Figures are easily manipulated, e.g., by changing the method of depreciation or the estimate of disposal value.
- Ignores the actual / incremental cash flows associated with the project, and the effect of the timing of those cash flows on the real return.
- Double counting: depreciation is deducted from the profit figure in full, but the use of the average assets figure means that part of this is also included in the denominator. The effect is to depress the calculated return.

Strengths

- Expressed in terms familiar to managers: profit and capital employed.
- Easy to calculate the likely effect of the project on the reported statement of comprehensive income / statement of financial position. Managers are frequently rewarded in relation to performance against these variables.
- Business is judged by ROI by financial markets.

Example of payback period and ARR

Blake Co is considering investing in a project with a cost of Rs. 100,000. Cash inflows from the project are expected to be as follows:

	Rs. '000'
Year 1	20
Year 2	30
Year 3	40
Year 4	40
Year 5	10

Straight line depreciation will be charged on the capital expenditure, over the 5 year life of the project.

Required:

Calculate the payback period for the proposed investment, and the ARR (based on the average investment).

4 Discounted Cash Flow (DCF) Investment Appraisal Methods

Basic concepts for DCF methods

Compounding

To calculate the value of an amount "X" in "n" years time in future, with an annual

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interest rate of r , use the compounding formula:

$$X \times (1+r)^n$$

For example, an amount of Rs. 10 in 2 years with an interest rate of 10% will be worth Rs. $10 \times 1.102 = \text{Rs. } 12.10$

Discounting

Discounting is the opposite to compounding i.e., it allows us to calculate the equivalent "present value" of a given future amount. The formula is below, but most of the time the present value (PV) tables will be used.

$$PV = \frac{1}{(1+r)^n} = (1+r)^{-n}$$

where r is the discount rate for a single time period (normally a year) and n is the number of time periods in the discount period (usually the number of years before the cash flow occurs).

For example, an amount of Rs. 100 receivable in 6 years with an interest rate of 10% has a present value of Rs. $100 \times 1.10^{-6} = \text{Rs. } 56.45$.

Also, an amount of Rs. 100 receivable in 3 months' time at a quoted annual interest rate of 10%, or 2.5% paid every quarter (where $2.5\% = 10\% \times 3/12$), has a present value of Rs. $100/1.025 = \text{Rs. } 97.56$.

Present value of cumulative flows (annuity)

The formula is below, but most of the time the cumulative present value tables will be used.

$$PV = \frac{1(1+r)^n}{r}$$

where r is the discount rate for a single time period (normally a year), and n is the number of time periods of cash flows.

Notation: $AF(1n)(r\%)$ = Annuity factor for n years at $r\%$.

Illustration 1 – Annuities

The present value of Rs. 1,000 received next year and for the following 4 years if the interest rate is 10% is:

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$$AF15(10\%) = 3.791$$

$$PV = 3.791 \times \text{Rs. } 1,000 = \text{Rs. } 3,791$$

Examination twist: The deferred annuity. This is where the first cash flow takes place not at time 1 but at a later date.

Consider a receipt of Rs. 1,000 each year for five years starting at time 3. Interest rate is 10%.

Since the receipt is for five years the five-year annuity factor is used. This gives the present value 1 year prior to the first receipt i.e., time 2. This is then discounted back to time 0.

$$3.791 \times \text{Rs. } 1,000 \times 0.826 = \text{Rs. } 3,131$$

Present value of a perpetuity

$$PV = \frac{1}{r}$$

Hence, the present value of Rs. 1,000 received every year from year 1 onwards if interest rates are 10% is Rs. $1,000 / 0.10 = \text{Rs. } 10,000$.

Present value of a growing perpetuity

$$PV = \frac{1}{r-g}$$

Hence, the present value of a perpetuity which will be Rs. 1,000 in 1 year and then will grow at 3% per annum thereafter is Rs. $1,000 / (0.10 - 0.03) = \text{Rs. } 14,286$ (assuming that interest rates are 10%).

Illustration 2 – Complex perpetuities and annuities

Calculate the present value of the following cash flows in each of the specified circumstances:

Year	Cash flow
1	1,000
2	1,500
3	1,600
4	1,800

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- 1) the Rs. 1,800 will arise annually each year from year 4, for the next ten years (last year year 13).
- 2) the Rs. 1,800 will arise each year in perpetuity.
- 3) the Rs. 1,800 arises in perpetuity but grows at 2% per annum.

The cost of capital is 10%.

Answer

1	Year	Cash flow	DF	PV
	1	1,000	0.909	909
	2	1,500	0.826	1,239
	3	1,600	0.751	1,202
	4-13	1,800	7.103 2.487	8,309
			or	
			6.145×0.751	

Total PV = Rs. 11659

2	Year	Cash flow	DF	PV
	1	1,000	0.909	909
	2	1,500	0.826	1,239
	3	1,600	0.751	1,202
	4-∞	1,800	$1/0.10$ 2.487	13,523
			or	
			$1/0.10 \times 0.751$	

Total PV = Rs. 16,873

3	Year	Cash flow	DF	PV
	1	1,000	0.909	909
	2	1,500	0.826	1,239
	3	1,600	0.751	1,202
	4-∞	1,800	$(1/(0.100.02)) \times 0.751$	16,898

Total PV = Rs. 20,248

Net Present Value (NPV)

Definition

This is a method of determining whether the expected financial performance of a proposed investment promises to be adequate when measured against a cost of capital. All the estimated incremental cash flows relating to the project are discounted to present value and then totaled.

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A positive NPV indicates that expected return on a project more than compensates the investor for the perceived level of (systematic) risk i.e., that the expected return is greater than the required return.

Identification of a project's relevant costs and benefits

A common difficulty experienced by students is how to choose which to exclude in the investment appraisal calculations.

Some of the main points to look out for are:

- Accounting adjustments such as depreciation do not represent cash outflows, as no physical movement of cash takes place. However, tax allowance do represent inflows as they reduce the amount of tax actually to be paid in cash.
- Cash inflows should be after-tax.
- Financing decisions can be analyzed separately from operational project decisions, so financing charges should not be included as a cash flow in the investment appraisal.
- Any incidental effects of undertaking a project need to be included if they represent cash movements.
- Working capital movements needs to be included (see examples later in this Chapter), but bear in mind that there will usually be a release of working capital (a terminal value) at the end of the project.
- Sunk costs, which have already been incurred, should be excluded as they do not involve a new cash movement created by the project.
- Opportunity cost could be defined as 'the value of a benefit sacrificed in favour of an alternative course of action'. For example, if by undertaking a project, we use some materials which would otherwise have been sold for Rs. 1,000, the Rs. 1,000 sale proceeds foregone would need to be recorded as a cost of new project.
- Residual values for any assets utilized in project should be included in the final year of the appraisal period. The residual value will reflect the remaining useful life in the asset or its disposal value. The residual value should be net being of disposal costs.

In general terms, an item should be included in an NPV analysis if it represents a **future, incremental cash flow** which will arise as a consequence of the project being undertaken.

Investment Appraisal

The meaning of NPV

A positive NPV indicates that expected return on a project more than compensates the investor for the perceived level of (systematic) risk i.e., that the expected return is greater than the required return.

The value of the NPV equals the gain (or loss) to shareholders if the project is undertaken.

Recommended format

Year	0	1	2	3	4	5
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Receipts		X	X	X	X	
Payments:						
Wages		(X)	(X)	(X)	(X)	
Materials		(X)	(X)	(X)	(X)	
Variable / Fixed overheads		(X)	(X)	(X)	(X)	
Administration / Distribution expenses		(X)	(X)	(X)	(X)	
Taxable cash flows		X	X	X	X	
Tax: Corporation tax			(X)	(X)	(X)	(X)
Capital allowances			X	X	X	X
Initial outlay	(X)					
Net Realisable Value					X	
Working capital	(X)				X	
Net cash flows	(X)	X	X	X	X	(X)
Discount rate (e.g., 10%)	1	0.909	0.826	0.751	0.683	0.621
Present value	(X)	X	X	X	X	(X)

Net Present Value (NPV) Rs. XXX

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Strengths of the NPV method

- Any project with a positive NPV increases the wealth of the company. The primary financial aim is to maximize the wealth of the ordinary shareholders, and selection of projects on an NPV basis is consistent with this objective.
- Takes account of the time value of money and therefore the opportunity cost.
- Discount rate can be adjusted to take account of the different level of risk inherent in different projects. Alternatively, the technique can be combined with sensitivity analysis to quantify the risk of the project's results being different from those expected.
- Unlike the payback technique, it takes into account events throughout the lifetime of the project.
- Superior to the Internal Rate of Return (IRR) approach because it does not suffer the problem of multiple rates of return due to irregularities in the pattern of cash flows.
- Better than the Accounting Rate of Return (ARR) method because it focuses on cash flows rather than profits and avoids the understatement of returns.

Explanation of the incremental cash flow method

Reasons why the incremental cash flow basis is best for appraising capital projects:

- Cash flows are better than profits**
 - Cash can be spent; profits are only a guide to the cash that may be available.
 - Profit measurement is subjective, cash is real.
 - Cash is used to pay dividends.
- Incremental cash flows**

Are those that result from accepting the project; they ignore those that would have arisen anyway.
- Relevance of cash flows**
 - 'Sunk costs' ignored.
 - 'Opportunity costs' used as the value for cash flows.
 - Interest payments ignored.
 - Dividend payments ignored.
 - Tax payments and receipts are valid cash flows.
 - Scrap proceeds are valid cash inflows.

The impact of taxation on the NPV analysis

There are three important tax effects to consider:

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- a) tax payments on operating profits;
- b) tax benefit from capital allowances;
- c) tax relief on interest payments on debt.

Tax relief on interest payments on debt is taken into account by adjusting the discount rate.

Depreciation and tax depreciation allowance

Depreciation

The Financial Strategy syllabus is not specifically concerned with the accounting treatment or methods of depreciation.

Depreciation is not cash and the key point to remember is that if a question requiring a DCF calculation includes depreciation (or other non-cash items, including accruals and prepayments), these items have to be added back to profits or losses to arrive at operational cash flows.

Tax depreciation allowances

However, tax depreciation allowances do have an impact on the cash flows of a business.

The important point is that tax depreciation allowances themselves are not cash, but they affect the tax liability of an entity, which in turn affects tax payable or refundable. Tax depreciation allowances do therefore have an effect on cash flow.

Tax depreciation allowances are sometimes given in the form of first year allowance followed by allowances at a lower rate in subsequent years.

'Capital allowances' is the term used for tax depreciation allowances.

Assumptions

- a) Tax is normally assumed to be payable one year after the relevant cash flow.
- b) It is normally assumed that the company is generating sufficient taxable profits so as to be able to absorb all allowances in full at the earliest opportunity.
- c) Capital allowances

Two alternative assumptions are possible:

- i) the expenditure arises just before a company's year end. The first

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- ii) Allowances can therefore be claimed immediately; the expenditure arises at the beginning of a new accounting period. The first allowance will therefore be claimed at time 1

Illustration 3

A company purchases a machine at the beginning of the year in order to undertake a new investment project.

The machine costs Rs. 30,000, it has a life of four years and a scrap value of Rs. 5,000 in year 4.

Tax depreciation allowances can be claimed on the machine on a reducing balance basis at 20% per annum. The tax rate is 30% and tax is payable in the same year as profits are generated.

Required:

Calculate the annual tax depreciation allowances, and the associated tax relief.

Answer:

Tax depreciation allowances

	WDV	Benefit
WDA Y1	30,000 (6,000) @ 20%	1,800 at T1
WDA Y2	24,000 (4,800) @ 20%	1,440 at T2
WDA Y3	19,200 (3,840) @ 20%	1,152 at T3
	15,360 Proceeds (5,000)	
BA Y4	10,360 (10,360) @ 20%	3,108 at T4
	Nil	

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Example 1 – Taxation

A company purchases a machine at a cost of Rs. 100,000.

It has a life of four years and a scrap value of Rs. 20,000 in year 4.

Writing down allowances are climbable on the machine on a reducing balance basis at 25% per annum.

The machine will generate the following annual net income:

year 1 Rs. 30,000

year 2 Rs. 40,000

year 3 Rs. 50,000

year 4 Rs. 40,000

The cost of capital is 12% net of corporation tax at 33%, payable in arrears.

Required:

Should the machine be acquired?

The impact of inflation on the NPV analysis

There are two acceptable approaches to incorporating inflation into an NPV analysis:

a) The "real" method

In this case **cash flows are not inflated** i.e., we consider future cash flows which will be generated, but in today's prices. When discounting the cash flows, however, we must use a discount rate which is adjusted for inflation. This is called a **real discount rate** or a real cost of capital.

b) The "money" method

In this case **adjust future cash flows for the effect of inflation** i.e., inflate the cash flows, and then discount by using a **money or nominal** cost of capital.

We will consider how to discount using each approach. If you need to get from a money cost of capital to a real cost of capital or vice versa then the relationship between the two is as follows:



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$$(1 + m) = (1 + r)(1 + i)$$

where m = money cost
 r = real cost
 i = inflation rate

Note: In an exam question, assume that both the discount rate and cash flows are given in money / nominal terms unless told otherwise.

Inflation terminology explained

A common source of confusion and misunderstanding in DCF calculations is the treatment of inflation.

Money and real costs of capital

Typically, the discount rate is the money cost of capital (often referred to as the nominal cost of capital), that is the rate payable on borrowed money (the source of funds may be a bank loan, bonds, equity or some combination of sources).

Such a rate includes an allowance for inflation, in the sense that the lender can not expect any more than the interest rate. (The lender may charge a 15% rate assuming that inflation will be 8% and so a 'real return' of approximately 7% will be generated.)

Money and real cash flows

If a money cost of capital is employed, then the cash flows on which the analysis is performed should also include any inflation which is expected. (An, if different rates of inflation are expected on revenues and costs, then this should be reflected in the cash flows.)

In practice, cash flows are often projected in so – called 'real' terms, that are excluding inflation. Given the uncertain nature of estimated future cash flows this is not surprising – inflating estimated future cash flows may introduce the potential for greater confusion.

And, since inflation might be expected to affect all entities equally, it can reasonably be assumed that, if there are unexpected inflationary pressures, they will be compensated by price adjustments.

There are therefore arguable reasons for the use of cash flows in 'real' terms in DCF analysis. However, it therefore follows that the discount rate should also be in 'real' terms.

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The interaction of tax and inflation in an NPV analysis

Finally, there is the problem of using the real rate when there are taxation implications in an examination question.

If there are any taxation implications in an investment appraisal, it would not usually be appropriate to leave the cash flows in terms of present day prices and discount those cash flows at the real cost of capital.

This would understate the overall tax liability as tax depreciation allowances are based on original, rather than replacement cost, and do not change in line with changing prices. The cash flows will have to be adjusted by the appropriate estimate of price change.

Illustration 4 - Inflation in an NPV calculation

Brooker has under review a project involving an outlay of Rs. 55,000 and expected to yield the following net cash flows in current terms:

	Rs.
Year 1	10,000
Year 2	20,000
Year 3	30,000
Year 4	5,000

The company's money cost of capital is 20% and the expected rate of inflation is 5% per annum.

Required:

Evaluate the project using both of the recognized approaches to dealing with inflation.

Solution:

The real method:

First, calculate the real rate of interest.

$$(1 + m) = (1 + r)(1 + i)$$

$$1.20 = (1 + r) \times 1.05$$

So $r = 14.29\%$ which should be used to discount the current terms cash flows:

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	Cash	Discount factor	PV
0	(55,000)	1	(55,000)
1	10,000	1/1.1429	8,750
2	20,000	1/1.1429 ²	15,311
3	30,000	1/1.1429 ³	20,095
4	5,000	1/1.1429 ⁴	2,930
			(7,914)

The money method

Discount the inflated cash flows at 20%:

	Cash	Discount factor	PV
0	(55,000)	1	(55,000)
1	10,500 (10,000 x 1.05)	1/1.20	8,750
2	22,050 (20,000 x 1.05 ²)	1/1.20 ²	15,313
3	34,729 (30,000 x 1.05 ³)	1/1.20 ³	20,098
4	6,078 (5,000 x 1.05 ⁴)	1/1.20 ⁴	2,931
			(7,908)

N.B. The small difference between the two methods is caused by rounding.

Example 2 – Inflation

Bahadur Ltd. is considering investing in a machine which automatically dispenses vodka when a person clicks his or her fingers. The machine costs Rs. 100,000. It will generate income of Rs. 50,000 per annum for the next three years in current prices when rented to modern trendy Moscow nightclubs. The selling price is expected to increase in line with the rate of inflation at 10% per annum.

The money cost of capital is 20%.

Required:

What is the NPV at the real cost of capital?

What is the NPV at the money cost of capital?

Note:

- 1) If the rate of inflation affecting all the cash flows and the cost of capital is the same, then the NPV in money terms will equal the NPV in real terms. In this case it does not matter whether you discount in money or in real terms.
- 2) In the exam you are much more likely to have to approach things in money rather than real terms. If there are different rates of inflation quoted for

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different cash flows e.g., for sales compared to cost of sales, then you will have to discount in money terms. Likewise if capital allowances are given in a question then you will have to discount in money terms. Basically, if in doubt assume that you have to discount in money terms.

- 3) Assume that a discount rate is a money rate unless told otherwise.
- 4) The only time when you are likely to have to discount in real terms is if you are given annuities for a long period of time, e.g., 10 years. By discounting in real terms you can use the cumulative annuity factors.

The working capital adjustment in an NPV analysis

In most industrial projects, investment is required, both in working capital and in fixed capital, although the risk attached to working capital is less than that for fixed capital. Values of land and buildings may appreciate and so present less risk, but money invested in machinery is a sunk cost, which is unlikely to be recovered, except for perhaps minimal scrap values.

In project appraisal, accurate estimates of working capital requirements are desirable, not only for assessment of project profitability, but also to facilitate forecasting of capital requirements.

Effectively it represents a cash flow that will automatically be refunded after the project has ended.

Illustration 5 – Working capital

A project requires the following levels of cumulative working capital investment (the working capital is required at the start of each year):

Year	Year	Year	Year
1	2	3	4
500	600	700	800

NPV – cash flows – put only the incremental cash flows at the start of each year, then release the total amount invested at the end of the project:

Time	Time	Time	Time	Time
0	1	2	3	4
(500)	(100)	(100)	(100)	(800)

Example of NPV with taxation, Inflation and working capital

PQ Co. a UK based motor components subsidiary of a conglomerate entity, has to decide whether to invest in a new production line. The project involves an initial

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investment in equipment costing Rs. 600,000 and working capital costing Rs. 180,000.

The projected net cash flows for the products are Rs. 200,000 per annum for 5 years at current price levels. At the end of 5 years it is projected that the equipment will have a terminal value of Rs. 50,000, and that the elimination of working capital will provide an inflow equal to its initial book value.

PQ Co.'s post-tax cost of capital is 14% in nominal (money) terms and the inflation rate is projected to be 5% per annum.

Taxation data is as follows:

- i) The equipment will be subject to tax depreciation allowances of 25% per annum on a reducing-balance basis, which can be claimed against taxable profits as from the current year (year 0) which is shortly to end. A balancing charge or allowance will arise on disposal.
- ii) The rate of corporate tax is 35% payable 1 year in arrears.

Required:

Determine whether or not the NPV of the project will justify the investment.

Solution

You should note that the figures required are in nominal (money) terms, but in this case, while it is possible to convert net cash flows back from nominal to real terms, it is not possible to ascertain a discount rate in real terms, from the data given, because of the mixture of inflated and non-inflated cash flows in the projections. If PQ Co.'s planners wished the figures to be in real terms, then the company's real discount rate would have to be separately determined. Care would also be required in adjusting the tax savings on tax depreciation allowances.

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For example, consider the following project:

	Rs.
Initial investment at t0	(50,000)
t1 cash inflow	127,500
t2 cash outflow	(78,750)

This project has IRRs of 5% and 50% (i.e., NPV = 0 when discounted at either of these rates).

- Ranking projects according to the size of their IRRs can give a different ranking from the ranking using NPV. This is because IRR is a relative figure and NPV is an absolute figure. For example, a project giving a Rs. 1,000 return in 1 year from a Rs. 900 investment immediately, has the same IRR as a project which gives a Rs. 1 m return in 1 year from a Rs. 900,000 investment. Clearly the larger project would have a much bigger NPV.

More on the limitation of IRR

Decision rule

The decision rule for IRR is:

- Accept the project if its IRR is greater than the cost of capital;
- Reject if the IRR is less than the cost of capital.

If a decision has to be made about a single project with 'conventional' cash flows (i.e., a single outlay followed by a series of inflows) IRR will lead to the same decision as NPV.

However, in more complex circumstances IRR and NPV can lead to different decisions.

Multiple IRRs

If project cash flows reverse during the life of the project – there may, for example, be an initial outflow followed by several inflows before another major outflow (as plant undergoes major refurbishment, for example) – there may be more than one IRR. A graph of discount rate versus NPV might appear as follows:

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[illegible]

The NPV is positive and, therefore, the investment should be accepted.

The Internal Rate of Return (IRR)

Definition

The IRR is the discount rate which gives a zero NPV.

In many cases this is the maximum discount rate at which a project would be acceptable (because in most cases, the NPV is positive at all discount rates less than the IRR).

Calculation

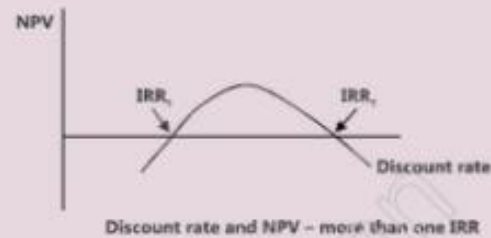
It can be estimated by working out the NPV at two different rates (L, the lower rate, and H, the higher rate) and then using the following formula:

$$L + \left(\frac{NPV_i}{NPV_i - NP_{ij}} \right) (H - L)$$

Limitations

- The IRR method assumes that earnings throughout the period of the investment are reinvested at the IRR. If the cost of capital is different from the IRR (as in most cases) this is an incorrect assumption which means that the IRR overestimates the project's return.
- For a project having irregular cash flows there can be more than one IRR for that project. This can make comparison of projects using IRR very confusing.

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In such an example, the IRR decision rule (accept if cost of capital is less than IRR) is misleading because the project should only be accepted if cost of capital is between IRR1 and IRR2.

To explain the result it is necessary to understand the reinvestment assumptions implicit in the NPV and IRR calculations.

The reinvestment assumptions

All NPV calculations assume that incoming cash can be reinvested at the rate which is used in the NPV calculation.

This means that the calculation of IRR1 assumes reinvestment at IRR1 while the calculation of IRR2 assumes reinvestment at IRR2. Only at rates which are sufficient to offset both the initial cash outflow and the eventual second cash outflow. This analysis is perfectly sound and, arguable; the project is acceptable only if the cost of capital lies between IRR1 and IRR2.

Unfortunately, however, it means that the IRR decision rule – accept if cost of capital is less than IRR – can be applied only to projects having conventional cash flows.

The NPV approach avoids this problem quite simply. By using the cost of capital as the discount rate in the NPV formula, a negative NPV is generated if cost of capital is less than IRR1, a positive NPV is obtained if cost of capital is between IRR1 and IRR2, and the NPV is negative again if cost of capital is greater than IRR2.

The possibility of multiple IRRs is cited as a disadvantage of the IRR technique. However, the problem can be overcome. Multiple IRRs arise only when cash flows reverse more than once. In these circumstances, it is only necessary to identify the (possibly) several IRRs (some seconds) and draw the correct conclusions.

IRR and mutually exclusive projects

Another problem with IRR concerns the selection of a favored project from two or

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more projects which are 'mutually exclusive' (i.e., if one is chosen the others are automatically ruled out).

Suppose, instead of our project (A) being a simple accept/reject decision we have to choose between it and another project (B) which can be compared with project A as follows:

	Project A	Project B
Initial investment (Rs. '000')	100.0	50.0
NPV (Rs. '000')	6.5	5.0
IRR (%)	12.7	18.0

The IRR approach would favour project B (18.0% compared with 12.7%). However, provided that funds are freely available, project A would maximize wealth because, if chosen, it could generate Rs. 6,500 NPV compared with project B's Rs. 5,000.

In essence, IRR can mislead because it may select a lower investment with higher 'earning potential', when it may be preferable to invest a greater sum which generates a lower 'return' but (because of its scale) produces a greater sum in the end.

Conclusion:

While the IRR technique assumes that cash flows can be reinvested at the IRR, the NPV technique assumes that cash flows can be reinvested at the cost of capital used in the discounting process. This difference has two repercussions:

- 1) Even if mutually exclusive projects have the same initial investment, NPV and IRR can give conflicting results. IRR may prefer a project with high early cash flows (assuming reinvestment at the IRR), while NPV may prefer a different project – with higher flows later.
- 2) If IRR is used to rank projects in a capital – rationing situation the ranking may be different from that obtained using the profitability index because IRR will favour early cash inflows (assuming investment at the IRR), while the profitability index (being based on NPV) may produce a different ranking. (Capital rationing is covered in more detail in the later Chapter 'investment appraisal further techniques'.)

It is usually assumed that NPV provides the best guidance because the cost of capital reinvestment assumption is more conservative and likely to be more realistic.

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5 Modified IRR (MIRR)



Definition and explanation of MIRR

Modified internal rate of return (MIRR) is that rate of return which, when the initial outlay is compared with the terminal value of the project's net cash flows reinvested at the cost of capital, gives an NPV of zero.

The MIRR gives the percentage return from a project, on the assumption that any cash inflows can be reinvested at the entity's cost of capital.

As a percentage return figure, it is arguably easier to understand than the absolute figure given by an NPV analysis (in many other contexts the return from an investment is given as a percentage, so the concept of a percentage return is well understood).

The process for calculating MIRR

- Cash inflows from the project are converted to a single cash inflow in the last year of the project (a 'terminal value' or TV) by assuming that the cash flows are reinvested at the cost of capital.
- MIRR is calculated as the annual return which equates the present value of the outflows to this TV.
- i.e., the MIRR is found by taking $(TV / PV \text{ of cash outflows})^{(1/n)} - 1$ (Note: n is the length of the project in years).

Note: This calculation identifies the rate of interest that equates the terminal value with the initial investment.

Illustration 6 – MIRR

Initial investment	(5,000)
Cash flows at t1	2,000
at t2	(1,000)
at t3	3,500
at t4	3,800

Cost of capital 10%

NPV = 1,216

IRR ≈ 19%

Required:

Calculate the MIRR of this project

Solution:

MIRR calculation

	Inflow		TV of inflows
1	2,000	$(1.10)^3$	2,662
3	3,500	$(1.10)^1$	3,850
4	3,800	1.0	3,800
			<hr/>
			10,312
	Outflow	DF	PV of outflows
0	5,000	1	5,000
2	1,000	$1/1.10^2$	826
			<hr/>
			5,826

$$\text{MIRR} = (10,312 / 5,826)^{1/4} - 1 = 0.1534 \text{ (15.34\%)}$$

This is a better measure of the financial return from the project than the IRR of 19% which was given.

Strengths of the MIRR approach

- MIRR is unique for each project and it assumes that reinvestment takes place at the cost of capital, so it is a much more accurate measure of the return from a project than IRR.
- MIRR represents the actual return generated by a project.

Discussion of investment appraisal methods

Discussion of techniques

In using discounting and other techniques of investment appraisal, you must always be aware that financial analysis is only a part of the decision-making process and that often social and other factors may also be of considerable importance.

However, accepting this point and the need for a rounded, pragmatic approach to investment decisions, it is still essential that a management accountant should thoroughly understand the application of the 'tools of his trade'.

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The arguments put forward here suggest that all the techniques of investment appraisal need to be well understood if they are to be wisely used.

The arguments put forward here suggest that all the techniques of investment appraisal need to be well understood if they are to be wisely used.

In summary:

- 1) NPV is the principal theoretical recommendation and should be used if the cost of capital is a realistic reinvestment assumption.
- 2) IRR like NPV incorporates discounting principles and, for some managers, may be more meaningful than the absolute NPV of the project. However, IRR needs to be thoroughly understood because of possible difficulties concerning multiple IRRs and its use if projects are mutually exclusive. MIRR is a recent innovation worthy of consideration.
- 3) Payback is must used in proactive and, aside from its obvious simplicity, it can also be recommended if a risk-averse decision is needed (or if liquidity is a major problem).
- 4) ARR takes no account of the time value of money and could lead to an incorrect decision if compared with the cost of capital. However, because of the extensive use of the return on capital employed or return on capital employed or return on investment ratio, in practice it could be foolish not to calculate it.

The analysis suggests that there may be a place for all techniques of investment appraisal in the management account's armoury.

However, a thorough understanding of their strengths and limitations is important.

How is risk incorporated using the different methods?

The usual textbook advice is to take account of risk in the following ways:

- 1) If payback is used, reduce the required pay back period;
- 2) If IRR is used, increase the required 'cut-off' rate;
- 3) If NPV is used, increase the discount rate to take account the 'risk' associated with the project. The capital asset pricing model can be used to provide a means of assessing the premium which ought to be added to the 'risk-free' discount rate;
- 4) Assign probabilities to 'best' most likely' and 'worst' values for each variable and calculate a range of possible outcomes together with their probabilities. (This approach can be refined by establishing distributions for the input variables and 'simulating' the project many times in order to build up a

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distribution of possible outcomes.)

The relatively straightforward methods of handling risk if payback or IRR are used are cited as advantages of these techniques.

However, none of the techniques described above deals with the important point that early cash flows are likely to be more certain than late ones. The discounting techniques take account the time value of money but they assume that whatever cash flows are projected are certain. Only the payback technique clearly favours early inflows much more than later ones and this may partially account for its popularity.

The issue of risk in investment appraisal is dealt with more fully in the next Chapter.

6 Conclusion – Which Investment Appraisal Method Should be Used?

To some extent, the decision as to which investment appraisal methods to use depends on the circumstances.

For example, if the company has short-term liquidity problems, the payback period may well provide useful information. Alternatively, if a manager is being appraised based on the ROCE generated, he may decide to use the ARR method as an important investment appraisal method.

However, in most cases, the NPV method is considered to be the best investment appraisal method, because it measures the absolute gain in shareholders' wealth if a project is undertaken. This links to the primary financial objective of all companies – to maximize the wealth of the shareholders.

The IRR is useful as a follow up to NPV when trying to assess the sensitivity of the project to changes in input factors (see next Chapter for more details). However, if it is difficult to interpret the IRR (perhaps because there is more than one IRR), the MIRR gives a unique percentage measure of project return and should be used if trying to explain the concept of return from a project to a non-financially minded audience.

Financial and strategic considerations in investment appraisal

The investment appraisal methods shown in this Chapter are, in the main, concerned with financial aspects.

However, you need to be clear that financial methods of evaluation are by no means

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the only factors to be taken into account in investment appraisal.

Maximizing shareholder wealth

We might define investment appraisal as being concerned with maximizing shareholder wealth, but we must be careful to qualify this concept by making it subject to constraints associated with issues of social responsibility, such as effective controls over pollution.

Stakeholder considerations

Shareholders' wealth in this context needs to be linked with the wider view of stakeholder theory which was introduced in the earlier chapter on 'Introduction to Financial Strategy'.

The key point here is many other interested parties apart from shareholders – for example, suppliers, lenders, employees, managers, as well the general public – need to be taken into account in assessing a project's viability.

For example, a project with a large positive NPV would normally be considered to be acceptable. However, if undertaking the project would lead to job losses within the entity, or would increase pollution levels, the decision is not so clear cut. In situations such as this, the competing needs of stakeholders would need to be assessed and compared.

Although it may seem to go against the key 'maximize shareholder wealth' objective a project with a positive NPV, it is worth considering that a project which fails to achieve the objectives of the other stakeholders might ultimately undermine the entity's position and may lead to negative publicity which might adversely impact shareholder wealth in the future.

Strategic considerations

The financial appraisal of a project must also be balanced against its strategic benefits to the entity.

For example, if a project has been appraised which has a small positive (or negative) NPV; usually the project would be rejected. However, if the project would help to consolidate the entity's competitive position, or give it the opportunity to expand into a new, attractive market, the decision is not so clear cut.

In this case, management would have to try to balance the financial requirements of the entity against the long-term strategic requirements.

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If it is felt that undertaking a project now would improve the entity's prospects and likely shareholder wealth in the future, a project with a small positive (or negative) NPV might sometimes be accepted.

Note: Real options theory (covered in the next Chapter) is one way of trying to formalize the process, by assigning values to strategic factors so that they can be incorporated more easily in the decision making process.

7 Exam Style Questions

Test your understanding 1 – Bilawal Ltd.

Assume that you have been appointed finance director of Bilawal Ltd. The company is considering investing in the production of an electronic security device, with an expected market life of five years.

The previous finance director has undertaken an analysis of the proposed project; the main features of his analysis are shown below. He has recommended that the project should not be undertaken because the estimated annual accounting rate of return is only 12.3%.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Investment in depreciable fixed assets	4,500					
Cumulative investment in working capital	300	400	500	600	700	700
Sales	3,500	4,900	5,320	5,740	5,320	
Materials	535	750	900	1,050	900	
Labour	1,070	1,500	1,800	2,100	1,800	
Overhead	50	100	100	100	100	
Finance charges	576	576	576	576	576	
Depreciation	900	900	900	900	900	
	3,131	3,826	4,276	4,726	4,276	
Taxable profit	369	1,074	1,044	1,014	1,044	
Taxation	129	376	365	355	365	
Profit after tax	240	698	679	659	679	

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Total initial investment is Rs. 4,800,000.

Average annual after tax profit is Rs. 591,000.

All of the above cash flow and profit estimates have been prepared in terms of present day costs and prices as the previous finance director assumed that the sales price could be increased to compensate for any increase in costs. You have available the following additional information:

- Selling prices, working capital requirements and overhead expenses are expected to increase by 5% per year.
- Material costs and labour costs are expected to increase by 10% per year.
- Capital allowances (tax depreciation) are allowable for taxation purposes against profits at 25% per year on a reducing balance basis.
- Taxation of profits is at a rate of 35% payable one year in arrears.
- The fixed assets have no expected salvage value at the end of five years.
- The company's real after tax discount rate (or weighted average cost of capital) is estimated to be 8% per year, and nominal aftertax discount rate 15% per year. Assume that all receipts and payments arise at the end of the year to which they relate except those in year 0 which occur immediately.

Required:

- Estimate the net present value of the proposed project. State clearly any assumptions that you make.
- Calculate by how much the discount rate would have to change to result in a net present value of approximately zero.

Multiple choice questions (MCQs)

- Which of the following is the limitation of IRR?
 - it ignores the time value of money
 - it does not consider the entire life of the project
 - it does not consider the size and amount of project
 - it considers profits and ignores cash flows

Test your understanding answers

Example 1 – Taxation

Assumptions:

- Asset is purchased on the first day of year 1.
- Tax is payable 1 year in arrears.

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Working - Capital allowances

	WDV	Benefit
	100,000	
WDA Y1	(25,000) @ 33%	8,250 at T2
	75,000	
WDA Y2	(18,750) @ 33%	6,188 at T3
	56,250	
WDA Y3	(14,063) @ 33%	4,641 at T4
	42,187	
Proceeds	(20,000)	
	22,187	
BA Y4	(22,187) @ 33%	7,322 at T5
	Nil	

Net present value

	0	1	2	3	4	5
Revenue flows	-	30,000	40,000	50,000	40,000	-
Tax @ 33%			(9,900)	(13,200)	(16,500)	(13,200)
CA (Working)			8,250	6,188	4,641	7,322
Scrap					20,000	
Capital	(100,000)					
	(100,000)	30,000	38,350	42,988	48,141	(5,878)

NPV at 12% = Rs. 15,247.

Example 2 – Inflation

NPV in real terms

$$1.2 = (1+r)(1+0.1)$$

$$r = 9.1\%$$

$$AF \ 139.1\% = (1 - (1.0901)^3) / 0.0901 = 2.5268$$

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Time	Flow	DF @ 9.1%	NPV
0	(100,000)	1.000	(100,000)
13	50,000	2.5268	126340
NPV			26,340

NPV in money terms

Time	Flow	DF @ 20%	NPV
0	(100,000)	1.000	(100,000)
1	50,000 × 1.10	0.833	45,815
2	50,000 × 1.102	0.694	41,987
3	50,000 × 1.103	0.579	38,532
NPV			26,334

Note: Difference is due to rounding

Test your understanding 1 – Bilawal Ltd.

Tutorial notes: As different items are inflating at different rates the only realistic approach is to discount money cash flows at the nominal (money) discount rate. This is particularly true as taxation is involved and the amount of tax payable will be based upon a taxable profit figure that in turn is determined by items subject to various rates of inflation.

The general procedure will be as follows:

- Determine the corporation tax liability.
- Determine other relevant cash flows (in money terms).
- Discount these cash flows to present value at the nominal WACC.

a) Calculation of corporation tax liability

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	1	2	3	4	5
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
Sales (5% rise p.a.)	3,675	5,402	6,159	6,977	6,790
Materials (10% rise p.a.)	588	907	1,198	1,537	1,449
Labour (10% rise p.a.)	1,177	1,815	2,396	3,075	2,899
Overheads (5% rise p.a.)	52	110	116	122	128
Capital allowances	1,125	844	633	475	1,423
note 1,2					
Taxable	733	1,726	1,816	1,768	891
Tax (35%)	256	604	636	619	312

Notes:

1) Capital allowances

	Opening balance Rs. '000'	Capital allowance Rs. '000'
Year 1	4,500	1,125
Year 2	3,375	844
Year 3	2,531	633
Year 4	1,898	475
Year 5	1,423	1,423

This assumes that the first capital allowance is available in the first year and that the balancing allowance is taken in year 5. Note that capital allowances are based upon original cost of assets.

2) Depreciation is replaced by the capital allowance

Interest is not deducted in calculating the tax liability. The tax deductibility of interest will have been allowed for in the calculation of the weighted average cost of capital.

Discount relevant cash flows to present value

Year inflows	0	1	2	3	4	5	6
Sales	-	3,675	5,402	6,159	6,977	6,970	-
Outflows							
Materials	-	(588)	(907)	(1,198)	(1,537)	(1,449)	-
Labour	-	(1,177)	(1,815)	(2,396)	(3,075)	(2,899)	-
Overheads (note 3)	-	(52)	(110)	(116)	(122)	(128)	-
Fixed assets	(4,500)						
Working	(300)	(120)	(131)	(144)	(156)	851	

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capital (note 4)							
Taxation		(256)	(604)	(636)	(619)	(312)	
(note 5)							
Net cash	(4,800)	1,738	2,183	1,701	1,451	2,546	(312)
Flows							
Discount		0.870	0.756	0.656	0.572	0.497	0.432
factors at 15%							
Present	(4,800)	1,512	1,650	1,119	830	1,265	(135)
values							

NPV = Rs. 1,441,000 and on this basis the project should be accepted.

- 3) Once again interest is not included. The cost of interest is taken care of in the discounting process. If we were to charge interest against cash flow and include it in the discounting process we would be double counting. This is a very common examination trap and should be avoided.
- 4) We require the incremental investment in working capital each year. Adjusting for inflation, this is:

Year 0		300
Year 1	$(400 \times 1.05) - 300 =$	120
Year 2	$(500 \times 1.052) - (400 \times 1.05) =$	131
Year 3	$(600 \times 1.053) - (500 \times 1.052) =$	144
Year 4	$(700 \times 1.054) - (600 \times 1.053) =$	156
Year 5	Refund of working capital assumed $(700 \times 1.055) =$	851
Net		0

5) Tax payment lagged by one year

- b) **Tutorial note:** This is a roundabout way of asking what is the IRR of the project. By normal trial and error procedures this may be determined as follows:

Year	Cash flow Rs. '000'	20% discount	PV Rs. '000'	27% discount	PV Rs. '000'
0	(4,800)		(4,800)		(4,800)
1	1,738	0.833	1,448	0.787	1,368
2	2,183	0.694	1,515	0.620	1,353
3	1,701	0.579	985	0.488	830
4	1,451	0.482	699	0.384	557
5	2,546	0.402	1,023	0.303	771
6	(312)	0.335	(105)	0.238	(74)

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5

The discount rate would have to change from 15% to approximately 27% to produce a net present value of zero. This is a change of approximately 80%.

Answers to MCQs:

- 1) c

6

Investment Appraisal- Further Techniques

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Investment Appraisal-Further Techniques

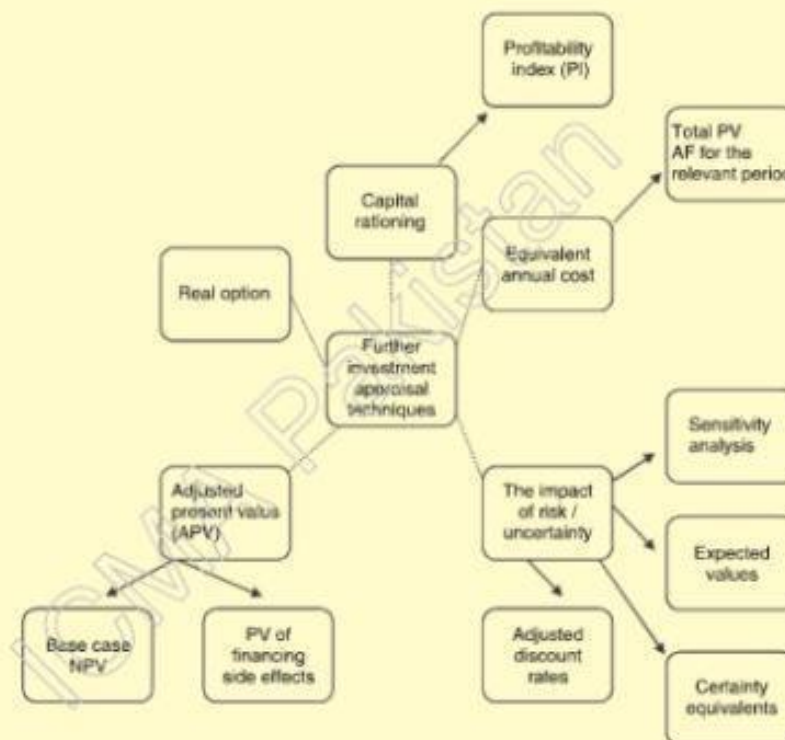
Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Understand risk and uncertainty
- Comprehend capital rationing
- Apprehend sensitivity analysis and changes in variables
- Compute equivalent annual cost
- Explicate real options
- Elucidate adjusted present value, investments and projects
- Learn feasibility study
- Know about project control and investment performance
- Learn about post-completion audits

Investment Appraisal-Further Techniques

1 Overview of Chapter



The previous Chapter introduced various investment appraisal techniques, most notably the Net Present Value (NPV) method.

This Chapter introduces some further considerations, many of which incorporate the use of NPV in different situations.

The main topics covered are:

Capital rationing

This considers how the investment decision is affected by a restriction in the amount of capital available. The key consideration is which project to choose if we have a choice of positive NPV projects available but insufficient finance to undertake them all.

Investment Appraisal-Further Techniques

The impact of risk

All the investment appraisal techniques in the previous chapter were based on estimating future cash flows and / or profits. We need to also consider the potential for inaccuracies in our estimates.

Sensitivity analysis is often performed to assess the likely impact on a project of certain estimates being inaccurate.

We shall also see how to use probabilities and certainty equivalents to address potential uncertainties in cash flows, and how to derive risk adjusted discount rates if a new project is deemed to have a different risk from an entity's existing operations.

Equivalent annual costs

So far we have only considered one-off investment projects. If we need to appraise an ongoing project where a machine needs to be replaced regularly, equivalent annual costs (based on NPV analysis) are useful.

Real options theory

The NPV method takes no account of any flexible options associated with an investment project. These 'real options' can make a project significantly more attractive.

Adjusted Present Value (APV)

In the earlier Chapter on 'Cost of Capital' we noted that a significant change in capital structure means that the existing cost of capital is inappropriate to use as a discount rate for project appraisal. The APV method is often proposed as an alternative investment appraisal method in these circumstances.

Investment appraisal in specific contexts (e.g., IT investments, and investment in design)

In the modern business environment, the traditional investment appraisal methods need to be adapted when faced with projects such as IT investments where some of the benefits may be difficult to quantify.

2 Capital Rationing

Introduction

This is a situation where the funds available for new projects are limited to an

Investment Appraisal-Further Techniques

amount which prevents acceptance of all new projects with a positive NPV.

Capital rationing needs to be recognized as a constraint during the capital budgeting cycle.

The methods below show how to decide between projects in different capital rationing situations.

Definition of capital rationing

Capital rationing definition

A restriction on any entity's ability to invest capital funds, caused by an internal budget ceiling being imposed on such expenditure by the management (soft capital rationing), or by external limitations being applied to the entity, as when additional borrowed funds cannot be obtained (hard capital rationing).

More details on the capital rationing problem

If capital is not rationed there is no problem; all projects which meet the cut-off criteria are accepted.

When capital is rationed the ranking of projects becomes important. The various methods of investment appraisal – payback, IRR, NPV, etc., often give conflicting rankings of investment priorities.

Methods of determining how the investment decision should be made will depend on the type of capital rationing.

Single-period capital rationing is a situation where capital is rationed at present (year 0), but will be freely available in the future.

Multi-period capital rationing is a situation where capital is rationed over a number of periods.

Capital budgeting and control

The capital budgeting cycle

A common feature of industrial activity is the need to commit funds by purchasing land, buildings, machinery, etc., in anticipation of being able to earn, in the future, and income greater than the funds committed. This indicates the need for an assessment of the size of the outflows and inflows of funds the life of the investment, the degree of risk attached (greater risk funds, the life of the investment, the degree

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of risk attached (greater risk being justified perhaps by greater returns) and the cost of obtaining funds.

Basic stages in the capital budgeting cycle may be identified as follows:

- Needs for expenditure are forecast.
- Projects to meet those needs are distinguished.
- Alternatives are appraised.
- Best alternatives are selected and approved.
- Expenditure is made and monitored.
- Deviations from estimates are examined as part of a Post Completion Audit (PCA)

Types of capital project

Reasons for capital expenditure vary widely. Projects may be classified into the following categories.

- Maintenance – replacement of worn-out or obsolete assets, safety and security etc.,
- Profitability – cost savings, quality improvement, productivity, relocation, etc.,
- Expansion – new products, new outlets, research and development, etc.,
- Indirect – office buildings, welfare facilities, etc.,

A particular investment project, of course, could combine any number or all of the above classifications.

Capital expenditure forecast

In preparing budgets, it is necessary to consider how much money can or must be allocated to capital expenditure. Capital development schemes may be started because a surplus of cash resources is revealed by the long-term plan, but usually management decided on a capital development scheme and then seeks the means to finance it. Initially, the budget will be an expression of management's intention to allocate funds for certain board purposes. In the budget period, money will be required as follows:

- For previously authorized existing projects;
- For new projects, full details of which may not yet be available.

The forecasts will indicate whether sufficient funds are available, and perhaps when additional funds will need to be obtained. It is advisable, therefore, for managers to

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submit long-term capital expenditure forecasts, say for two to five years ahead. Consequently, the possibility of obsolescence (and the direction of the future development of the firm) must be borne in mind.

Capital expenditure committee

A capital expenditure committee may be formed, either as a sub-committee of the budget committee or as a separate meeting of the entire budget committee. The responsibilities of the capital expenditure committee are to:

- Co-ordinate capital expenditure policy;
- Appraise and authorize capital expenditure on specific projects;
- Review actual expenditure on capital projects against the budget.

Capital expenditure decision

Capital expenditure requiring approval by the committee must be formulated by the managers. The amount of detail should be stipulated by the committee and would generally cover the following:

- Outline of the project, including the budget classification and how it is linked, if at all, with other projects.
- Reason for the expenditure, if a new project and the departments affected. An assessment of intangible benefits or disadvantages.
- The amount of capital expenditure required (fixed and working capital), including a breakdown by budget periods, and an estimate of any internal work required.
- A complete statement of incremental costs and revenue arising from the project, and the budget periods affected. An assessment of the effect of taxation ought to be made.
- Estimated life of the project.
- Assessment of risks to which the project is sensitive – political, economic, competitors, natural hazards, etc.,
- Projects that are feasible alternatives, and comparative data.
- Effect of postponement or rejection of project.

Major projects would probably be subjected to a comprehensive financial evaluation, as part of the committee's consideration. Less important projects could be submitted, accompanied by an economic justification.

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Types of capital rationing

Hard rationing

This refers to an external constraint on the amount of capital available. It may arise because of:

- problems raising bank loans due to tight lending criteria being applied;
- problems raising equity or bond finance in a depressed stock market;
- prohibitively high costs of raising small amounts of finance.

Soft rationing

This is where the constraint is internally imposed. It may be because:

- management are reluctant to issue share capital because it might dilute the earnings per share, or lead to an unwanted change in the ownership structure of the business,
- management do not want to raise additional debt finance because of concerns about the level of gearing, or the potential problem of meeting higher interest payments,
- the capital expenditure budget may place a limit on the level of spending permitted (perhaps for a subsidiary or a division).

Single period capital rationing

- If projects are mutually exclusive, pick the project with the largest positive NPV.
- If projects are divisible, rank projects via the profitability index.

The profitability index is calculated as:

$$\text{NPV of project} / \text{Capital investment}$$

- If projects are indivisible, rank projects and combinations of projects via total NPV. The optimal solution is found by using trial and error i.e., identify the possible combinations of investments and pick the one with the highest NPV.

Justification for the use of profitability index

The NPV technique is the academic recommendation and it is theoretically sound.

However, its use in practice implies that the decision – maker must judge a project by an absolute number and while it is easy to give the 'rule' any project generating

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positive NPV is acceptable a decision maker will be interested not only in the final NPV 'payoff' but also in the size of the initial investment and the length of time before the project 'matures'.

Use of the NPV rule becomes problematic if capital is rationed, because not all projects can then be accepted.

In this situation, it becomes necessary to rank projects according to their 'earning power' placing the project which generates the maximum NPV per pound invested at the top of the list.

Conventionally, the profitability index is calculated in order to rank projects.

More details on terminology

Mutually exclusive, divisible and indivisible projects

The key to a single period capital rationing problem is to identify first whether projects are mutually exclusive, divisible or indivisible.

If projects are mutually exclusive, only one of the projects can be undertaken. In this case the decision rule is clear cut choose the available project with the highest positive NPV.

A divisible project is one where a fraction of the project can be undertaken and the same fraction of total NPV generated.

For example, if an entity is considering buying 10 machines to undertake a manufacturing project, it may be possible to only buy five of the machines and still generate half of the NPV.

An indivisible project is one which has to be done in total or not at all.

For example, a company buying a single machine to undertake a manufacturing project will not be able to invest in a fraction of the project.

Implications for a capital rationing scenario

When faced with a limiting factor (capital in this case), management should follow the decision rule of maximizing the return per unit of the limiting factor. This is called the Profitability Index (PI).

Hence, if possible, projects should always be ranked using PIs.

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However, whereas the PI approach works in a situation where projects are divisible, it is not appropriate when projects are indivisible or mutually exclusive.

This is because:

- When projects are mutually exclusive, the decision should be to undertake the project with the highest absolute return (i.e., NPV) rather than considering the relative measure of PI.
- When projects are indivisible, there will often be some unused capital left over when allocating finance to projects, because finance can only be allocated to full projects. It may be that a better absolute return (NPV) can be generated by investing in two projects with low PIs, rather than investing in the project with the best PI and then having surplus funds left over which can not be invested in any other project.

Multiple period rationing

To rank projects, linear programming techniques must be used. The examiner has stated that candidates will not be expected to solve a linear programming problem in the exam.

Example 1 – Capital rationing

Bahar Ltd. has Rs. 60,000 available to invest at time zero.

Data is available about the following four projects:

	A	B	C	D
Initial cost	30,000	20,000	40,000	10,000
PV of inflows	52,000	25,000	56,000	18,000

Required:

Determine the optimum investment plan if:

- projects are divisible;
- projects are not divisible.

Assume that any surplus funds cannot be invested elsewhere.

3 Dealing with Risk and Uncertainty

Many projects are subject to risk or uncertainty and it is important that this can be evaluated and incorporated into the evaluation process.

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You can usually expect to see the term 'risk' used in examination questions in the context of the possibility of an outcome that affects us in a negative manner, whereas the term 'uncertainty' would refer to the possibility of both positive and negative outcomes or inputs.

This follows common use of the term in practice.

For example, the possibility of a travel delay would normally be referred to as a 'risk' and lack of certainty over the actual departure date as 'uncertainty', whereas the possibility of a higher revenue than expected would be likely to be referred to as an 'opportunity' rather than as a 'risk'.

We set out below brief descriptions of procedures that can be used to help evaluate projects which are subject to risk.

Sensitivity analysis

Definition of sensitivity analysis

A modeling and risk assessment procedure in which changes are made to significant variables in order to determine the effect of these changes on the planned outcome. Particular attention is, thereafter, paid to variables identified as being of special significance.

When undertaking an NPV analysis of a project, the accuracy of the NPV depends on the accuracy of the input factors in the calculation (e.g., estimates of cost of capital, sales, expenses, tax rates).

After computing the NPV of a project, sensitivity analysis can be used:

- to identify which of the input variables of the project could have the most adverse impact on the NPV of the project if they were to change.
- to assess the impact on the NPV of a certain change in a particular input factor.
- to consider by how much each input variable could change before the NPV of the project became zero (and hence the project became unacceptable).

Interpretation of sensitivity analysis results

A company has calculated the NPV of a project, and has subsequently identified the following sensitivities:

Sales can fall by 10% or costs may rise by 20%, or the discount rate can increase by 1% before the NPV becomes zero.

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In this case we would conclude that the project NPV is very sensitive to changes in discount rate (small percentage sensitivity) but not very sensitive to changes in costs (if costs were to change, unless they changed by more than 20% the NPV would still be positive).

Limitations of sensitivity analysis

The major problem is that we normally consider the impact of only one variable at a time. Management may be more interested in the risk of some key factors changing at the same time. For example, if the selling price changes, there is likely to be an impact on sales volume too. Sensitivity analysis can only deal with one of these variables changing at a time.

Also, sensitivity analysis does not include any assessment of the probability of certain variables changing.

It is, therefore, useful as an aid to decision making, rather than a decision rule in itself.

Two basic approaches to sensitivity analysis

- 1) An analysis can be made of all the key input factors to ascertain by how much each factor must change before the NPV reaches zero, the indifference point.
- 2) Alternatively specific changes can be calculated, such as the sales decreasing by 5%, in order to determine the effect on NPV.

Both approaches will be shown in the illustration below.

Illustration 1 – Sensitivity

A project has an NPV of Rs. 1 m. The PV of material costs (included in the NPV calculation) are Rs. 5 m.

$$\text{Sensitivity} = 1 \text{ m} / 5 \text{ m} = 0.2$$

i.e., the material costs could rise by up to 20% and the project remains viable. A rise of greater than 20% will produce a negative NPV and the project would not be worthwhile.

Alternatively, sensitivity analysis could be used to assess the impact of a given percentage change in a variable.

To continue with the above example, if the material costs were to change by 10%

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(from a PV of Rs. 5 m to Rs. 5.5 m – a change of Rs. 0.5 m) the NPV would reduce by Rs. 0.5 m from Rs. 1 m to Rs. 0.5 m (a fall of 50%).

More detailed example of sensitivity analysis

AVI Co. is evaluating a new investment project as follows:

	Rs. '000'				
	T ₀	T ₁	T ₂	T ₃	T ₄
Sales		1,000	1,000	1,000	1,000
Costs		600	600	600	600
		400	400	400	400
Tax (30%)		(120)	(120)	(120)	(120)
Net		280	280	280	280
CapEx	(600)				
Tax relief on depreciation (30% x 600/4)		45	45	45	45
Net cash flow	(600)	325	325	325	325
DF @ 10%	1	0.909	0.826	0.751	0.683

$$\text{NPV} = \text{Rs. } 430,000$$

Sensitivity to sales (i.e., by how much could sales fall before NPV becomes zero)

$$= (\text{NPV} / \text{PV of cash flows affected by the estimate of sales}) \times 100\%$$

$$= [430 / (1,000 \times (1 - 0.30) \times 3.170)] \times 100\%$$

$$= 19.4\%$$

i.e., if sales were to fall by 19.4% (to Rs. 806,000 per annum) then the NPV would be zero.

Sensitivity to tax rate

$$= (\text{NPV} / \text{PV of cash flows affected by the estimate of tax rate}) \times 100\%$$

$$= [430 / ((46 - 120) \times 3.170)] \times 100\%$$

$$= 181\%$$

i.e., if the tax rate were to rise by 181% (from 30% to $30 \times 2.82 = 84.6\%$) then the NPV would fall to zero.

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Sensitivity to discount rate

This can not be calculated in the same way. Instead the IRR of the project should be calculated and the difference between the existing cost of capital and the IRR then indicated the sensitivity to the discount rate.

Here, the IRR is approximately 40%.

Interpretation of sensitivity calculations

AVI Co. would initially be inclined to accept the project due to its positive NPV.

However, before making a final decision, the sensitivities would be considered. Any factors with small percentage sensitivities will have to be carefully assessed, because if the estimates of these factors turn out to be incorrect, the result may be a negative NPV.

In this example, the project NPV is not very sensitive to changes in the tax rate or the discount rate. The likelihood of sales falling by 19.4% would need to be assessed before making a final decision, but assuming that management decide that this is not a major risk, the project would be undertaken.

Probabilities

If forecasts are uncertain and probabilities can be attached to the possible outcomes, expected values (EV) can be calculated.

$EV = (\text{outcome 1} \times \text{probability 1}) + (\text{outcome 2} \times \text{probability 2}) \text{ etc.}$

Examples of probabilities

Simple example

GH Co. is trying to estimate sales in the coming year.

It has been predicted that there is a 30% chance of sales being Rs. 20,000, a 50% chance of sales being Rs. 30,000 and a 20% chance of sales being Rs. 40,000.

Required:

Calculate the expected sales in the coming year.

Solution:

Expected sales = $(0.30 \times 20,000) + (0.50 \times 30,000) + (0.20 \times 40,000) = \text{Rs. } 29,000$

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More complex example (dependent probabilities)

Following on from the example above, assume that the sales in year 2 are dependent on the level of sales achieved in the first year, as follows:

Sales in year 1 (as above)	Probability (as above)	sales in year 2
Rs. 20,000	30%	Could be Rs. 20,000 (probability 70%) or Rs. 10,000 (probability 30%)
Rs. 30,000	50%	Will also be Rs. 30,000
Rs. 40,000	20%	Could be Rs. 40,000 (probability 60%) or Rs. 50,000 (probability 40%)

Required:

Calculate the expected sales in year 2.

Solution:

Expected sales in year 2
 $= 0.30 \times [(0.70 \times 20,000) + (0.30 \times 10,000)]$
 $+ 0.50 \times 30,000$
 $+ 0.20 \times [(0.60 \times 40,000) + (0.40 \times 50,000)]$
 $= \text{Rs. } 28,900$

Decision trees

In appraisal situations where uncertainty can apply to more than one variable, and values of the variables can be interdependent, many different outcomes are possible. The decision tree is a useful tool for reviewing a multiplicity of choices and outcomes.

Imagine the trunk of the tree as representing a project to be appraised, perhaps a new product to be added to a range, then the first branches (of which there may be two, three or more) may represent alternative probabilities are assigned. Each revenue volume branch then creates secondary branches to represent contributions, to which again probabilities are assigned, and finally these branches create tertiary branches with allied probabilities to represent fixed costs.

The probabilities of each branch sequence are then multiplied and the joint probabilities thus obtained are applied in turn to each sequential set of values to give a series of pay-offs or outcomes as shown below:

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Sales ('000 units)	Contribution Rs.	Fixed Costs Rs. '000'	Joint probabilities	Pay-offs Rs.
100 0.4	7	400 (0.4)	0.08	24,000
	0.5	500 (0.6)	0.12	24,000
	5	400 (0.4)	0.08	8,000
	0.5	500 (0.6)	0.12	NIL
80 0.6	7	400 (0.4)	0.12	19,200
	0.5	500 (0.6)	0.12	10,800
	5	400 (0.4)	0.12	NIL
	0.5	500 (0.6)	0.18	(18,000)
			<u>1.00</u>	<u>68,000</u>

Decision tree

As can be seen from the diagram, we arrive at eight joint probabilities leading to eight outcomes arising from 2 x 2 x 2 branches; representing 2 sales volumes x 2 contributions x 2 fixed cost values.

By relating the joint probabilities to the value figures, we obtain the eight pay-offs which are added to give an overall predicted net contribution of Rs. 68,000.

The pay-offs also show a range of net contributions from Rs. 24,000 positive to Rs. 18,000 negative, and by adding the joint probabilities there is a 58% chance of positive outcome, 24% of a breakeven and 18% of a negative result.

Certainty equivalents

The cash flows of the project are calculated as per normal but then adjusted downwards by a certainty equivalent factor. This in effect decreases the cash flow. The cash flows are then discounted at a risk free rate. In practice the major problem is that the use of certainty equivalents is subjective.

Definition of certainty equivalents

An approach to dealing with risk in a capital budgeting context. It involves expressing risky future cash flows in term of the certain cash flow which would be considered, by the decision maker, as their equivalent, that is the decision maker would be indifferent between the risky amount and the (lower) riskless amount considered to be its equivalent.

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Illustration 2 – Certainty equivalents

Year	Cash flow	Certainty equivalent	RF DF, 6%	PV
0	(1,000)	1	1	(1,000)
1	900	0.95	0.943	806
2	750	0.9	0.89	601

NPV = 407

More details on certainty equivalents

The certainty equivalents method adjusts for risk by incorporating the decision maker's risk attitude into the investment decision by converting the expected cash flows of the project into equivalent riskless amounts.

The danger of using certainty equivalents lies in the high level of subjective judgment required from the decision-maker, while it could also be argued that risk-averse management might be better off using a high cut-off rate.

Nevertheless, certainty equivalents do represent a useful tool in the investment appraisal armory, especially in assessing cases where an apparently small change in a key variable can interact with others to create significant falls in inflows, with a possible cumulative effect over the life of the project.

Adjusted discount rate**Discount rate considerations**

In all the examples considered so far in this section on risk, a constant discount rate has been used, on the assumption that the cost of capital will remain the same over the life of the project. As the factors which influence the cost of capital, such as interest rates and inflation, can change considerably over a short period of time an organization may wish to use different rates over the life of the project. Net present value and discounted present rates over the life of the project. Net present value and discounted present value allow this, but IRR and ARR present a uniform rate of return. Using NPV for example, a different discount factor can be used for each year if so desired.

Perhaps, one of the major problems in using a discounted cash flow method is deciding on the correct discount rate to use.

It is difficult enough in year 1 but deciding on the rate for, say, year 4 may be very difficult because of changes in the economy, etc., If a very low rate is chosen almost

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all projects will be accepted, whereas if a very high discount rate is chosen very few projects will be accepted.

Looking back over the year, it would appear that the majority of managers have probably used too high a discount rate and have, as a consequence, not invested in projects that would have helped their organization to grow in relation to their competitors. There are no prizes for being too conservative; it is just as much a failing as being too optimistic.

If there is any doubt over the correct discount rate to be used, sensitivity analysis can help.

A premium to the normal discount rate may be added to evaluate projects that are considered more risky.

Then, more marginal projects would be less likely to have a positive NPV.

More details on adjusted discount rates

A useful scheme is to have a risk category schedule providing different risk grading. For example, a "normal" project could be discounted at the usual cost of capital, with more risky projects being discounted at perhaps 2% more than this.

The difficulty with risk-adjusted discount rates lies mainly in the need for skilful management judgment as to the risk category, even though considerable product and market research may have undertaken.

The Capital Asset Pricing Model (CAPM) is often used to calculate risk adjusted discount rates, as shown in the earlier Chapter on "Capital Structure".

4 Equivalent Annual Cost

This is sometimes useful for comparing projects if they have different lives when the assets of the project need replacing periodically, by new assets.

Definition

The Equivalent Annual Cost (EAC) is the equivalent annuity which has the same present value as the project if paid for the same number of years as the project's life.

Formula

$$\text{EAC} = \frac{\text{Total present value}}{\text{Annuity factor for life of asset}}$$

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Further details on the use of annual equivalent cost

When the present value (of a capital project) is expressed as an annual amount, this is called annual equivalent cost and is used to compare projects having different life cycles.

Calculating equivalent annual costs is basically a method of discounting especially for asset replacement decisions, but is also has value when comparing the sensitivity of variables where projects have unequal lives.

Unequal lives

When two or more mutually exclusive investments with unequal lives are being compared, consideration must be given to the time period over which a comparison of the investments is to be made.

Before making a comparison between mutually exclusive projects with differing lives, and explicit decision must be taken as to whether it is necessary to equalize the lives.

A choice should be made on the basis of NPV, whether equalization is required or not, although the process of equalization may alter the ranking of the projects under consideration.

Asset replacement cycles

The concept of equivalent annual costs can be used in determining the optimum replacement cycle for an asset.

This decision involves how long to continue operating the existing asset before it is replaced with an identical one. As the asset gets older, it may become less deficient, its operating costs may increase and the resale value will reduce.

Illustration 3 – Equivalent annual cost

Assume that the NPV of cash outflows for asset replacement project A is Rs. 64,300, with discounting at 12% and an asset life of 4 years, while for project B, the NPV of outflows is Rs. 79,355, also after discounting at 12% but with an asset life of 6 years.

Annual equivalent costs are:

Project A: $64,300 / 3.037$ (AF for 4 years at 12%) = 21,172

Project B: $79,355 / 4.111$ (AF for 6 years at 12%) = 19,303

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So on an annualised basis, project B has the lower cost and would be preferred even though on a non-annualised basis project A would have seemed more advantageous.

Note that the cash flows and discount rates must always be in real terms in order to deal with inflation accurately.

Detailed example of the use of equivalent annual cost

Lita Co. operates a delivery vehicle, which cost Rs. 20,000 and has a useful life of 3 years. Lita Co. has a cost of capital of 5%. The details of the vehicle's cash operating costs for each year and the resale value at the end of each year are as follows:

	Year 1 Rs.	Year 2 Rs.	Year 3 Rs.
Cash operating costs	9,000	10,000	11,900
End of year resale value	14,000	11,500	8,400

Required:

Determine how frequently the vehicle should be replaced.

Solution

The first step is to calculate the present value of the total costs incurred if the vehicle is kept for 1, 2 or 3 years, respectively.

Keep for 1 year

$$NPV = -20,000 + (5,000 \times 0.952) = -15,240$$

Keep for 2 years

$$NPV = -20,000 - (9,000 \times 0.952) + (1,000 \times 0.907) = -27,661$$

Keep for 3 years

$$NPV = -20,000 - (9,000 \times 0.952) - (10,500 \times 0.907) - (3,500 \times 0.864) = -14,116$$

These present value figures are not comparable because they relate to different time periods.

To render them comparable they must be converted to average annual figures, or equivalent annual costs, by dividing by the cumulative discount factors:

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Keep for 1 year

$$EAC = 15,240 / 0.952 = 16,008$$

Keep for 2 years

$$EAC = 27,661 / 1.859 = 14,880$$

Keep for 3 years

$$EAC = 41,116 / 2.723 = 15,100$$

The lowest equivalent annual cost occurs if the vehicle is kept for 2 years. Therefore, the optimum replacement cycle is to replace the vehicle every 2 years.

5

Real Options

One criticism of the conventional NPV approach to investment appraisal is that insufficient attention is given to the options aspect of making investment decisions. Any project can be viewed as an opportunity which can either be taken immediately or delayed. Traditional approaches to investment appraisal tend to treat investments either as reversible or as an irreversible one-off decision which must be taken at a single point in time, with the opportunity otherwise being lost. While this may typify some investment decisions, it certainly does not apply to them all.

In many situations it may be possible to delay and gain further valuable information, which could be influential in the viability or otherwise of the investment decision. In such cases the opportunity to invest can be thought of as being very similar to a call option. It gives a right, but not an obligation, to a stream of cash flows associated with the project at some future date. When a company either decides to go ahead or completely rejects an investment proposal it effectively brings this option to an end.

While the option is open it has a value, and recent research would suggest that the NPV rule should be modified to take account of the value of this option. In effect this would mean that, in order to proceed with a project, the value of the NPV would not only have to be positive but must also be sufficient to cover the value of the option. When a proposed capital investment project is being appraised, there are likely to be several options inherent in the project:

- the option to make followon investments if the project is a success;
- the option to abandon the project part way through its life, if it appears not to be a success;
- the option to wait before investing;

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- the strategic option the project may open up new markets or follow up products.

Such options are called 'real options' because they are options on real physical assets, to distinguish them from financial options which are options on financial assets.

Detailed explanation of real option

Introduction

Option – pricing theory is not part of the syllabus, but it is useful to consider the option-like features found in investment decisions, when a project is slipping behind forecast, managers can take action in an attempt to achieve the original NPV target. In other words, they can create options, or take action to mitigate losses or exploit new opportunities presented by capital investments.

Terminology – calls and put options

Before discussing investment decisions as options on future cash flows, it may be useful to identify the meaning of call and put option:

A call option is an option to buy a specified asset at a specified exercise price on or before a specified exercise date:

A put option is an option to sell a specified asset at a specified exercise price on or before a specified exercise date.

Application to investment appraisal

The NPV approach to investment appraisal makes two assumptions that may be questioned:

- 1) A project is reversible;
- 2) A project cannot be delayed.

The assumption that a project is reversible implies that if the project does not work out, the original investment can be recovered and applied to a new project. This is flawed, as in most significant projects the original investment will either be wholly or partly irreversible.

In some instances, it may not be possible to delay an investment decision, but in the majority of cases of delay is possible – although there may be costs associated with delay. If a project is irreversible to some degree, the ability to delay the investment

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decision in order to obtain new information is valuable. The additional costs associated with delay should be assessed against the benefits associated with that new information.

Investment projects can be related to financial call options, in that the project provided the right, but not the obligation, to purchase an asset (or commit to a series of cash flows) in the future. When an irreversible investment decision is made, the call option becomes exercised. The opportunity to delay an investment and keep the option alive has a value, which is not normally reflected in an NPV calculation.

The real options approach suggests that decisions that increase flexibility by creating and preserving options should be pursued. Decisions that reduce flexibility by exercising options and irreversibly committing resources should be valued at a lower figure than conventional NPV would suggest.

Categorization of real options

In the context of investment decision there are three options to be considered:

- 1) The abandonment option (financial put option).
- 2) Timing options (financial call option) – sometimes referred to as 'wait and see options'.
- 3) Strategic investment options (financial call option) – sometimes referred to as 'follow – on options'.

Different types of real options

The abandonment option

Major investment decisions involve heavy capital commitments and are largely irreversible: once the initial capital expenditure is incurred, management can not turn the clock back and act differently.

Because the management is committing large sums of money in pursuit of higher, but uncertain, payoffs, the ability to abandon, or 'bail out', should things look grim, can be valuable.

Timing options (or "wait and see options")

Management may view an investment as a 'now or never' opportunity, arguing that in highly competitive markets there is no scope for delay.

In effect, this amounts to viewing the decision as a call option which is about to expire. If a positive NPV is expected, the option will be exercised, otherwise the

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option lapses and no investment is made. However, delaying the decision by a year to gain valuable new information is likely to be a more valuable option.

This helps us to understand why entities sometimes do not take up apparently wealth-creating opportunities: the option to wait and gather new information is sufficiently valuable to warrant such delay.

Strategic investment options (or "follow-on options")

Certain investment decisions give rise to follow-on opportunities which are wealth-creating.

For example, new technology investment, involving large-scale research and development, is particularly difficult to evaluate, and many such projects would show negative NPVs as the uncertainty involved would demand the use of high discount rates. However, they offer the potential to access a large market in the future.

The negative NPV can be viewed as the option cost, or premium on the follow-on option. The value of the option is the value of the flexibility associated with the project.

Simple real options example

Cardiff Components Co. is considering building a new plant to produce components for the nuclear before industry.

Proposal A is to build a custom-designed plant using the latest technology, but applicable only to nuclear defence contracts.

A less profitable scheme, B, is to build a plant using standard machine tools, giving greater flexibility in application.

The outcome of general election to be held one year, hence, has a major impact on the decision. If the current government is returned to office, their commitment to nuclear defense is likely to give rise to new orders, making proposal A the better choice. If, however, the current opposition party is elected, its commitment to run down the nuclear defence industry would make proposal B the better course of action.

Proposal B has, in effect, a put option attached to it, giving the flexibility to abandon the proposed operation in favor of some other activity.

Investment Appraisal-Further Techniques

Illustration - 4 Real options

Initial scenario

A project, P, has expected cash flows as shown below:

Year 0	Year 1		Year 2		Year 3	
Rs.	p	Rs.	p	Rs.	p	Rs.
(3,500)	1/3	3,000	1/3	3,000	1/3	3,000
	1/3	2,000	1/3	2,000	1/3	2,000
	1/3	1,000	1/3	1,000	1/3	1,000
Expected values		2,000		2,000		2,000

Note that p = probability of each outcome.

The project's NPV at a discount rate of 10%, based on the expected value of its cash flows is:

Year	Cash flow (Rs.)	DF 10%	PV (Rs.)
0	(3,500)	1	(3,500)
1	2,000	0.909	1,818
2	2,000	0.826	1,653
3	2,000	0.751	1,503
			<u>1,474</u>

More details regarding the project

The initial investment of Rs. 3,500 in project P represents the purchases of a customized machine, the price of which is known with certainty.

Because it is a customized machines its resale value is low' it can only be sold for Rs. 2,000 up to 1 year after purchase. Thereafter, its resale value will be zero.

The option to abandon the project immediately

Once the machine is bought, the expected value of abandoning the project immediately would be Rs. 2,000 (1 x Rs. 2,000).

This must be compared with the expected value of continuing with the project, which is Rs. 4,974 (Rs. 1,818 + Rs. 1,653 + Rs. 1,503).

In this case, the expected benefits of continuing with the project far outweigh the returns from abandoning it immediately.

Investment Appraisal-Further Techniques

The option to abandon the project in 1 year's time

Once the machine has been in operation for a year, the first year's cash flows will be known with certainty.

Assume that in this scenario, the year 1 outcome determines the years 2 and 3 outcomes with certainty (i.e., if the outcome is Rs. 1,000 in year 1, it will also be Rs. 1,000 in year 2 and year 3, etc.).

Note: If this were not to be case, a decision tree could be used to identify all the potential combinations of outcomes.

Given that machine can be sold for Rs. 2,000 at this point, the three possible outcomes if the project is abandoned in 1 year's time are:

Year	Cash flow (Rs.)	DF 10%	PV (Rs.)
New 0	2,000	1	2,000
1	(1,000)	0.909	(909)
2	(1,000)	0.826	(826)
			265

Year	Cash flow (Rs.)	DF 10%	PV (Rs.)
New 0	2,000	1	2,000
1	(2,000)	0.909	(1,818)
2	(2,000)	0.826	(1,652)
			(1,470)

Year	Cash flow (Rs.)	DF 10%	PV (Rs.)
1	2,000	1	2,000
2	(3,000)	0.909	(2,727)
	(3,000)	0.826	(2,478)
			(3,205)

Note that in each case it has been assumed that the project has been abandoned, and therefore all the future cash flows have been foregone.

It can be seen that if the future cash flows are expected to be Rs. 2,000 per annum or Rs. 3,000 per annum, the project should not be abandoned in 1 year's time. Since the value of the future cash flows foregone would be higher than the disposal value of Rs. 2,000.

However, if the future cash flows are expected to be Rs. 1,000, the project should be abandoned since the abandonment option has a positive NPV.

Investment Appraisal-Further Techniques

Assessing the value of the abandonment option

The fact that the project can be abandoned in 1 year's time if cash flows turn out to be at the low end of expectations (Rs. 1,000 per annum) gives an additional value to the overall project.

The value of this can be incorporated into the NPV of the project by recomputing the NPV based on the cash flows if the abandonment takes place, as follows:

Year 0	Year 1		Year 2		Year 3	
Rs.	p	Rs.	p	Rs.	p	Rs.
(3,500)	1/3	3,000	1/3	3,000	1/3	3,000
	1/3	2,000	1/3	2,000	1/3	2,000
	1/3	1,000+2,000	1/3	NIL	1/3	NIL
Expected values		2,667		21,667		1,667

The NPV of the project now becomes:

Year	Cash flow (Rs.)	DF 10%	PV (Rs.)
0	(3,500)	1	(3,500)
1	2,667	0.909	2,424
2	1,667	0.826	1,377
3	1,667	0.751	1,252
			1,553

i.e., the option to abandon the project in 1 year's time increases the NPV of the project by Rs. 79 (Rs. 1,553 - Rs. 1,474).

Valuing real options

Option valuation

Calculations on option pricing are not part of the syllabus, but it is worth noting that the Black - Scholes option pricing model can be used to value real options if the following five factors can be identified and entered into the model:

- 1) Present value of the future cash flows from the investment;
- 2) Initial outlay on the investment;
- 3) Time unit the investment opportunity disappears, that is the length of time than an investment decision can be deferred without losing the opportunity to invest;
- 4) Variability of project returns;
- 5) Risk - free rate of interest.

In practice, however, the time to expiry and the variability of project returns may be difficult to measure.

Investment Appraisal-Further Techniques

Pricing an option using values for these factors will arguably provide more information about the value of a project than using NPV. However, quantifying these factors objectively is not straightforward.

6 Adjusted Present Value (APV)

Introduction

The risk adjusted WACC can be used as an NPV discount rate when capital structure is being maintained, but project risk is different from that of the company. When capital structure is not being maintained (i.e., the project will be financed in such a way as to change the company's capital structure), then no form of NPV analysis, neither:

- NPV plus WACC; nor
- NPV plus risk adjusted WACC.

is suitable. Instead we have to use Adjusted Present Value (APV).

APV consists of two different decisions:

APV = Investment decision + financing decision

(i.e., Value of a geared project = value of an all equity financed project + PV of financing side effects)

Three stage approach

APV takes a three stage approach:

- Stage One: the project is evaluated as if it is all equity financed.
- Stage Two: the project's 'finance package' is evaluated
- Stage Three: stages one and two are combined to produce the APV.

Stage One

Stage One is a standard NPV analysis of the project, except for the discount rate used.

In a normal NPV analysis either WACC or risk adjusted WACC is used. In APV a special discount rate is used the base case discount rate.

To find the base case discount rate, we use the asset beta of a 'pureplay comparison' company and input it into the CAPM. This gives the base case discount rate for the project: the return required for the project's business risk.

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Procedure is to

- Find the ungeared beta value;
- Put into CAPM to get k_{EU} to use as a base case discount rate;
- Calculate the base case NPV.

Stage Two

In Stage Two, the present value of the costs and benefits associated with the financing package is calculated. Costs and benefits include:

- issue costs on debt and equity;
- tax relief on interest payments (the 'tax shield');
- the value of a subsidy on debt.

What rate should be used to discount these financing cash flows?

As all financing cash flows are low risk they are discounted at either the k_D or the risk free rate.

Details of financing costs and benefits

Issue costs

Equity issue costs are not tax deductible but debt issue costs tend to be. Sometimes the amount raised has to cover the issue costs, in other cases, the issue costs will be in addition read the question carefully.

PV of tax relief on interest payments = PV of tax shield

This is a calculation of an annuity, or a deferred annuity if tax relief is first received in year 2.

Annual tax relief = total loan \times interest rate \times tax rate

Subsidised / cheap loan

Like all loans, calculate the tax shield. In addition, you need to calculate the opportunity benefit of the cheap loan as follows:

PV of interest saved	X
Less PV of tax relief lost	(X)
	<hr/>
PV of the cheap loan	X

Investment Appraisal-Further Techniques

Debt capacity

A project's debt capacity denotes its ability to act as security for a loan. It is the tax relief available on such a loan, which gives debt capacity its value.

When calculating the present value of the tax shield (tax relief on interest) one should base it on the project's theoretical debt capacity and not the actual amount of the debt used.

The company accrues a tax benefit from a project of each pound of debt finance that project can support, even if the debt is used on some other project. Therefore, we use the theoretical debt capacity to match the tax benefit to the specific project.

This technique assumes that the theoretical debt capacity is fully utilised within the company as a whole.

Stage Three

Having calculated the project's base case present value and also the present value of each 'subsidy' that the project receives and of each finance issue cost, these are then combined to find an overall PV: the project's Adjusted Present Value or APV.

Example 2: APV

DT Ltd. is a quoted company. The directors have been evaluating a cost saving project which will require Rs. 1.9 million capital expenditure on new machinery. The directors expect the capital investment to provide cost savings of Rs. 300,000 per annum indefinitely. Both of these figures are given net of any tax implications.

The company is at present all equity financed. The discount rate which it applies to investment decisions of this nature is 16%. The directors believe the current capital structure fails to take advantage of the tax benefits of debt and propose to finance the new project with undated debt secured on the company's assets. The current rate of interest required by the market on corporate debt of this risk and maturity is 9%, but half of the loan will be subject to an interest rate of 3% under a Government subsidy scheme. The costs of issue, which are not tax deductible, are expected to be 5% of the gross proceeds of issue. The company intends to issue sufficient debt to cover the cost of capital expenditure and the costs of issue.

The company's tax rate is 33%.

Required:

Using the information given for DT Ltd. calculate the APV of the investment.

Investment Appraisal-Further Techniques

7 Linking Investment Appraisal to Customer Requirements

Primary objective

By this stage, you should be entirely happy with the assumed primary objective of companies to maximise their shareholder wealth. Any investment decision should be appraised with this objective in mind, as explained in the next section dealing with Net Present Value (NPV) analysis.

Link to customer requirements

However, it is worthwhile taking a step back from the mathematics and starting by noting that an investment project will only be a success if it delivers value to its customers, who are willing voluntarily to pay for the output of the investment project and will thereby yield the cash inflows that are required. Satisfying customer requirements is key to successful investment project management, from the initial planning stage through to actual delivery.

Product / service design

Satisfying customer requirements is closely tied in with product/service design, for a product should be specifically designed to include the features that customers actually want and are willing to pay for.

For example, there is no point in a computer hardware manufacturer paying money to paint a fancy logo on the hard drives that it produces. Customers simply want to pay for a unit that they can install inside their computers and never look at again. They are not willing to pay extra for units with fancy paintwork on the outside, so the outside of the hard drives should be left unpainted.

Investment projects should be tested against this idea of delivering known value to customers by bringing them the features that they require and are willing to pay for

Investments in IS / IT

A particular problem is experienced in appraising investment projects concerned with Information Systems (IS) and Information Technology (IT). Businesses have always used information systems, even before computers became widespread, as methods to collect data about the company and its competitors, which is then made available to the managers of the company to help them in their decision making.

Recent developments in IT including the prevalence of cheap powerful computers and database technology have allowed such systems to help managers:

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- at the strategic level, to plan for the achievement of the organization's overall objectives;
- at the operational level, to ensure that the processes currently carried out are efficient and effective;
- to control the business, by comparing actual performance with planned performance, highlighting for attention any significant variances that arise.

While the cost of a computer or a software application is a known amount, the benefits of IT are hard to tie down. As the economist Robert Solow has famously said: 'In business you can see computers everywhere but in the productivity statistics'.

Some senior managers simply believe that expenditure on IT is a 'good thing' and that money must be spent as an 'act of faith', but the pressure on all budget areas in recent years has led to blind faith no longer being an acceptable policy.

Top managers today insist on IT spending being justified in the same way as any other proposed expenditure. The problem in applying conventional DCF analysis to IS/IT projects is that, even if the upfront cost is known, the benefits will be both tangible and intangible, and selecting a discount rate to reflect the risk of the project will also prove difficult. Nevertheless, the exercise can still be carried out, even if it will only be possible in approximate terms.

8 Control of Investment Projects

The capital budgeting cycle

A common feature of industrial activity is the need to commit funds by purchasing land, buildings, machinery, etc., in anticipation of being able to earn, in the future, an income greater than the funds committed. This indicates the need for an assessment of the size of the outflows and inflows of funds, the life of the investment, the degree of risk attached (greater risk being justified perhaps by greater returns) and the cost of obtaining funds.

Basic stages in the capital budgeting cycle may be identified as follows:

- a) Needs for expenditure are forecast.
- b) Projects to meet those needs are distinguished.
- c) Alternatives are appraised.
- d) Best alternatives are selected and approved.
- e) Expenditure is made and monitored.
- f) Deviations from estimates are examined as part of a Post Completion Audit (PCA).

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Post completion audit of capital projects

During the life of a project, an investigation should be undertaken to examine its profitability and compare it with the plan. There are three reasons for undertaking these postmortems:

- To discourage managers from spending money on doubtful projects, because they may be called to account at a later date.
- It may be possible over a period of years to discern a trend of reliability in the estimates of various managers.
- A similar project may be undertaken in the future, and then the recently completed project will provide a useful basis for estimation.

More on capital budgeting and controls

Types of capital project

Reasons for capital expenditure vary widely. Projects may be classified into the following categories.

- Maintenance – replacement of worn out or obsolete assets, safety and security, etc.,
- Profitability – cost savings, quality improvement, productivity, relocation, etc.,
- Expansion – new products, new outlets, research and development, etc.,
- Indirect – office buildings, welfare facilities, etc.,

A particular investment project, of course, could combine any number or all of the above classifications.

Capital expenditure forecast

In preparing budgets, it is necessary to consider how much money can or must be allocated to capital expenditure. Capital development schemes may be started because a surplus of cash resources is revealed by the long-term plan, but usually management decides on a capital development scheme and then seeks the means to finance it. Initially, the budget will be an expression of management's intention to allocate funds for certain broad purposes. In the budget period, money will be required as follows:

- for previously authorised existing projects;
- for new projects, full details of which may not yet be available.

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The forecasts will indicate whether sufficient funds are available, and perhaps when additional funds will need to be obtained. It is advisable, therefore, for managers to submit long-term capital expenditure forecasts, say for two to five years ahead. Consequently, the possibility of obsolescence (and the direction of the future development of the firm) must be borne in mind.

Capital expenditure committee

A capital expenditure committee may be formed, either as a sub-committee of the budget committee or as a separate meeting of the entire budget committee. The responsibilities of the capital expenditure committee are to:

- coordinate capital expenditure policy;
- appraise and authorise capital expenditure on specific projects;
- review actual expenditure on capital projects against the budget.

Capital expenditure decision

It has frequently been reported that, in both the private and public sectors, investment decisions are made rather casually and that this laxity is one of the major causes of lack of growth within the economy. Of all the decisions taken by management, those concerned with investment are the most crucial: once made, they may fix the future of the company in terms of its technological role, cost structure and market effort required, i.e., once the product has been selected and the plant built, the company is committed to the specific cost structure which accompanies that particular type of plant and the product made.

Authorization of capital projects

The capital budget will not necessarily be based on a detailed analysis of required projects. It is likely that managers will be asked to forecast their capital expenditure requirements for inclusion in the budget but, even if such figures are included, it is still necessary for detailed proposals to be submitted to the committee before the projects may be started. Many projects will incur fairly small expenditure and, in order not to involve the committee in unnecessary detail, broad guidelines ought to be laid down regarding the amounts of expenditure that may be committed by each level of management. Top management must see that the types of expenditure to be treated as capital are clearly defined, and that every subordinate or committee knows precisely the limits to which they can approve capital expenditure.

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Feasibility study

Feasibility study normally includes three main areas:

- i) Market issues:
 - a) Potential market opportunities
 - b) Type of industry
 - c) Size of market
 - d) Projected market share
- ii) Technical or organizational requirement
 - a) Management's experience for the project under consideration
 - b) Organization's access to sources of required resources
 - c) Technicalities involved in the investment projects
 - d) Organizational structure
- iii) Financial overview
 - a) Estimated starting cost of the project
 - b) Estimated operating cost of the project
 - c) Estimated demand and revenues related to project
 - d) Project profit (loss) related to project
 - e) Possible sources of finance and cost of finance
 - f) Risk associated with project
 - g) Payback period and life of project
 - h) Taxation effect
 - i) Estimated residual value of project's assets at the end of project

Capital expenditure control

Strict control of large projects must be maintained and the accountant must submit periodic reports to top management on progress and cost. A typical report would include data such as the following:

- Budgeted cost of the project, date started and scheduled completion date.
- Cost and over or underexpenditure to date.
- Estimated cost to completion, and estimated final over or underexpenditure.
- Estimated completion date and details of penalties, if any.

The capital expenditure committee will seek explanations for any overspending that may have arisen. Where projects are incomplete and actual expenditure exceeds the authorisation, additional authority must be sought to complete the project. In so doing, the committee must consider the value of the project as it then stands and the

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additional value that will be gained by completing it, compared with the additional expenditure to completion.

11 Exam style questions

Test your understanding 1 – Borrowing Ltd.

Whilst setting its long-term budget for the years ended 31 December, 20X1 to 31 December, 20X9, Borrowing Ltd. has reviewed the costs attributable to each cost centre. The firm is concerned with the cost forecasts for centre CS/23/CS, namely the circular saw. The cost budget for the next five years is:

Year ended	31.12.X1	31.12.X2	31.12.X3	31.12.X4	31.12.X5
	Rs.	Rs.	Rs.	Rs.	Rs.
Depreciation	211	158	119	89	67
Supervision salary	500	600	720	864	1,037
Power	15	15	20	20	25
Insurance	5	5	10	10	15
Consumable stores	130	150	180	220	270
Maintenance labour	800	1,000	1,200	1,500	1,900
parts	550	830	1,090	1,500	1,790
Fixed overheads absorbed	200	250	300	350	450

The charge for insurance is in respect of a policy which specifically relates to the saw. The supervisor only spends a portion of his time with the saw – when it is being used by apprentices. The saw is currently (31 December, 20X0) valued at Rs. 750, although this figure is expected to fall by Rs. 250 each year.

A new saw has come onto the market which is being offered at Rs. 3,500. As a sales promotion idea the firm selling the saw has promised that its first 100 customers may purchase all future saws at the same price. The running costs of the new saw are expected to be:

Year ended	31.12.X1	31.12.X2	31.12.X3	31.12.X4	31.12.X5
	Rs.	Rs.	Rs.	Rs.	Rs.
Labour	300	475	650	700	800
Parts	200	300	400	500	600
Other direct costs	500	600	700	800	900
Fixed overheads absorbed	300	350	400	450	500

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The scrap value of the new saw is estimated as being Rs. 2,000 at the end of its first year's use, Rs. 1,500 after two years, Rs. 1,000 after three years, Rs. 250 after four years and from then on the asset would have negligible scrap value.

Required:

- Determine how often the new machine should be replaced.
- Determine when the old machine should be replaced.

Ignore taxation and assume that this type of machine will be used in perpetuity.

Borrowing Ltd. has a required rate of return of 10%.

Test your understanding 2 – Sindh Ltd.

Sindh Ltd. has details of two machines which could fulfil the company's future production plans. Only one of these machines will be purchased.

The 'standard' model costs Rs. 50,000, and the 'deluxe' Rs. 88,000, payable immediately. Both machines would require the input of Rs. 10,000 working capital throughout their working lives, and both machines have no expected scrap value at the end of their expected working lives of four years for the standard machine and six years for the deluxe machine. The forecast pretax operating net cash flows associated with the two machines are:

Years hence	1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.	Rs.
Standard	20,500	22,860	24,210	23,410	35,100
Deluxe	32,030	26,110	25,380	25,940	38,560

The deluxe machine has only recently been introduced to the market and has not been fully tested in operating conditions. Because of the higher risk involved, the appropriate discount rate for the deluxe machine is believed to be 14% per year, 2% higher than the discount rate for the standard machine.

The company is proposing to finance the purchase of either machine with a term loan at a fixed interest rate of 11% per year.

Taxation at 35% is payable on operating cash flows one year in arrears, and capital allowances are available at 25% per year on a reducing balance basis.

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Required:

a) Calculate for both the standard and the deluxe machine:

- i) payback period;
- ii) net present value.

Recommend, with reasons, which of the two machines Sindh Ltd. should purchase.

(Relevant calculations must be shown.)

- b) If Sindh Ltd. were offered the opportunity to lease the standard model machine over a four year period at a rental of Rs. 15,000 per year, not including maintenance costs, evaluate whether the company should lease or purchase the machine.
- c) Surveys have shown that the accounting rate of return and payback period are widely used by companies in the capital investment decision process. Suggest reasons for the widespread use of these investment appraisal techniques.

CHAPTER 6

CHAPTER 6

Investment Appraisal-Further Techniques

Multiple choice questions (MCQs)

1) **Profitability index is calculated when**

- a) projects are divisible in capital rationing situation
- b) projects are not divisible in capital rationing situation
- c) asset replacement decision is taken
- d) buy or lease decision is taken

2) **Adjusted Present Value (APV) is only used when**

- a) business risk is changed
- b) financial risk is changed
- c) both financial and business risks are changed
- d) in all above situations

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Test your understanding answers

Example 1 – Capital rationing

	Rs. '000'			
	A	B	C	D
NPV	22	5	16	8
Initial cost	30	20	40	10
NPV/Rs. invested	0.73	0.25	0.40	0.80
Rank	2	4	3	1

Bahar Ltd. should invest the Rs. 60,000 as follows:

- 1) Do project D leaving Rs. 50,000.
 - 2) Do project A leaving Rs. 20,000.
 - 3) Do half of project C, using up the remaining funds.
- b) Bahar Ltd. can afford to invest in the following multiasset portfolios:

	NPV
A + B + D	35
B + C	21
C + D	24

By trial and error the optimal investment is A + B + D.

Example 2: APV

APV = Base case NPV ± PV of financing side effects

$$\text{Base case NPV} = \frac{\text{Rs. } 300,000}{0.16} - \text{Rs. } 1,900,000 = (\text{Rs. } 25,000)$$

The side effects of financing are:

Tax relief on debt interest

Debt issued = Rs. 1.9 m + issue costs (= 5% debt issued)

∴ 95% debt issued = Rs. 1.9 m

∴ debt issued = Rs. 1.9 m / 0.95 = Rs. 2 m

Tax relief on interest = [(Rs. 1 m × 9%) + (Rs. 1 m × 3%)] × 33% = Rs. 39,600 p.a.

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$$\text{This has a PV of } \frac{\text{Rs. } 39,600}{0.09} = \text{Rs. } 440,000$$

(Note: A discount rate appropriate to the level of risk of the flow is used to find the PV.)

Value of subsidy

The subsidy saves 6% p.a. in interest (9% - 3%). The post tax value of this subsidy in perpetuity is therefore:

$$6\% \times \text{Rs. } 1 \text{ m} \times (10.33) \times \frac{1}{0.09} = \text{Rs. } 446,667$$

Issue costs

Issue costs = 5% of Rs. 2 m = Rs. 100,000

These arise at time 0, and thus have a PV of (Rs. 100,000)

The adjusted present value is thus:

$$\text{Rs. } 25,000 + \text{Rs. } 440,000 + \text{Rs. } 446,667 - \text{Rs. } 100,000 = \text{Rs. } 761,667$$

Test your understanding 1 – Borrowing Ltd.

a) Running costs (new saw)

Labour, parts and other direct costs included.

PV factor	Rs.	PV	Cumulative Rs.	Rs.
Year 1	1,000	0.909	909	909
Year 2	1,375	0.826	1,136	2,045
Year 3	1,750	0.751	1,314	3,359
Year 4	2,000	0.683	1,366	4,725
Year 5	2,300	0.621	1,428	6,153

Scrap value (new saw)

	Rs.	PV	Cumulative Rs.
Year 1	2,000	0.909	1,818
Year 2	1,500	0.826	1,239
Year 3	1,000	0.751	751
Year 4	250	0.683	171
Year 5	Nil	0.621	-

Investment Appraisal-Further Techniques

One year cycle

PV	Rs.
Purchase cost	(3,500)
Running costs Year 1	(909)
Scrap value Year 1	1,818
Total PV cost	Rs. (2,591)

Two years cycle

Purchase cost	(3,500)
Running costs Years 1 and 2	(2,045)
Scrap value Year 2	1,239
Total PV cost	Rs. (4,306)

Three years cycle

Purchase cost	(3,500)
Running costs Years 1, 2, 3	(3,359)
Scrap value Year 3	751
Total PV cost	Rs. (6,108)

PV	Rs.
----	-----

Four years cycle

Purchase cost	(3,500)
Running costs Years 1, 2, 3, 4	(4,725)
Scrap value Year 4	171
Total PV cost	Rs. (8,054)

Five years cycle

Purchase cost	(3,500)
Running costs Years 1, 2, 3, 4, 5	(4,725)
Scrap value Year 5	171
Total PV cost	Rs. (8,054)

Investment Appraisal-Further Techniques

To calculate AE cost

Year	Total PV cost Rs.	Annuity factor	AE cost Rs.
1	2,591	0.909 =	2,850 pa
2	4,306	1.736 =	2,480 pa
3	6,108	2.487 =	2,456 pa
4	8,054	3.170 =	2,541 pa
5	9,653	3.791 =	2,546 pa

b) Nonidentical replacement

Running costs (old saw)

Power, consumable stores, maintenance and insurance are included. Supervisor's salary is ignored as it would be incurred anyway.

	PV factor Rs.	PV	cumulative Rs.	Rs.
Year 1	1.500	0.909	1,364	1,364
Year 2	2.000	0.826	1,652	3,016
Year 3	2.500	0.751	1,878	4,894
Year 4	3.250	0.683	2,220	7,114
Year 5	4.000	0.621	2,484	9,598

Replace now	PV factor	PV
Scrap value 750	1.00	750
AE cost new machine		
Year 1 - ∞	2,456	(24,560)
	0.10	
Total PV cost		Rs. (23,810)

Replace in one year's time

Running costs Year 1	(1,500)	0.909	(1,364)
Scrap value Year 1	500	0.909	455
AE cost: new machine			
Years 2 - ∞	2,456	22,325	
	0.10		
Total PV cost			Rs. (23,234)

Investment Appraisal-Further Techniques

Replace in two year's time

Running costs Year 1-2			(3,016)
Scrap value Year 2	250	0.826	207
AE cost: new machine			
Years 3 - ∞	2,456		(20,287)
	$\frac{2,456}{0.10} \times 0.826$		
Total PV cost			Rs. (23,096)

Replace in three year's time

Running costs Year 1-3			(4,894)
Scrap value Year 3			-
AE cost: new machine			
Years 3 - ∞	2,456		(18,445)
	$\frac{2,456}{0.10} \times 0.751$		
Total PV cost			Rs. (23,339)

Replace in four year's time

Running costs Year 1-4			(7,114)
Scrap value Year 4			-
AE cost: new machine			
Years 5 - ∞	2,456		(16,775)
	$\frac{2,456}{0.10} \times 0.683$		
Total PV cost			Rs. (23,889)

Investment Appraisal-Further Techniques

Replace in five year's time

		PV factor	PV Rs.
Replace in five years' time			
Running costs Year 1-5	(1,500)	0.909	(9,598)
Scrap value Year 5	500	0.909	-
AE cost: new machine			
Years 6 - ∞	2,456		(15,252)
	$\frac{2,456}{0.10} \times 0.621$		
Total PV cost			Rs. (24,850)

Investment Appraisal-Further Techniques

Test your understanding 2 – Sindh Ltd.

a) Calculation of tax liability

	Year 1 Rs.	Year 2 Rs.	Year 3 Rs.	Year 4 Rs.	Year 5 Rs.	Year 6 Rs.
Standard						
Operating cash flows	20,500	22,860	24,210	23,410		
Capital allowance	12,500	9,375	7,031	21,094*		
	<u>8,000</u>	<u>13,485</u>	<u>17,179</u>	<u>2,316</u>		
Taxation (35%)	2,900	4,720	6,013	811		
Deluxe						
Operating cash flows	32,030	26,110	25,380	25,940	38,560	35,100
Capital allowance	22,000	16,500	12,375	9,281	6,961	20,883*
	<u>10,030</u>	<u>9,610</u>	<u>13,005</u>	<u>16,659</u>	<u>31,599</u>	<u>14,217</u>
Taxation (35%)	3,511	3,363	4,552	5,831	11,060	4,976

* Including balancing allowance

Forecast after tax cash flows

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Standard						
Fixed assets	(50,000)					
Working capital	(10,000)				10,000**	
Operating cash flows		20,500	22,860	24,210	23,410	
Taxation			(2,800)	(4,720)	(6,013)	(811)

Investment Appraisal-Further Techniques

	(60,000)	20,500	20,060	19,490	27,397	(811)
Discount factor (12%)	0.893	0.797	0.712	0.636	0.567	

Present values	(60,000)	18,307	15,988	13,877	17,424	(460)
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- i) Payback period is approximately three years.
 ii) Net present value is Rs. 5,136

	Year 0 Rs.	Year 1 Rs.	Year 2 Rs.	Year 3 Rs.	Year 4 Rs.	Year 5 Rs.	Year 6 Rs.	Year 7 Rs.
Deluxe								
Fixed assets	(88,000)							
Working capital	(10,000)					10,000***		
Operating cash flows		32,030	26,110	(25,380)	25,940	38,560	35,100	
Taxation		3,511	3,363	4,552	5,831	11,060	4,976	
	<u>(98,000)</u>	<u>32,030</u>	<u>22,599</u>	<u>22,017</u>	<u>21,388</u>	<u>32,729</u>	<u>34,040</u>	<u>4,976</u>
Discount factor (14%)	0.877	0.769	0.675	0.592	0.519	0.456	0.4	
Present Values	98,000	28,090	17,379	14,861	12,662	16,986	15,522	1,990

- i) Payback period is approximately four years.
 ii) Net present value is Rs. 5,510.

** Assumes working capital is released immediately. In reality some timelag will exist.

Normally the project with the highest NPV would be selected. However, as the projects have unequal lives, it can be argued that, although the deluxe has a higher NPV, this is only achieved by operating for two more years. If the machines are to fulfil a continuing production requirement the time factor needs to be considered.

The annual equivalent cost approach is not appropriate as both machines have different levels of risk. In this situation the most useful approach is to assume infinite reinvestment in each machine and calculate their NPVs to infinity.

Investment Appraisal-Further Techniques

$$\text{NPV of the investment} \div \text{Present value of an annuity of appropriate years and discount rate}$$

$$\text{NPV } \infty = \frac{\text{Discount rate}}{\text{Discount rate}}$$

Standard

$$\text{NPV } \infty = \frac{5.136 \div 3.037^*}{0.12} = \text{Rs. 14,092}$$

Deluxe

$$\text{NPV } \infty = \frac{5.510 \div 3.889^*}{0.14} = \text{Rs. 10,120}$$

* The present values of annuities are taken for four and six years as these are the useful lives of the projects.

As the standard machine has the higher NPV, it is recommended that this machine should be purchased.

An alternative approach to the problem of different lives might be to assume a reinvestment rate for the shorter investment and to use this rate to equalise the lives of the investments.

Investment Appraisal-Further Techniques

Answers to MCQs

- 1) a
- 2) b

7

Business Valuations

ICMA Pakistan

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Business Valuations

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

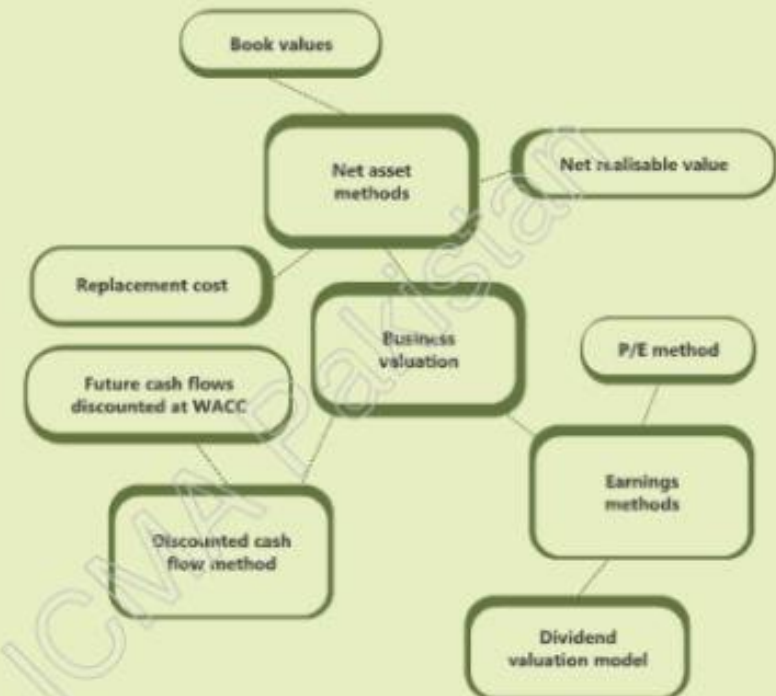
- Understand reasons for valuations
- Apprehend asset valuation bases
- Comprehend earning valuation bases
- Learn about dividend valuation bases
- Know about cash flow valuation method
- Elucidate valuation issues
- Explicate efficient market hypothesis

CHAPTER 7

CHAPTER 7

Business Valuations

1 Overview of Chapter



2 Introduction To Business Valuation

Business valuation is not a precise, scientific process. The value of a business is affected by:

- reported sales, profits and asset values;
- forecast sales, profits and asset values;
- type of industry;
- level of competition;
- range of products sold;
- breadth of customer base;
- perspective – the buyer and the seller will often have different expectations and, hence, may value the business differently.

Business Valuations

The valuation methods covered in this chapter give suggested values of a business.

The final value is then agreed between buyer and seller after a process of negotiation.

Valuation of listed and unlisted companies

Listed companies

A listed company will have a stock market value (or market capitalization).

If small numbers of shares are being traded on the stock market, this share price will be used by traders.

However, if one company is attempting to take over another acquiring the majority of the shares, the market capitalization value will not necessarily give a suitable value for the transaction, since the shareholders will not have any incentive to sell their shares at the current market price.

In order to encourage the shareholders in the target company to sell their shares, a premium is normally offered on top of the current stock market share price.

In conclusion, when valuing a listed company, the current stock market share price should be used as a starting point for the calculations rather than as a definitive final figure.

Unlisted companies

An unlisted company has no stock market value, so the valuation process is more complex. Also, there is likely to be less published information available which might help a purchaser to assess the value of an unlisted company.

Therefore, when valuing an unlisted company, estimates often have to be made, based on available information taken from similar listed companies ("proxy" companies).

The valuation methods shown below often value unlisted companies using data derived from proxy listed companies e.g., cost of equity, beta, dividend yield, P/E ratio.

In practice, it can be difficult to find a similar listed company.

The final answer may have to be discounted by 25% to 35% to account for:

- Relative lack of marketability of unquoted shares – it is more difficult for

Business Valuations

investors to sell their shares if the company is not listed;

- Lower levels of scrutiny, therefore greater risk of poor quality financial information;
- Higher risk of being a smaller, less well-regarded company with, possibly, a more volatile earnings record.

3 The Different Valuation Methods

There are three basic ways of valuing a business:

Net asset based valuation method

The business's assets form the basis for the valuation. Net asset based valuation methods are difficult to apply to businesses with high levels of intangible assets, but this Chapter covers methods of valuing intangible as well as tangible assets.

Earnings based valuation method

The projected earnings for a business will give an indication of the value of that business. For example, a business with high forecasted earnings will be attractive to a potential purchaser, and hence will be valued highly. In this Chapter, we shall see how earnings and dividends (which are dependent on earnings) can be used in business valuation.

Discounted cash flow method

In theory, a business's value should be equal to the present value of its future cash flows, discounted at an appropriate cost of capital. This Chapter explains how to identify and forecast future cash flows, and how to choose an appropriate discount rate.

Exam approach

Frequently, the compulsory case study (Section A) question in the examination will give information on an entity and request the candidate to calculate a range of values for that entity.

Part of the test is not only to be able to use the various methods to calculate values but to understand the circumstances in which each is most appropriate.

For example asset-based valuations have very limited relevance for entities which are going concerns especially if they have substantial intangible assets.

Business Valuations

In each of the following sections, the various valuation methods are explained together with the circumstances in which they might be most appropriate.

4 Net Asset Based Valuation

In this method the company is viewed as being worth the sum of the value of its net assets.

Remember to deduct borrowings when arriving at a net asset value if just the equity is being acquired, but not if only the physical assets and related liabilities are being purchased without acquiring any liability for the borrowings.

A net assets based valuation is most useful when a company is being broken up, rather than purchased as a going concern. Since the method does not incorporate the valuation of intangible assets, it usually gives a low valuation figure, which helps the parties to set a minimum price in a takeover situation.

Asset valuations are therefore likely to be more useful for capital-intensive businesses, than for service businesses, where many of the assets are intangible.

Alternative asset valuation bases

The net asset valuation can be calculated in various ways:

Book value

This method suffers from being largely a function of depreciation policy, for example, some assets may be written down prematurely and others carried at values well above their real worth. Original costs may be of little use if assets are very old, or if asset replacement has been irregular over time.

Thus, this method is of little use in practice.

Replacement value

This method calculates the cost of replacing the business's assets, which may be relevant if the assets are going to be used on an ongoing basis.

Break-up value / net realisable value

Individual assets are valued at the best price obtainable, which will depend partly on the secondhand market and partly on the urgency of realizing the asset.

This method can be used to set a minimum selling price for the vendors, as they

Business Valuations

could liquidate the business as an alternative to selling the shares.

The strengths and weaknesses of net asset based valuations

The main strengths of asset-based valuations are:

- the valuations are fairly readily available;
- they provide a minimum value of the entity.

The main weaknesses of asset-based valuations are:

- future profitability expectations are ignored;
- balance sheet valuations depend on accounting conventions, which may lead to valuations that are very different from market valuations;
- it is difficult to allow for the value of intangible assets such as intellectual property rights.

More detail on net asset based valuation

A net asset based valuation method for a listed company will usually give a value considerably lower than the market value of all the company's shares (the market capitalization value).

So it should be obvious that shareholders / the market do not value the company on the basis of the balance sheet's net asset figure.

Shareholders are not buying the company for its assets but for the income those assets can produce.

This future income is generated from the use of the balance sheet assets together with the non-balance sheet assets (intangible assets) like highly skilled workforce, strong management team and complete positioning of the company's products.

Thus assets in the crude sense of balance sheet values are only one dimension of a company's overall value (in a normal going concern situation).

Example 1

The summarized balance sheet (statement of financial position) of Owen at 31 December, 20X7 is as follows:

Business Valuations

Assets	Rs. '000'
Non-current assets	23,600
Current assets	8,400
	<hr/>
	32,000
Equity and liabilities	
Capital and reserves	
Rs. 10 ordinary shares	8,000
Retained earnings	11,200
	<hr/>
	19,200
Non-current liabilities	
6% unsecured bond	8,000
Current liabilities	4,800
	<hr/>
	32,000
	<hr/>

Required:

Calculate the value of one ordinary share in Owen, using net assets based valuation method.

Example 2

Fowler wants to make a bid for Owen (see details for Owen in the previous example).

It has estimated that the replacement cost of Owen's non-current assets is Rs. 40 million.

Required:

Calculate the value of a share in Owen from Fowler's perspective.

Example 3

Ray Ltd. a listed manufacturing company, is considering a takeover bid for Ribbon Ltd. a smaller, unlisted company in the same industry.

Ribbon Ltd. has been making losses in the last 2 years, so it is considered that an asset based method should be used to value the business.

Business Valuations

Extracts from Ribbon Ltd.'s statement of financial position

Assets	Rs. '000'
Non-current assets (Note 1)	1,207
Current assets (Note 2)	564
	<hr/>
	1,771
Equity and liabilities	
Capital and reserves	
Rs. 10 ordinary shares	100
Retained earnings	553
	<hr/>
	653
Non-current liabilities	
5% bonds	600
Current liabilities	518
	<hr/>
	1,118
	<hr/>

Note 1: The non-current assets comprise specialized manufacturing equipment. To replace the equipment would cost Rs. 1.5 m, but if Ribbon Ltd. were to be closed down, the assets would sell for no more than Rs. 1 m.

Note 2: Receivables contain an amount of Rs. 120,000 from a large customer which has just gone into liquidation. A contract for the same customer, included in work in progress (inventory) at a value of Rs. 30,000 will now have to be scrapped.

Required:

Calculate the expected valuation of Ribbon Ltd. from the perspective of Ray Ltd. Explain and justify your figures.

5 Valuation of Intellectual Capital/Intangible Assets**Definition of Intellectual capital**

The term 'intellectual capital' has many complex connotations and is often used synonymously with intellectual property, intellectual assets and knowledge assets.

Intellectual capital can be thought of as the total stock of capital or knowledge-based equity that the entity possesses. As such, intellectual capital can be both the result of a knowledge transformation process or the knowledge itself that is transformed into intellectual property or intellectual assets of the firm.

Business Valuations

Intellectual capital includes:

Human resources – The collective skills, experience and knowledge of employees;

Intellectual assets- knowledge which is defined and codified such as drawing, compute program or collection of data;

Intellectual property – Intellectual assets which can be legally protected such as patents and copyrights;

Intellectual property is legally defined and assigns property rights to such things as patents, trademarks and copyrights;

These assets are the only form of intellectual capital that is regularly recognized for accounting purposes;

However, accounting conventions based upon historical costs often understate their value:

Valuation of intellectual capital / intangible assets

It is recognized that goodwill, brands and other intellectual capital (intangible assets) often have a significant value. Indeed often intellectual capital is the main contributor of value to an entity.

The net asset based methods covered above do not incorporate this value.

There are two ways of valuing the intangible assets of an entity:

1) Simple estimate

Value of intangibles is equal to

Value of equity (either using a quoted market capitalization or using one of the earnings based methods below i.e., DVM, P/E method, or PV of future cash flows)

minus

Value of the tangible assets (see Net Asset Valuation above).

2) Calculated Intangible Value (CIV) method

The CIV method examines the excess return earned by the entity over the return expected on its tangible assets (this excess is called the Value Spread). The discounted value of the post tax Value Spread is the CIV of the entity, and then:

Business Valuations

Total value of equity = Value of tangible assets + CIV

Example 4

Chapman Co. has just reported a pre tax profit of Rs. 24.29 m, and the value of its tangible assets in the balance sheet is Rs. 128.66 m.

The average return on assets for companies in the same industry is 10%.

The tax rate is 30% and Chapman Co.'s cost of capital is 16%.

Required:

Calculate the value of Chapman Co. using the CIV approach.

6 Earnings Based Valuation – the Dividend Valuation Model

Dividend Valuation Model (DVM) Theory

The theory states that the value of the company / share is the present value of the expected future dividends, discounted at the shareholders' required rate of return.

This links to the NPV method covered earlier, where the discounted cash flows from a project represented the gain in wealth to shareholders if the project were undertaken (wealth (share value) is linked to discounted future cash flows).

DVM formula

$$\text{Either: } P_0 = \frac{d_0}{k_e} \quad \text{or} \quad P_0 = \frac{d_0 (1 + g)}{k_e - g}$$

Assuming: a constant dividend or constant growth

Note that:

g = forecast future growth rate in dividends, and:
 P_0 = Value of company, when d_0 = Total dividends
 P_1 = Value per share, when d_0 = Dividends per share

Also, note that the simple formula (when assuming a constant dividend) is just a rearrangement of the standard dividend yield formula:

$$\text{Dividend yield} = (\text{Dividend} / \text{Share price}) \times 100\%$$

Business Valuations

Example 5

Target has just paid a dividend of Rs. 250,000. It has 2 million shares in issue.

The current return to shareholders in the same industry as Target is 12%, although it is expected that an additional risk premium of 2% will be applicable to Target, being a smaller and unlisted company.

Required:

Calculate the expected valuation of Target, if

- dividends are expected to be constant;
- dividends are expected to grow at 4% per annum.

The strengths and weaknesses of dividend-based valuations

The strengths of dividend-based valuations are:

- value is based on the present value of the future dividend income stream, so the method has a sound theoretical basis;
- they are useful for valuing minority shareholdings where the shareholder only receives dividends from the entity (rather than a share of total assets or cash flows – factors which form the basis of the other valuation methods).

The main weaknesses of using dividend models include:

- investors tend to have very different expectations from each other, so it is difficult to estimate what dividends will be in the future (Modigliani and Miller's theories can hardly cope with the present-day wide difference in attitude between institutional and individual investors);
- most investors look for a return based on two components: dividend and capital appreciation leading to capital gain on sale of the shares the DVM approach only looks at the dividend element;
- it is difficult to estimate a future growth rate;
- particularly for unlisted companies, it can be difficult to estimate the cost of equity (note that in the exam, if you are not given the cost of equity, you should use CAPM to derive it, or use proxy company information);
- dividend-based valuations are suitable for valuing small shareholdings rather than for valuing a controlling interest.

Business Valuations

Uneven growth rates

The dividend valuation model formula can not be used directly when the annual growth rate is expected to change.

In such cases, the entity's lifespan should be segmented into the periods for which the varying growth rates apply, and value each separately.

Illustration 1

Target has just paid a dividend of Rs. 250,000. It has 2 million shares in issue.

The current return to shareholders in the same industry as Target is 12%, although it is expected that an additional risk premium of 2% will be applicable to Target, being a smaller and unquoted company.

Required:

Calculate the expected valuation of Target, if dividends are expected to stay constant for 3 years, then grow at 4% per annum thereafter.

Solution

Separate the future dividend stream into two parts: first, the constant dividends for 3 years, then the growing perpetuity thereafter.

First 3 years

Present value of expected dividends = $250,000 \times AF_{1-3}(14\%) = \text{Rs. } 0.580 \text{ m}$

Perpetuity from year 4

Use the given DVM formula, then adjust for the fact that the dividend stream starts in year 4, not year 1 as normal:

$$[(250,000 \times 1.04) / (0.14 - 0.04)] \times DF_3(14\%) = \text{Rs. } 1.755 \text{ m}$$

Total value = $0.580 \text{ m} + 1.755 \text{ m} = \text{Rs. } 2.335 \text{ m}$
or $2.335 / 2 = \text{Rs. } 1.17 \text{ per share.}$

7 Earnings Based Valuation – the P/E Method

The P/E valuation method is a very simple method which values a business by applying a suitable P/E ratio to the business's earnings (profit after tax).

Business Valuations

P/E valuation method formula

Value of company = Total post-tax earnings \times P/E ratio

Value per share = EPS \times P/E ratio

Using the P/E valuation formula

The P/E ratio method is the simplest valuation method. It relies on just two figures (the post-tax earnings and the P/E ratio).

Post tax earnings

The current post – tax earnings, EPS, for a company can easily be found by looking at the most recent published accounts. However, these published figures will be historic, whereas the earnings figure needed for valuation purposes should be an expected, future earnings figure.

It is perfectly acceptable to use the published earnings figure as a starting point, but before performing the valuation, the historic earnings figure should be adjusted for factors such as:

- One-off items which will not recur in the coming year (e.g., debt write offs in the previous year);
- Directors salaries which might be adjusted after a takeover has been completed;
- Any savings ("synergies") which might be made as part of a takeover.

P/E ratio

The P/E ratio for a listed company is a simple measure of the company's share price divided by its earnings per share.

The P/E indicates the market's perception of the company's current position and its future prospects. For example, if the P/E ratio is high, this indicates that the company has a relatively high share price compared to its current level of earnings, suggesting that the share price reflects good growth prospects of the company.

An unlisted company has no market share price, so has no readily available P/E ratio. Therefore, when valuing an unlisted company, a proxy P/E from a similar listed company is often used.

Business Valuations

Proxy P/E ratios

An explained above, and unlisted company will not have a market – driven P/E ratio, so an industry average P/E, or one for a similar company, will be used as a proxy.

However, proxy P/E ratios are also sometimes used when valuing a listed company – of course if a listed entity's own P/E ratio is applied to its own earnings figure, the calculation will just give the existing share price.

In particular, proxy P/E ratios are used in the context of bootstrapping which is covered in the next Chapter.

Example 6

Molier is an unquoted entity with a recently reported after-tax earnings of Rs. 3,840,000. It has issued 1m ordinary shares. A similar listed entity has a P/E ratio of 9.

Required:

Calculate the value of one ordinary share in Molier using the P/E basis of valuation.

The strengths and weaknesses of earnings-based valuations

The main strengths of earnings-based valuations are:

- they are commonly used and are well understood;
- they are relevant for valuing a controlling interest in an entity.

The main weaknesses of earnings-based valuations are:

- they are based on accounting profits rather than cash flows;
- it is difficult to identify a suitable P/E ratio, particularly when valuing the shares of an unlisted entity;
- it is difficult to establish the relevant level of sustainable earnings.

Example 7

Company X is considering a bid for Company Y.

X has earnings of Rs. 3 m per annum, and Y has earnings of Rs. 1.5 m per annum. The P/E ratio of X is 12 and that of Y is 8.

If the takeover proceeds, it is expected that synergies of Rs. 0.5 m per annum will be

Business Valuations

generated, and that the combined company will have a P/E ratio of 11.

Required:

Calculate the maximum price that X should pay for Y, and the minimum price that Y should accept.

Earning yield method

In some question, you may not be given the P/E ratio, but you may be given the Earnings Yield instead.

The earnings yield is the reciprocal of the P/E ratio i.e., $\text{Earnings Yield} = 1/(\text{P/E ratio})$.
Hence,

Value of company = Total earnings / Earnings Yield

Value per share = EPS / earnings yield

Understanding and interpretation of Earnings Yield

Some deeper analysis is desirable, for example earning the trend of share price over a number of quarters in the light of any events such as profits warnings and acquisitions (or rumors thereof), and the likely effect that they have had on earnings.

The stability of earnings yield is often as important as its growth, bearing in mind that in a general way the market is absorbing new information to try to assess a sustainable level of EPS on which to base growth for the future. Clearly, effective growth is dependent on a stable base, and the trend of earnings yield over time is to an extent a reflection of this factor.

A prospective acquirer would, of course, be concerned to assess the worth of a prospective bid on the basis of its becoming part of the acquiring entity, and the valuation will especially need to take into account the expectation of the bid's shareholders.

A further point relates to the acquirer's intentions regarding the bid. If, for example, the latter entity is to be partially demerged, that is certain parts disposed of two other entities in which they would provide a better fit, and then the share price valuation may well be greater than if the whole bid entity was to be retained. Nevertheless, any such break-up considerations will need to take into account all the stakeholders, including employees, suppliers and customers of the bid, as any serious demonization will take away from the good will value of the acquisition

Business Valuations

and quite possible damage that of the acquiring entity itself.

8 Discounted Cash Flow Method

Overview of the method

Under the Discounted Cash Flow (DCF) method, a value for the equity of the entity is derived by estimating the future annual after-tax cash flows of the entity, and discounting these cash flows at an appropriate cost of capital.

This is theoretically the best way of valuing a business, since the discounted value of future cash flows represents the wealth of the shareholders (as seen in the earlier Chapter 'Investment Appraisal basic techniques').

The cost of capital used to discount the cash flows should reflect the systematic risk of the cash flows.

Example 8

The expected after-tax cash flows of Thomas, an all equity financed company with 2 million shares in issue, will be as follows:

Year	Rs.
1	120,000
2	100,000
3	140,000
4	50,000
5 onwards	130,000

A suitable cost of capital for evaluating Thomas is 12%.

Required:

Calculate the value of Thomas's equity (in total and per share) using the DCF basis of valuation.

More details on cash flows and cost of capital

Free cash flows

Ideally, free cash flows should be used in DCF valuations rather than post-tax post-financing cash flows.

Free cash flows are similar to post-tax post-financing cash flows, except that they include average sustainable levels of capital and working capital not cash flow

Business Valuations

investments over the longer term rather than this year's figures.

Post-tax cash flows (after financing charges) are often used as an approximation for free cash flows.

However, where sufficient information is provided in a question to enable free cash flows to be calculated, free cash flows should be used in the DCF valuation instead of post-tax post-financing cash flows.

The concept of "free cash flows"

The cash flow available for distribution to investors after the entity has made all the investments in non-current assets and working capital necessary to sustain ongoing operations is referred to as "free cash flow".

Definition

Free cash flow: Cash flow from operations after deducting interest, tax, preference dividends and ongoing capital expenditure, but excluding capital expenditure associated with strategic acquisitions and / or disposals and ordinary share dividends.

Use of free cash flows

The value of the shareholder's stake (equity) in an entity is then the sum of the future free cash flows discounted at the cost of equity.

Note that if we assume that a company pays out all of its free cash flow as a dividend, the DCF company valuation method (where free cash flows are discounted at cost of equity) will give exactly the same result as the DVM valuation method introduced earlier in the Chapter, where the free cash flows used in the DCF calculation are assumed to grow at a constant rate and the same growth rate is used in the DVM valuation.

The problem of block information

In a project appraisal, the cash flows generated from the project are easily identifiable, but in a business valuation they are not necessarily.

This is because there are so many of them, and because the necessary information does not usually exist in the public domain.

Therefore, for business valuation, we often have to estimate cash flows using the readily-available accounting information.

Business Valuations

Illustration 2 - Free cash flows

The recently published accounts of Carey show the following figures:

Operating profit (after deducting depreciation of Rs. 3 m) = Rs. 32 m
Interest paid = Rs. 2 m

Taxation = Rs. 9 m

Capital expenditure = Rs. 4 m, which is assumed to represent a sustainable level of investment in non-current assets.

Required:

Calculate the free cash flow in the year.

Solution:

Free cash flow = $32\text{ m} + 2\text{ m} - 2\text{ m} - 9\text{ m} - 4\text{ m} = \text{Rs. } 20\text{ m}$

An appropriate cost of capital

The introductory paragraph above explained that "an appropriate cost of capital" should be used for discounting. In some exam questions, you will be told directly which cost of capital to use. However, in other cases you will be expected to either calculate or select an appropriate cost of capital. It is then important to understand the following relationships:

Use of cost of equity as a discount rate

The cost of equity can be used to discount the free cash flows (i.e., post-tax cash flows AFTER financing charges) in order to value the equity in a company directly.

Use of WACC as a discount rate

WACC can be used to discount post-tax cash flows BEFORE financing charges when valuing a project or an entity (debt + equity value). To find the enterprise's equity value, the value of debt would need to be deducted.

Business Valuations

In summary:

Entity value	Equity value / Share holder value
<ul style="list-style-type: none"> use WACC to discount post-tax cash flows BEFORE financing charges 	<ul style="list-style-type: none"> Use cost of equity to discount free cash flows (or post-tax cash flows AFTER financing charges as an approximation to free cash flows where free cash flows are not known)
	Debt value

Use of proxy company information

The cost of capital used must reflect the risk of the entity's cash flows. If a cost of capital is not given, or if it is difficult to derive one (perhaps because the entity is unlisted and therefore there is a lack of available information), a proxy cost of capital from a similar listed company could be used instead.

When using a proxy cost of capital, care must be taken to ensure that it reflects the entity's business risk and its capital structure. If necessary, a risk adjusted cost of capital could be used, as covered in the earlier Chapter on 'Capital Structure'.

Illustration 3

Eamon Co. is forecast to generate a constant stream of post tax cash flows (after interest charges) of Rs. 10 m per year.

The company is not listed, and no cost of equity has been calculated. However, a similar listed entity, Frank Co. which operates in the same business sector has a cost of equity of 10%.

Frank Co. is all equity financed whereas Eamon Co. has 20% debt and 80% equity by market values. The tax rate is 30%, and the yield on Eamon's debt is 4%.

Required:

Calculate the value of Eamon Co. using the discounted cash flow method.

Business Valuations

Solution

The given post tax and post interest cash flows need to be discounted using an appropriate cost of equity.

Although Frank Co. operates in the same business sector, its gearing is different. Hence, a risk adjusted cost of equity (suitable to Eamon Co.'s circumstances) would be (using M + M's formula):

$$k_e = k_a + (k_a - k_d) (1 - t) VD / VE$$

$$= 10\% + (10\% - 4\%) (1 - 0.30) 20/80$$

$$= 11.05\%$$

Therefore, the value of Eamon Co.'s equity is Rs. 10 m / 0.1105 = Rs. 90.5 m

Example 9

Chassagne Co. is considering making a bid for Butler Co. a rival company.

The following information should be used to value Butler Co.

Income statement for the most recent accounting period

	Rs. in m
Revenue	285.1
Cost of sales	(120.9)
Gross profit	164.2
Operating expenses (inc depreciation Rs. 12.3 m)	(66.9)
Profit from operations	97.3
Finance costs	(10.0)
Profit before tax	87.3
Taxation	(21.6)
Profit after tax	65.7

Other information

- selling prices are expected to rise at 3% p.a. for the next 3 years and then stay constant, thereafter.
- sales volumes are expected to rise at 5% p.a. for the next 3 years and then stay constant, thereafter.

Business Valuations

- assume that cost of sales is a completely variable cost, and that other operating expenses (including depreciation) are expected to stay constant.
- Butler Co. invested Rs. 15 m in noncurrent assets and Rs. 2 m in working capital last year. These annual amounts are expected to stay constant in future.
- Butler Co.'s financing costs are expected to stay constant each year in the future.
- the marginal rate of tax is 28%, payable in the year in which the liability arises.
- assume that book depreciation equals tax depreciation.
- Butler Co. has 500 million shares in issue
- the WACC of Butler Co. is 9% and its cost of equity is 12%.

Required:

Calculate the value of the equity in Butler Co. (in total and per share) by forecasting future free cash flows and discounting them to present value.

The strengths and weaknesses of cash-based valuations

The strengths of this method of valuation are:

- theoretically this is the best method of valuation;
- it can be used to place a maximum value on the entity;
- it considers the time value of money.

The weaknesses of this method are:

- It is difficult to forecast cash flows accurately;
- it is difficult to determine an appropriate discount rate;
- what time period should we evaluate in detail and then how do you value the company's worth beyond this period? i.e., the realisable value at the end of the planning period;
- the NPV method does not evaluate further options that may exist;
- It assumes that the discount rate and tax rates are constant through the period.

Summary of valuation methods – when should each be used?

This Chapter has covered the different valuation methods in turn, and has separately identified the strengths and weaknesses of each of the methods. To conclude, we should the circumstances in which each valuation method is most useful.

Business Valuations

Net asset based methods

The net asset based valuation methods are most appropriate when valuing capital intensive business with plenty of tangible assets.

For a service business, the net asset based approach is likely to significantly undervalue the business, unless some effort is also made to value the intangible assets of the business.

Note, however, that in times of uncertainty, the net asset based approach avoids the need to forecast future earnings or cash flows, so it may be favored in these circumstances.

Dividend Valuation Model (DVM)

The DVM is a suitable valuation method when valuing a minority shareholding in a company, because if an investor purchases a minority stake, the dividends represent the forecast income from the investment which will impact the valuation.

If the investor was to purchase a majority stake, it would be more relevant to consider overall company cash flows or net asset values as a basis for the valuation.

P/E method and discounted cash flow method

Both these methods are based on forecasts of the future, and often use proxy information from proxy companies. These factors may be difficult to identify in practice.

Providing that free forecasts are accurate, these methods value the business based on its future prospects, so automatically include a measure of the good will / intangible assets associated with a business.

For service business, these methods are generally preferred to the net asset based methods.

9 The Efficient Market Hypothesis (EMH)

Introduction to market efficiency

In theory, in a perfect market, the market value of a listed company should be a fair reflection of all the information which is known about that company.

For example, a profitable company with good prospects should be worth more than an under performing company.

Business Valuations

In the real world, it is often argued that the market is not perfect, so the value of a listed company does not reflect all the information known about a company.

The extent to which market share prices are a fair reflection of a company's position depends on the efficiency of the market.

The Efficient Market Hypothesis (EMH)

The efficiency of a financial market may be examined in various ways, the most relevant here being in terms of information processing.

Information processing efficiency reflects the extent to which information regarding the future prospects of a company is reflected in its current price.

Information processing efficiency is of great importance to financial management as it means that the results of management decisions will be quickly and accurately reflected in share prices. For example, if a firm undertakes an investment project that will generate a large surplus, then in an efficient market it should see the value of its equity rise. Accordingly there have been many tests of the so-called Efficient Market Hypothesis (EMH) for the USA and the UK stock markets.

For the purposes of testing, the EMH is usually broken down into three categories, as follows.

- the weak form;
- the semi-strong form (which is closest to the real world situation);
- the strong form (which is assumed by many of the theories in Financial Strategy).

More Detail on the EMH

Weak form

When a stock market displays weak form efficiency, share prices reflect all known publicly-available past information about companies and their shares. Share prices reflect this historical information, such as published financial results and dividend payments. If this hypothesis is correct, then it should be impossible to predict future share price movements from historical patterns (which is what so-called 'technical analysis' or 'chartists' attempt to do). For example, if a company's share price had increased steadily over the last few months to a current price of Rs. 2.50, this price will already fully reflect the currently available information about the company.

The next change in share price could be either upwards or downwards, with equal

Business Valuations

probability, depending on the nature of the next information made available to the market.

Because of this randomness in share price movements, this is frequently referred to as the random walk hypothesis. This means that the movements of share prices over time approximate a random walk. It also follows that because the current share price fully reflects past information about price changes it is the best estimate of share's value.

Semi-strong form

The semi-strong form hypothesis of market efficiency is that current share prices reflect not only historical share price information and other historical information about a company, but also respond immediately to other current publicly-available information about the company.

For example, suppose that Alpha plc. is a stock market company that announces its latest profits and dividends figures. If the stock market is efficient in its semi-strong form, the share price will react immediately to the news announcement and settle at a new level that reflects the new information. If the stock market does not display semi-strong form efficiency, it might be several days or weeks before the share price adjusts.

Thus, a stock market specialist, who attempts use his expertise to use the publicly available information to predict which shares will be worth buying, would have little success in out-guessing the market.

The evidence also tends to confirm that the semi-strong form of efficiency does exist in leading stock markets.

Strong form

The strong form hypothesis of market efficiency states that the current share price reflects all the information relevant to the company, including information that has not yet been made public. If the hypothesis is correct then the mere publication of the information should have no impact on the share price, consequently it should not be possible to make profits by dealing in response to inside information. It would be impossible to make a profit by predicting future share price movements for reasons not yet known to the market, because the market knows everything. It would be impossible for individuals to make a profit from insider dealing. (Insider dealing is illegal in both the UK and the US.) It is unlikely that the strong form exists.

Business Valuations

Implications of the EMH for financial managers

If capital markets are efficient, the main implications for financial managers are:

- The timing of issues of debt or equity is not critical, as the prices quoted in the market are 'fair'.
- The entity's share price will reflect the net present value of its future cash flows, so managers must only ensure that all investments are expected to exceed the company's cost of capital.

Multiple choice questions (MCQs)

- Which of the following statement is correct:
 - eps of risky company should be adjusted for valuation
 - lower dividend of target company will result in lower value under earning approach
 - under net asset valuation method, company will be valued as book value of net assets plus goodwill
 - DVM does not consider the earnings of company
- If stock market is semi-strong efficient, when share price will change if company takes a decision of investment in new project :
 - share price will change when decision is taken
 - share price will change at announcement of decision
 - share price will change at actual results (profit or loss)
 - share price will change at receipt of dividend

10 Exam style questions

Note: Several of the exam style questions at the end of the next Chapter ('Financial and Strategic Implications of Mergers and Acquisitions') also contain business valuation calculations.

Test your understanding 1 – Predator Ltd.

The board of directors of Predator Ltd. is considering making an offer to purchase Target Ltd, a private limited company in the same industry. If Target Ltd. is purchased it is proposed to continue operating the company as a going concern in the same line of business.

Summarized details from the most recent financial statements of Predator and

Business Valuations

Target are shown below:

	Predator Ltd. SFP as at 31 March		Target Ltd. SFP as at 31 March	
	Rs. in m	Rs. in m	Rs. '000'	Rs. '000'
Freehold property		33		460
Plant and equipment		58		1,310
Inventory	29		330	
Receivables	24		290	
Cash	3		20	
less current liabilities	(31)	25	(518)	122
		116		1,892
Financed by: Ordinary shares		35		160
Reserves		43		964
		78		1,124
Shareholders funds		38		768
Medium term bank loans		116		1,892

Predator Ltd. Rs. 10 ordinary shares, Target Ltd. Rs. 5 ordinary shares.

	Predator Ltd.		Target Ltd.	
Year	PAT Rs. m	Dividend Rs. m	PAT Rs. '000'	Dividend Rs. '000'
T5	14.30	9.01	143	85.0
T4	15.56	9.80	162	93.5
T3	16.93	10.67	151	93.5
T2	18.42	11.60	175	102.8
T1	20.04	12.62	183	113.1

N.B. T5 is five years ago and T1 is the most recent year.

Target's shares are owned by a small number of private individuals. Its managing director, who receives an annual salary of Rs. 120,000, dominates the company. This is Rs. 40,000 more than the average salary received by managing directors of similar companies. The managing director would be replaced if Predator purchases Target.

The freehold property has not been revalued for several years and is believed to have a market value of Rs. 800,000.

Business Valuations

The statement of financial position value of plant and equipment is thought to reflect its replacement cost fairly, but its value if sold is not likely to exceed Rs. 800,000. Approximately Rs. 55,000 of inventory is obsolete and could only be sold as scrap for Rs. 5,000.

The ordinary shares of Predator are currently trading at Rs. 86 ex-div. A suitable cost of equity for Target has been estimated at 15%.

Both companies are subject to corporation tax at 33%.

Required:

Estimate the value of Target Ltd. using the different methods of valuation and advise the board of Predator as to how much it should offer for Target's shares.

Answers to MCQs:

- 1) d
2) b

Test your understanding answers**Example 1**

Assuming the balance sheet values are realistic, the valuation is:

	Rs. '000'
Noncurrent assets	23,600
Current assets	8,400
Less: 6% Unsecured bond	(8,000)
Less: Current liabilities	(4,800)
	<hr/>
	19,200

So the value per share is Rs. 19,200,000 / 800,000 = Rs. 24

(Note that the net asset value of Rs. 19,200,000 is equal to the value of the ordinary share capital plus reserves.)

Example 2

Value per share = (Rs. 19,200,000 + Rs. 40,000,000 – Rs. 23,600,000) / 800,000 = Rs. 44.5

Business Valuations

Example 3

	Rs. '000'	Explanation / justification
Noncurrent assets	1,500	Ray Ltd. is buying the business, so would have to buy the machinery from scratch if it decided on the alternative of organic growth. The realisable value will be a useful minimum value from Ribbon Ltd.'s perspective, but it is not relevant to Ray Ltd.
Current assets (564–120–30)	414	The inventory and receivables relating to the bankrupt customer will not be acquired by Ray Ltd. They are therefore excluded from the valuation.
Less: 5% bonds	(500)	
Less: Current liabilities	(518)	In order for Ray Ltd. to takeover Ribbon Ltd. it needs to buy the equity of the business. After the takeover, Ray Ltd. will be responsible for meeting these liabilities, so they should be included in the valuation of Ribbon Ltd.
	<hr/>	
	796	

Value per share = Rs. 796,000 / 10,000 = Rs. 79.6

Example 4

		Rs. in m
Current pre tax profit		24.29
Less: Industry ROA x Net assets	10% x 128.66 m	(12.87)
Value Spread		<hr/> 11.42
Post Tax Value Spread	11.42 m x (1–0.30)	7.99
CIV (assuming constant perpetuity)	7.99 m x 1/0.16	49.94

Therefore, the total value of Chapman Co. is estimated to be 128.66 m + 49.94 m = Rs. 178.60 m

Business Valuations

Example 5

$$a) \quad P_0 = \frac{250,000}{0.14}$$

= Rs. 1.786 million, or $1.786/2 = \text{Rs. } 0.893$ per share.
 = Rs. 2.6 million, or $2.6/2 = \text{Rs. } 1.30$ per share.

$$b) \quad P_0 = \frac{250,000 \times 1.04}{0.14 - 0.04}$$

Example 6

EPS = $3,840,000 / 1,000,000 = \text{Rs. } 3.84$

Value = $P/E \times \text{EPS} = 9 \times 3.84 = \text{Rs. } 34.56$

Example 7

The maximum that X should be prepared to pay for Y is the total increase in value generated by taking over Y, i.e.,

Value of combined =	$11 \times (3\text{m} + 1.5\text{m} + 0.5\text{m}) =$	Rs. 55 m
Less value of X =	$12 \times 3\text{m} =$	Rs. 36 m
Max. price to pay =		Rs. 19 m

However, the shareholders of Y will value their company at $8 \times 1.5 \text{ m} = \text{Rs. } 12 \text{ m}$ since they will not have enough information to enable them to value the expected synergies.

The price paid by X to take over Y is then likely to fall somewhere between these two valuations, depending upon the negotiating skills of the buyer and seller.

Example 8

Year	Rs.	DF (12%)	PV
1	120,000	0.893	107,160
2	100,000	0.797	79,700
3	140,000	0.712	99,680
4	50,000	0.636	31,800
5 onwards	130,000	0.567	73,710
NPV			392,050

Business Valuations

However, this ignores cash flows after year 5. Assuming the year 5 cash flow continues to infinity, this has a present value of:

$$130,000 / 0.12 = \text{Rs. } 1,083,333$$

This has a present value today of:

$$\text{Rs. } 1,083,333 \times 0.567 = \text{Rs. } 614,250$$

This gives a total present value (value of equity) of:
 $614,250 + 392,050 = \text{Rs. } 1,006,300$

With 2 million shares, this is $1,006,300 / 2,000,000 = \text{Rs. } 0.50$ per share.

Example 9

	Year 1	Year 2	Rs. in m Year 3 etc.,
Sales ($\times 1.03 \times 1.05$)	308.3	333.5	360.6
Cost of sales ($\times 1.05$)	(126.9)	(133.3)	(140.0)
Gross profit	181.4	200.2	220.6
Operating expenses	(66.9)	(66.9)	(66.9)
Financing costs	(10.0)	(10.0)	(10.0)
Forecast profit before tax	104.5	123.3	143.7
Less Taxation (28%)	(29.3)	(34.5)	(40.2)
Add back depreciation	12.3	12.3	12.3
Less capital expenditure	(15.0)	(15.0)	(15.0)
Less working capital investment	(2.0)	(2.0)	(2.0)
Forecast free cash flows	70.5	84.1	98.8
DF 12%	0.893	0.797	0.797/0.12
Present value	63.0	67.0	656.2

So the net present value = Rs. 786.2 m

This is the total value of the equity in Butler Co.

With 500 million shares in issue, this corresponds to a value of

$$786.2 / 500 = \text{Rs. } 1.57 \text{ per share.}$$

Business Valuations

Test your understanding 1 – Predator Ltd.

The approaches to use for valuation are:

- 1) Net asset valuation
- 2) Dividend valuation model
- 3) P/E ratio / Earnings valuation.

1) Net asset valuation

Target is being purchased as a going concern, so realisable values are irrelevant.

	Rs. '000'
Net assets per accounts (1,892 768)	1,124
Adjustments to freehold property (800 460)	340
Adjustment to inventory	(50)
	<hr/>
Valuation	1,414
	<hr/>
	Say Rs. 1.4 m

2) Dividend valuation model

The average rate of growth in Target's dividends over the last four years is 7.4% on a compound basis.

The estimated value of Target using the dividend valuation model is therefore:

$$\text{Valuation} = \frac{\text{Rs. } 113,100 \times 1.074}{0.15 - 0.074} = \text{Rs. } 1,598,281 \text{ Say Rs. } 1.6 \text{ m}$$

3) P/E ratio / Earnings valuation

A suitable P/E ratio for Target will be based on the P/E ratio of Predator as both companies are in the same industry.

$$\text{P/E of Predator: } \frac{3.5 \text{ m} \times \text{Rs } 86}{\text{Rs. } 20.04} = 15.02$$

The adjustments: downwards

Target is a small private company. It has a poorer growth potential based on past performance.

Business Valuations

Predator Ltd.
= 8.8%

Target Ltd.
= 6.36%

A suitable P/E ratio is therefore $15.02 \times 80\% = 12.02$, say 12.

Target's maintainable earnings are:

Rs. $183,000 + (\text{Rs. } 40,000 \times 67\%) = \text{Rs. } 209,800$ after adjusting for the savings in the director's remuneration.

The estimated value is therefore $\text{Rs. } 209,800 \times 12 = \text{Rs. } 2,517,600$, say Rs. 2.5 m

Advice to the board

On the basis of its tangible assets the value of Target is Rs. 1.4 m, which excludes any value for intangibles.

The dividend valuation gives a value of around Rs. 1.6 m.

The earnings based valuation indicates a value of around Rs. 2.5 m, which is based on the assumption that not only will the current earnings be maintained, but that they will increase by the savings in the director's remuneration.

On the basis of these valuations an offer of around Rs. 2 m would appear to be most suitable. The directors should, however, be prepared to increase the offer to:

Maximum price

It is worth noting that the maximum price Predator should be prepared to offer is:

The NPV of the combined group after the acquisition	X
The NPV of the acquiring company before the acquisition	(X)
Maximum price	X

If **synergy** occurs this could justify a higher price than shown by the valuation methods illustrated.

The comment on the maximum price is particularly appropriate in this question as this an example of horizontal integration where considerable synergies normally exist.

8

Mergers and Acquisitions

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Mergers and Acquisitions

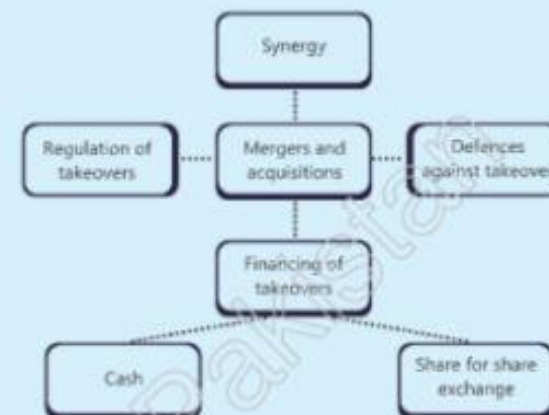
Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Understand merger and acquisitions
- Learn about conduct of a takeover
- Know about payment methods
- Comprehend valuation of mergers and amalgamations
- Apprehend regulation of acquisition
- Elucidate post-acquisition integration
- Explicate impact of mergers and acquisition on stakeholders
- Learn exit strategies

Mergers and Acquisitions

1 Overview of Chapter



Terminology

The term 'merger' is usually used to describe the joining together of two or more entities.

Strictly, if one entity acquires a majority shareholding in another, the second is said to have been acquired (or 'taken over') by the first. If the two entities join together to submerge their separate identities into a new entity, the process is described as a merger.

In fact, the term 'merger' is often used even when an acquisition / takeover has actually occurred, because of the cultural impact on the acquired entity – the word merger makes the arrangement sound like a partnership between equals.

Types of merger / acquisition

Mergers and acquisitions can be to reflect the nature of the enlarged group:

- Horizontal integration results when two entities in the same line of business combine. For example, recent bank and building society mergers are good example of this type of integration.
- Vertical integration result from acquisition of one entity by another which is at different level in the 'chain or supply' – as an example, UK breweries have moved heavily into the distribution of their product via public houses.

Mergers and Acquisitions

- A conglomerate results when two entities in unrelated business combine.

2 The reasons for growth by acquisition or merger

Specific reasons for merger / acquisition

The following reasons have been suggested as to why entities merge or acquire.

- **Increased market share / power:** In a market with limited product differentiation, price may be the main competitive weapon. In such a example reducing prices in the short-term to eliminate competition before increasing prices later.
- **Economies of scale:** These result when expansion of the scale of productive capacity of an entity (or industry) causes total production costs to increase less than proportionately with output. It is clear that a merger which resulted in horizontal or vertical integration could be giving such economies since, at the very least, duplication would be avoided. But how could a conglomerate merger give economies? Possibly through central facilities such as offices, accounting departments and computer departments being rationalized. (Indeed, both sets of management are unlikely to be needed in their entirety.)
- **Combining complementary needs:** Many small entities have a unique product but lack the engineering and sales organizations necessary to produce and market it on a large scale. A natural course of action would be to merge with a larger entity. Both entities gain something – the small entity gets “instant” engineering and other benefits which a unique product can bring. Also if, as is likely, the resources which each entity requires are complementary, the merger may well produce further opportunities that neither would see in isolation.
- **Improving efficiency:** A classic takeover target would be an entity operating in a potentially lucrative market but which, owing to poor management or inefficient operations, does not fully exploit its opportunities. Of course, being taken over would not be the only way of improving such a poor performer, but such an entity's managers may be unwilling to give themselves the sack.
- **A lack of profitable investment opportunities – surplus cash**
An entity may be generating a substantial volume of cash, but sees few profitable investment opportunities. If it does not wish to simply pay out the surplus cash as dividends (because of its long-term dividend policy,

Mergers and Acquisitions

perhaps), it could use it to acquire other entities. A reason for doing so is that entities with excess cash are usually regarded as ideal targets for acquisition – a case of buy or be bought.

- **Tax relief:** An entity may be unable to claim tax relief because it does not generate sufficient profits. It may, therefore, wish to merge with another entity which does generate such profits.
- **Reduced competition:** It is often one benefit of merger activity – provided that it does not fall foul of the competition authorities.
- **Asset – stripping:** A predator acquires a target and sells the easily separable assets, perhaps closing down or deposing of some of its operations.

The following reasons are of questionable validity:

- **Diversification, to reduce risk:** While acquiring an entity in a different line of activity may diversify away risk for the entities involved, this is surely irrelevant to the shareholders. They could have performed exactly the same diversification simply by holding shares in both entities. The only real diversification produced is in the risk attaching to the managers and employees jobs, and this is likely to make them more complacent than before – to the detriment of shareholder's future returns.
- **Share of the target entity are undervalued:** This may well be the case, although it would conflict with the efficient markets theory. However, the shareholders of the entity planning the takeover would derive as much benefit (at a lower administrative cost) from buying such undervalued shares themselves. This also assumes that the acquirer entity's management is better at valuing shares than professional investors in the market place.

Synergy

Definition

Synergy may be defined as two or more entities coming together to produce a result not independently obtainable.

For example, a merged entity will only need one marketing department, so there may be savings generated compared to two separate entities.

Mergers and Acquisitions

Importance of synergy in mergers and acquisitions

For a successful business combination we should be looking for a situation where:

$$\text{MV of combined company (AB)} > \text{MV of A} + \text{MV of B}$$

Note: MV means Market Value here.

If this situation occurs we have experienced synergy, where the whole is worth more than the sum of the parts. This is often expressed as $2 + 2 = 5$.

It is important to note that synergy is not automatic. In an efficient stock market A and B will be correctly valued before the combination, and we need to ask how synergy will be achieved, i.e., why any increase in value should occur.

Sources of synergy

There are several reasons why synergistic gains arise. These break down into the following:

- **operating economies**, such as economies of scale and elimination of inefficiency,
- **financial synergy**, such as the reduced risk caused by diversification,
- **other synergistic effects**, such as market power.

Detailed examples of synergy

Synergy from operating economies

Economies of scale - Horizontal combinations (acquisitions of a company in a similar line of business) are often claimed to reduce costs and, therefore, increase profits due to economies of scale. These can occur in the production, marketing or finance areas. Note that these gains are not automatic and diseconomies of scale may also be experienced. These benefits are sometimes also claimed for conglomerate combinations (acquisition of companies in unrelated areas of business) in financial and marketing costs.

Economies of vertical integration - Some acquisitions involve buying out other companies in the same production chain, e.g., a manufacturer buying out a raw material supplier or a retailer. This can increase profits by 'cutting out the middle man'.

Complementary resources - It is sometimes argued that by combining the

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strengths of two companies a synergistic result can be obtained. For example, combining a company specializing in research and development with a company strong in the marketing area could lead to gains.

Elimination of inefficiency - If the victim company is badly managed, its performance and, hence, its value can be improved by the elimination of inefficiencies. Improvements could be obtained particularly in the areas of production, marketing and finance.

Financial synergy

Several financial arguments are proposed in this area.

Diversification - The argument goes that diversification normally reduces risk. If the earnings of the merged companies simply stay the same (i.e., no operating economies are obtained), there could still be an increase in value of the company due to the lower risk.

Diversification and financing - If the future cash flow streams of the two companies are not perfectly positively correlated then, by combining the two companies, the variability of their operating cash flow may be reduced. A more stable cash flow is more attractive to creditors and this could lead to cheaper financing.

The 'boot strap' or P/E game - It is sometimes argued that companies with high P/E ratios are in a good position to acquire other companies as they can impose their high P/E ratio on the victim firm and increase its value.

Other synergistic effects

Surplus managerial talent - Companies with highly skilled managers can make use of this resource only if they have problems to solve. The acquisition of inefficient companies is sometimes the only way of fully utilizing skilled managers.

Surplus cash - Companies with large amounts of surplus cash may see the acquisition of other companies as the only possible application for these funds. Of course, increased dividends could cure the problem of surplus cash, but this may be rejected for reasons of tax or dividend stability.

Market power - Horizontal combinations may enable the firm to obtain a degree of monopoly power that could increase its profitability. Removing competition from a market in this way could attract the attentions of the competition authorities.

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Speed - Acquisition may be far faster than organic growth in obtaining a presence in a new and growing market.

By considering all the above sources of synergy, a company can work towards increasing the post-merger value of the newly formed joint company.



Example 1

Williams Inc. is the manufacturer of cosmetics, soaps and shower gels. It also markets its products using its own highly successful sales and marketing department. It is seen as an employer of choice and as such has a talented and loyal workforce with a history of developing new and exciting products which have sold well. It is now considering extending its range, however, it has currently a buildup of unfulfilled orders due to a lack of capacity.

GSL is a well known herbal remedy for skin problems. GSL Co. was founded by three brothers in the 1950s and until the death of the remaining brother in 2007 has performed well – however the new Chairman has limited experience and the company has not performed well over recent years. GSL has a dedicated team of herbalists who have developed products, which would find a ready market – however, there is insufficient funds and expertise to correctly market these products and market share is low.

Williams' products and GSL's products are made using similar production technologies and their financial and administrative systems are similar and it is hoped savings can be made here.

Required:

Identify any potential synergy gains that would emerge from a merger of Williams and GSL.

Reasons why mergers and acquisitions fail

Not all mergers and acquisitions are successful.

Synergy will not automatically arise. Unless the management of the two entities can work together effectively, there is a chance that any forecast benefits of the new arrangement might not be realized.

In many cases, the forecast synergy is not achieved, or is not as large as expected. It may be that the premium paid on acquisition by the acquirer was too high, so the

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shareholder value of the acquirer actually reduced as a result of the acquisition.

Detailed reasons why mergers / acquisition fail

The fit / lack of fit syndrome

There may be a good fit of products or services, but a serious lack of fit in terms of management's styles or corporate structure.

Lack of industrial or commercial fit

Failure can result from a horizontal or vertical takeover where the acquired entity turns out not to have the product range or industrial position that the acquirer anticipated. Usually in the case where a customer or supplier is acquired, the acquirer knows a lot about the acquired entity; even so, there may be aspects of the acquirer, such that, even in these cases, a prospective acquisition should be planned very carefully and not be based solely on experience gained from a direct relationship with the acquired entity.

Lack of goal congruence

This may apply not only to the acquired entity but, more dangerously, to the acquirer, whereby disputes over the treatment of the acquired entity might well take away the benefits of an otherwise excellent acquisition.

'Cheap' purchases

The 'turn around' costs of an acquisition purchased at what seems to be a bargain price may well turn out to be high multiple of that price. In these situations, the amount of resources in terms of cash and management time could well also damage the acquirer's core business. In preparing a bid, a would-be acquirer should always take into account the likely total cost of an acquisition, including the input of its own resources, before deciding on making an offer or setting an offer price.

Paying too much

The fact that a high premium is paid for an acquisition does not necessarily mean that it will fail. Failure would result only if the price paid is beyond that which the acquirer considers acceptable to increase satisfactorily the long-term wealth of its shareholders.

Failure to integrate effectively

An acquirer needs to have a workable and clear plan of the extent to which the

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acquired company is to be integrated and the amount of autonomy to be granted. At best, the plan should be negotiated with the acquired entity's management and staff, but its essential requirements should be fairly but firmly carried out. The plan must address such problems as differences in management styles, incompatibilities in data information systems, and continued opposition to the acquisition by some of the acquired entity's staff. Failure to plan can – and often does – lead to failure of an acquisition, as it leads to drift and de-motivation, not

only within the acquired entity but also within the acquirer itself.

Every aspect of a prospective acquisition, as it will affect the would-be acquirer, should be weighed up before embarking on a bid. Problems of integration have a much better chance of being resolved before bidding action is taken than they do after the event, when many more complications can ensue.

Even if a product fit is satisfactory, this would-be acquirer should be satisfied that the aspects of its own operation affected by the bid will be properly adaptable to the new activities. Running the rule carefully over one's operations may yield vital information as to areas which may need adaptation before a bid can be contemplated, and provide vital clues to appropriate areas for search when a bid has actually been launched. One factor of special importance is a clear assessment of the flexibility of one's information systems.

Inability to manage change

Several of the above points stress the need for an acquirer to plan effectively before and after an acquisition if failure is to be avoided. But this in itself calls for the ability to accept change – perhaps even radical change – from established routines and practices. Indeed, many acquisitions fail mainly because the acquirer is unable – or unwilling – reasonably to adjust its own activities to help ensure a smooth takeover. One such situation is where the acquired company has a demonstrably better data information system than the acquirer, which it might be greatly in the acquirer's interest to adopt.

3 Defences Against Hostile Takeover Bids

Any listed company needs to be aware that a bid might be received at any time.

The directors of a company subject to a hostile takeover bid should act in the best interests of their shareholders. However, in practice they will also consider the views of other stakeholders (such as employees, and themselves).

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If the board of directors of a target company decides to fight a bid that appears to be financially attractive to their shareholders, then they should consider one of the following defences:

- Pre-bid defences
 - Communicate effectively with shareholders;
 - Revalue noncurrent assets;
 - Poison pill;
 - Change the articles of Association (super majority).
- Post-bid defences
 - Appeal to their own shareholders;
 - Attack the bidder;
 - White Knight;
 - Counterbid ("Pacman");
 - Refer the bid to the Competition authorities.

Details of takeover defences

Pre-bid defences

Communicate effectively with shareholders

This includes having a public relations officer specializing in financial matters liaising constantly with the entity's stockbrokers, keeping analysts fully informed, and speaking to journalists.

Revalue non-current assets

Non-current assets are revalued to current values to ensure that shareholders are aware of true asset value per share.

Poison pill strategy

Here a target company takes steps before a bid has been made to make it less attractive to a potential bidder. The most common method is for existing shareholders to be given rights to buy future bonds or preference shares. If a bid is making before the date of exercise of the rights, then the rights will automatically be converted into full ordinary shares.

Super majority

The Articles of Association are altered to require that a higher percentage (say 80%)

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of shareholders have to vote for the takeover.

Post – bid defences

Appeal to their own shareholders

For example, by declaring that the value placed on the target company's shares is too low in relation to the real value and earning power of the company's assets, or alternatively that the market price of the bidder's shares is unjustifiably high and is not sustainable.

A well-managed defensive campaign would include:

- i) Aggressive publicity on behalf of the company preferable before a bid is revived. Investors may be told of any good research ideas within the company and of the management potential or merely be made more aware of the company's achievements.
- ii) Direct communication with the shareholders in writing stressing the financial and static reason for remaining independent.

Attack the bidder

Typically concentrating on the bidder's management style, overall strategy, methods of increasing earnings per share, dubious accounting policies and lack of capital investment.

White Knight strategy

This is where the directors of the target company offer themselves to a friendlier outside interest. This tactic should only be adopted in the last resort as it means that the company will lose its independence. This tactic is acceptable provided that any information given to a preferred bidder is also given to a hostile bidder. The alternative company's management will be considered to be sympathetic to the target company's management.

Counterbid (Pacman defence)

Where the bidding company is itself the subject of a takeover bid by the target company.

Competition authorities

The target entity could seek government intervention by bringing in the Competition

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authorities. For this to be effective it would have to be proved that the takeover was against the public interest.

4 The Form of Consideration for a Takeover

Introduction

When one firm acquires another, two questions must be addressed regarding the form of consideration for the takeover:

- 1) what form of consideration should be offered? Cash offer, or share exchange, or earn-out are the three main choices.
- 2) If a cash offer is to be made, how should the cash be raised? The choice is generally debt finance or a rights issue to generate the cash (if the entity does not have enough cash already).

The key considerations regarding these two questions are outlined below.

Form of consideration

Cash

In a cash offer, the target company shareholders are offered a fixed cash sum per share.

This method is likely to be suitable only for relatively small acquisitions, unless the bidding entity has an accumulation of cash.

Advantages

- When the bidder has sufficient cash the takeover can be achieved quickly and at low cost.
- Target company shareholders have certainty about the bid's value i.e., there is less risk compared to accepting shares in the bidding company.
- There is increased liquidity to target company shareholders, i.e., accepting cash in a takeover, is a good way of realizing an investment.
- The acceptable consideration is likely to be less than with a share exchange, as there is less risk to target company shareholders. This reduces the overall cost of the bid to the bidding company.

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Disadvantages

- With larger acquisitions the bidder must often borrow in the capital markets or issue new shares in order to raise the cash. This may have an adverse effect on gearing, and also cost of capital due to the increased financial risk.
- For target company shareholders, in some jurisdictions a taxable chargeable gain will arise if shares are sold for cash, but the gain may not be immediately chargeable to tax under a share exchange.
- Target company shareholders may be unhappy with a cash offer, since they are "bought out" and do not participate in the new group. Of course, this could be seen as an advantage of a cash offer by the bidding company shareholders if they want to keep full control of the bidding company.

Share exchange

In a share exchange, the bidding company issues some new shares and then exchanges them with the target company shareholders. The target company shareholders, therefore, end up with shares in the bidding company, and the target company's shares all end up in the possession of the bidding company.

Large acquisitions almost always involve an exchange of shares, in whole or in part.

Advantages

- The bidding company does not have to raise cash to make the payment.
- The bidding company can 'bootstrap' earnings per share if it has a higher P/E ratio than the acquired entity (terminology explained later in this Chapter).
- Shareholder capital is increased – and gearing similarly improved – as the shareholders of the acquired company become shareholders in the post acquisition company.
- A share exchange can be used to finance very large acquisitions.

Disadvantages

- The bidding company's shareholders have to share future gains with the acquired entity, and the current shareholders will have a lower proportionate control and share in profits of the combined entity than before.

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- Price risk – there is a risk that the market price of the bidding company's shares will fall during the bidding process, which may result in the bid failing. For example, if a 1 for 2 share exchange is offered based on the fact that the bidding company's shares are worth.
- Approximately double the value of the target company's shares, the bid might fail if the value of the bidding company's shares falls before the acceptance date.

Earn-out

Definition of an earn-out arrangement: A procedure whereby owners / managers selling an entity receive a portion of their consideration linked to the financial performance of the business during a specified period after the sale. The arrangement gives a measure of security to the new owners, who pass some of the financial risk associated with the purchase of a new entity to the sellers.

The purchase consideration is sometimes structured so that there is an initial amount paid at the time of acquisition, and the balance deferred. Some of the deferred balances will usually only become payable if the target entity achieves specified performance targets.

Summary of key issues relating to forms of consideration

Considerations of different stakeholders

In order to evaluate which form of consideration is appropriate in a particular case, it is important to assess the positions of both the target company's shareholders, and the bidding company and its shareholders.

Position of the target company's shareholders

The target company's shareholders may want to retain an interest in the business, in which case a cash offer would not be welcomed. However, there is a greater certainty of value with a cash offer (share prices fluctuate, so in a share exchange the target company's shareholders fluctuate, so in a share exchange the target company's shareholders cannot be completely sure whether they are receiving an appropriate valuation for their shares).

Position of the bidding company and its shareholders

The bidding company will have to issue new shares if it is to undertake a share exchange. This may require the consent of shareholders in a general meeting. The

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shareholders may be concerned in share exchange that their control of the bidding company will be diluted by the issue and exchange of shares.

Another key consideration is the impact of the takeover on the bidding company's financial statements. An issue of new shares could reduce the level of earnings per share (a measure which is often used as a key performance measure by market analysts). However, if a cash offer is made, the raising of the necessary cash could have a significant impact on the gearing of the bidding company – see below for details.

Methods of financing a cash offer

If the bidding company has a large cash surplus, it might be able to make a cash offer without raising any new finance.

However, in most cases, this will not be the case, so various financing options will have to be considered by the bidding company. The main two options are debt or a rights issue.

Debt

The bidding company could borrow the required cash from the bank, or issue bonds in the market.

The advantage of using debt in this situation is the low cost of servicing the debt. However, raising new debt finance will increase the bidding company's gearing. This will increase the risk to the bidding company's shareholders, so might not be acceptable to the shareholders.

The disadvantage to the target company's shareholders is that debt might be infrequently traded, and this will affect their ability to liquidate the investment should they need to. Also, the lack of marketability might adversely affect the value of the securities.

Rights issue

If the bidding company shareholders do not want to suffer the increased risk which debt finance would bring, the alternative would be for the bidding company to offer a rights issue to its existing shareholders. In this case, the company's gearing is not affected, although its earnings per share will fall as new shares are issued.

From the shareholders' point of view, the problem with this financing option is that it is the shareholders themselves who have to find the money to invest.

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Evaluating a share for share exchange

One popular question is to comment on the likely acceptance of a share for share offer. The procedure is as follows:

- Value the predator company as an independent entity and hence calculate the value of a share in that company.
- Repeat the procedure for the victim company.
- Calculate the value of the combined company post integration. This is calculated as:

Value of predator company as independent company	X
Value of victim company as independent company	X
Value of any synergy	X
Total value of combined company	X

- Calculate the number of shares post integration:

Number of shares originally in the predator company	X
Number of shares issued to victim company	X
Total shares post integration	X

- Calculate the value of a share in the combined company, and use this to assess the change in wealth of the shareholders after the takeover.

Illustration 1

Company A has 200 m shares with a current market value of Rs. 4 per share. Company B has 90m shares with a current market value of Rs. 2 per share.

A makes an offer of 3 new shares for every 5 currently held in B. A has worked out that the present value of synergies will be Rs. 40 m.

Required:

Calculate the expected value of a share in the combined company.

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Solution

MV of A = Rs. 800 m

MV of B = Rs. 180 m

PV of synergies = Rs. 40 m

TOTAL = Rs. 1,020 m

No. of new shares = $200 \text{ m} + (3/5) \times 90 \text{ m} = 254 \text{ m}$

New share price = $1,020 \text{ m} / 254 \text{ m} = \text{Rs. } 4.02$

	Shares	MV	Old wealth	
	Change			
a	200m	Rs. 804 m	Rs. 800 m	Rs. 4 m
b	$(3/5) \times 90 \text{ m} = 54 \text{ m}$	Rs. 216 m	Rs. 180 m	Rs. 36 m

The wealth of the shareholders in company B will increase by Rs. 36 m as a on sequence of the takeover. This is a $(36/180)$ 20% increase in wealth.

Company B's shareholders should be advised to accept the 3 for 5 share for share offer.

Example 2

Mavers Co. and Power Co. are listed on the stock exchange.

Relevant information is as follows:

	Mavers Co.	Power Co.
Share price today	Rs. 3.05	Rs. 6.80
Shares in issue	48 million	13 million

Mavers Co. wants to acquire 100% of the shares of Power Co.

The directors are considering offering 2 new Mavericks Co. shares for every 1 Power Co. share.

Required:

Evaluate whether the 2 for 1 share for share exchange will be likely to succeed.

If necessary, recommend revised terms for the offer which would be likely to succeed.

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Bootstrapping and post acquisition values

In the previous examples, we were told specifically what the values of the separate companies were before the takeover, and the synergy generated by the takeover was also given.

Sometimes we might have to derive these figures, using the bootstrapping method as in the following illustration.

Illustration 2

	Post Tax Profit	P/E ratio	Pre-acquisition value
Company C	Rs. 10 m	16	Rs. 160 m
Company D	Rs. 1 m	8	Rs. 8 m

If Company C takes over Company D, the post acquisition value of the combined company can be estimated by applying Company C's P/E ratio to the combined post tax profit.

This is known as bootstrapping, and it is based on the assumption that the market will assume that the management of the larger company will be able to apply common approach to both companies after the takeover, thus improving the performance of the acquired company by using the methods that they have been using on their own company before the takeover.

Value of (C+D) post acquisition = $16 \times (\text{Rs. } 10 \text{ m} + \text{Rs. } 1 \text{ m}) = \text{Rs. } 176 \text{ m}$

Thus, the value of the synergy is this combined value, less the values of the individual companies pre acquisition, i.e.,

$\text{Rs. } 176 \text{ m} - \text{Rs. } 160 \text{ m} - \text{Rs. } 8 \text{ m} = \text{Rs. } 8 \text{ m}$

5 The Regulation of Takeovers

A: Competition (Merger Control) Regulations, 2007

Mergers

Regulations define merger as:

- Two or more undertakings merge to form a new undertaking or
- One undertaking is absorbed by another; or
- Persons / undertakings acquire control of the whole or part of other undertakings; or
- The result of an acquisition by one undertaking of the assets or shares, or a substantial part of the assets or shares, of another undertaking

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- f) A collaborative arrangement by which two or more undertaking devote their resources to pursue a common objective.

Thresholds

Before consummation of the merger, concerned undertakings shall give notice of its / their intention of merger, to the Competition Commission of Pakistan if;

- the value of gross assets of the undertaking, excluding value of goodwill, is more than three hundred million rupees and / or the combined value of the undertaking and the undertaking(s) the shares of which are proposed to be acquired or the undertakings being merged, is more than one billion rupees; or
- annual turnover of the undertaking in the preceding year is more than five hundred million rupees and/or the combined turnover of the undertaking and the undertaking(s) the shares of which are proposed to be acquired or the undertakings being merged is more than one billion rupees; and
- the transaction relates to acquisition of shares or assets of the value of one hundred million rupees or more; or
- in case of acquisition of shares by an undertaking, if an acquirer acquires voting shares, which taken together with voting shares, if any, held by the acquirer shall entitle the acquirer to more than 10% voting shares;
- in the case of an asset management company carrying out asset management services, its collective exposure for itself and in all of its collective investment schemes in a single entity is more than 25% of total voting rights; or
- the value of total assets under management of an Asset Management Company is one billion rupees or more.

B: Listed Companies (Substantial Acquisition of Voting Shares and Takeovers) Ordinance, 2002.

Acquisition of more than ten percent voting shares of a company

Any acquirer who acquires voting shares, which (taken together with voting shares, if any, held by the acquirer) would entitle the acquirer to more than ten percent voting shares in a listed company, shall disclose the aggregate of his shareholding in that company to the said company and to the stock exchange on which the voting shares of the said company are listed.

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Additional acquisition of voting shares

No person shall, directly or indirectly, acquire voting shares, which (taken together with voting shares, if any, held by such person) would entitle such person to more than twenty five percent voting shares in a listed company or control of a listed company, unless such person makes a public announcement of offer to acquire voting shares or control of such company.

Consolidation of holdings

No acquirer, who has acquired more than twenty-five percent but less than fifty-one per cent of the voting shares or control of a listed company, shall acquire additional voting shares or control unless such acquirer makes a public announcement of offer to acquire voting shares or control. Provided that such acquirer shall not be required to make a fresh public announcement of offer within a period of twelve months from the date of the previous announcement.

Procedure for making competitive bid

Any person, other than the acquirer who has made the first public announcement, who is desirous of making a competitive bid, shall, within twenty-one days of the public announcement of the first offer, make a public announcement of his offer for acquisition of the same voting shares of the target company at higher price.

Upon the public announcement of a competitive bid the acquirer, who has made a public announcement of the earlier offer, shall have the option to make another announcement:

- revising the public offer; or
- withdrawing the public offer with the prior approval of the SECP.

Provided that if no such announcement is made within ten days of the public announcement of the competitive bid, the earlier offer on the original terms shall continue to be valid and binding on the acquirer who has made the earlier public offer, except that the date of closing of such public offer shall stand extended to the date of closure of public offer under the last subsisting competitive bid.

6 The Post-Merger or Post-Acquisition Integration Process

Introduction to the post-merger or post-acquisition process

Mergers and acquisitions often fail to deliver the anticipated benefits as a result of failing to effectively integrate the newly acquired entity into the parent.

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Poor planning and a lack of information to guide the integration plans ahead of the acquisition will lead to post-acquisition integration problems.

Druker's Golden Rules

P. F. Druker (1981) identified five Golden Rules to apply to post-acquisition integration.

- 1) Ensure a 'common core of unity' is shared by the acquired entity and acquirer. Shared technologies or markets are an essential element.
- 2) The acquirer should not just think 'What is in it for us?', but also 'What we offer them?'.
- 3) The acquirer must treat the products, markets and customers of the acquired entity with respect.
- 4) Within 1 year, the acquirer should provide appropriately skilled top management for the acquired company.
- 5) Within 1 year, the acquirer should make several cross-entity promotions of staff.

Post-acquisition value enhancing strategies

The following are key points to consider when determining strategy for the combined entity.

- The integration strategy must be in place before the acquisition is finalized.
- Review each of the business units for potential cost cuttings / synergies or potential asset disposals. It is possible there is outlets mover valuable to another entity, but it is important they are in good shape before they are sold. However, more than this is needed for a full effective enhancement programme and a position audit could be carried out.
- Consider the effect on the workforce and determine how many, if any redundancies are likely and what the cost will be.
- Risk diversification may well lower the cost of capital and therefore increase the value of the entity.
- The entity's cost of capital should be re-evaluated.
- Make a positive effort to communicate the post-acquisition intentions within the entity to prevent demotivation and avoid adverse post-acquisition effects on staff morale.
- There may be economies of scale to identify and evaluate.

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- Undertake a review of assets, or resource audit, and consider selling non-core elements or redundant assets.
- There may well be need to pursue a more aggressive marketing strategy.
- The risks of the acquisition need to be evaluated.
- There needs to be harmonization of corporate objectives.

Impact on ratios or performance measures

Following the completion of an acquisition the purchaser will need to examine thoroughly the financial and management accounting records of each business unit of the acquired entity.

Thus, the directors of the acquirer will be particularly interested in the financial condition of those units which they might plan to dispose of.

From a strategic point of view these are likely to be of more use to another entity with whom they would form a better fit. However, it is still essential that financially and operationally they should be in as good shape as possible to ensure that a good price can be obtained for them.

Illustration 3

Hall Co. has just acquired a subsidiary called Wodgits as part of a larger acquisition.

Hall Co. has no other subsidiaries in the same business sector as Wodgits, so management are considering disposing of Wodgits.

A small listed company called Bigwodge, whose core business is similar to Wodgits, has been identified, and by using all published and any other information reasonably available, the following analysis has been prepared:

	Wodgits	Bigwodge
Return on Capital Employed (ROCE)	14.9%	25.0%
Asset turnover	1.3 times	1.8 times
Net profit margin	11.5%	13.9%
Current ratio	1.5 times	2.2 times
Inventory holding period	68 days	57 days
Receivables collection period	54 days	43 days
Payables payment period	49 days	37 days

Note: All these ratios were introduced in the earlier Chapters on 'Performance Measurement in Financial Strategy' and 'Short Term Finance – Working Capital Management'.

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Other key information:

- Bigwodge has a P/E ratio of 18.
- Wodgits made an operating profit of Rs. 860,000 last year.
- Wodgits has total non current assets of Rs. 4.87 m, out of which land and buildings comprise Rs. 2.5 m. Its net assets at book value are Rs. 5.77 m.
- The tax rate is 33%.

Required:

As the management accountant of Hall Co. prepare a report to the directors in which you analyse the performance of Wodgits compared with Bigwodge, and recommend a price which Hall Co. ought to seek for the disposal of Wodgits.

Solution

Report to the directors of Hall Co.

Return on capital employed (ROCE)

Wodgits' inadequate ROCE seems to be mainly due to a low rate of asset turnover, which we must carefully investigate.

We know that land and buildings account for Rs 2.5 m of Wodgits' fixed asset total of Rs 4.87 m and it is important to establish how much of this property value represents redundant assets. As to plant and machinery, it may be that this is substantially new or revalued, in which case the assets may be of good value and the faults may lie mainly in undercapacity working or production inefficiencies. Much more serious, however, would be a situation where the plant is old and requiring heavy maintenance, and would be hard put to cope with increased volume of throughput.

If the first of these plant scenarios is correct, then Wodgits may well fetch a reasonable price, as a bidder, possibly Bigwodge themselves, would be obtaining good assets to add to their own evidently successful performance in their sector. If the second scenario applies, then we might find it difficult to obtain net asset value for the assets remaining after sale of the redundant properties.

Current ratio

Wodgits' current ratio and inventory holding period are fairly good, but before we put

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the unit up for sale, we would improve our prospects for a reasonable price by taking early action in regard to both receivables and payables. Both are too high and we should aim to tighten up credit control and also bring payables down to the more acceptable level which Bigwodge's payable payment period indicates is appropriate for the industry sector.

Conclusions

Assuming that we can find that, say, Rs. 1.5 m of land and buildings are redundant and can be separately sold, and that the plant scenario is favorable or can be made so, then it would not seem to be too difficult to make the remainder of Wodgits a saleable proposition.

Thus if we can assume no debt interest, and taxation of 33%, then after-tax profits could be Rs. 576,000 ($\text{Rs. } 860,000 \times 0.67$), and as Bigwodge's current P/E is 18, we might achieve for Wodgits a P/E of 9 or 10 which suggests a price of between

Rs. 5.2 and Rs. 5.8 m, which is comfortably above an asset value of Rs. 4.3 m ($\text{Rs. } 5.8 \text{ m} - \text{Rs. } 1.5 \text{ m assets sold}$).

The impact of an acquisition on the acquirer's post-acquisition share price

A very important aspect for an acquirer is the post-acquisition effect on its earnings per share (EPS), and the impact on the share price and P/E ratio arising from the market's perceived views on the acquisition.

Once again, detailed analysis of the accounts and comparison to other companies in similar business sectors can help to assess whether the likely impact will be favourable.

Simple example of the impact on EPS

Assume that the new entity starts with a prospective EPS of 13.1 cents based on combined profits of acquirer and acquired of Rs. 8.4 m, and 64 m shares in issue, and if these earnings could be maintained in year 1 (post-acquisition) they would appear not to be diluted.

However, if the acquirer is expected from its previous performances to attain 10% per annum growth in normal (money) terms, then for year 1 EPS of 13.1 cents $\times 1.10$ would be 14.4 cents, and arguably if this is not attained then dilution will seem to have taken place.

A serious threat to an acquirer's EPS is the 'getting to know you' costs and also the

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'reverse synergy' effects of $2 + 2 = 3$, which sadly seems to be the fate of numerous acquisitions.

A major question is whether the present value of the combined earnings including assumed longer – term profit improvements, really takes into account all the downside costs of putting two different entities together, each with its own management style.

7 Divestment

So far in this Chapter, we have considered entities joining together in mergers and acquisitions. Now we turn our attention to the issue of divestment.

Definition

Divestment: Disposal of part of its activities by an entity.

Reasons for divestment

The reasons for divestment include:

The sum of the parts of the entity may be worth more than the whole

As identified earlier in this Chapter, businesses which combine will attempt to find areas where resources can be combined to generate synergy. However, it may be that a business with many disparate parts actually ends up suffering from the opposite effect. For example, the company could be spending a lot of money trying to integrate business units together where there are no apparent benefits.

In such situations, the divestment of part of the business should be considered.

Divesting unwanted or less profitable parts

If there is an underperforming business unit which fails to meet general company performance targets, divestment should be considered.

However, management should always consider the effect of the divestment on the other parts of the company. For example, if a division is sold off which previously performed some work for other business units within the company, disposing of that business unit will lead to the other parts of the business having to buy in goods and services from third parties.

To shift the strategic focus onto the core activities

A part of the business which operates in a different market sector from the rest of the

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group may be considered for divestment. Increased focus on the company's core activities should help to develop the expertise of management and staff, and the strength of the company's brand.

A response to crisis

In a crisis, when cash is needed quickly, a part of the business might be divested if an attractive offer is received.

The most common examples of divestments are sell offs (trade sales), spin offs and management buyouts.

More on divestment – sell – offs and spin – offs

Sell-off (or trade sale)

A sell – off is the sale of part of an entity to a third party, usually in return for cash.

The most common reasons for a sell-off are:

- To divest of a less profitable business unit if an acceptable offer is received – this could be through a management buyout – see below;
- To protect the rest of the business from takeover – a part of the business which is attractive to a purchaser may be sold off to avoid the whole company being taken over;
- To generate cash in a time of crisis.

A sell-off may disrupt the rest of the organization if key staff or products from within the organization are part of the business unit sold off.

Spin-off (or demerger)

In a spin-off (or demerger) a new entity is created, where the shares of that new entity are owned by the shareholders of the entity that made the transfer of assets into the new entity. There are now two entities, each owning some of the assets of the original single entity. The ownership has not changed, and in theory the value of the two individual entities should be the same as the value of the original single entity.

Reasons for spin-offs

Spin – offs may be justified as follows

- They allow investors to identify the true value of a business that was hidden

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within a large conglomerate;

- They should lead to a clearer management structure;
- They reduce the risk of a takeover bid for the core entity.

8 Management buyouts



Definition

Definition of a management buyout (MBO): Purchase of a business from its existing owners by members of the management team, generally in association with a financing institution.

Overview of an MBO

In an MBO, the purchaser of the business is not another company (like in a sell off / trade sale), but the existing management.

Usually the management provides some of the capital for the buyout, but the majority is provided by other financiers such as venture capitalists and financial institutions.

MBOs - consideration for divesting company

Members of the buyout team may possess detailed and confidential knowledge of other parts of the vendor's business and the vendor will, therefore, require satisfactory warranties over such aspects which it will not be able to control.

More seriously, key members of the MBO team may have skills vital to the vendor's operation, especially in regard to information services and networking.

A vendor may be reluctant to allow key players to end their contracts of service to take part in an MBO, because losing vital operational skills can hardly be compensated by forms of warranty.

MBOs consideration for the management team

MBOs are not dissimilar to other acquisitions and many of the factors to be considered will be the same.

- **Do the current owners wish to sell?** – The whole process will be much easier (and cheaper) if the current owners wish to sell. However, some MBOs have been concluded despite initial resistance from the current owners.
- **Potential of the business** – The management team engaged in the buyout

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will be making the switch from a relatively safe salaried position to a risky ownership position. They must, therefore, ensure that the victim business will be a long run profit generator. This will involve analyzing the performance of the business and drawing up a business plan (products, markets, required new investment, sources of finance, etc.,) for future operations. Research shows that MBOs are less likely to fail than other types of new ventures, but server have collapsed, and managers must appreciate the risks they are taking and attempt to reduce them as far as possible.

- **Loss of head office support** – On becoming an independent firm many of the services that are taken for granted in a large organization may be lost. The importance of these services varies from one industry to another but provision will have to be made for support in the areas of finance, computing, research and development, etc.,. Although head office fees might be saved, after the buyout these support services can involve considerable expense when purchased in the outside market.
- **Quality of the management team** – The success of any MBO will be greatly influenced by the quality of the management team. It is important to ensure that all functional areas (marketing, sales production, finance) are represented and that all managers are prepared to take the required risks. A united approach is important in all negotiations and a clear responsibility structure should be established within the team.
- **The price** – As in any takeover situation the price paid will be crucial in determining the long term success of the acquisition. The usual valuation techniques may be employed, often with more confidence as managers are likely to have a clearer idea of the future prospects of the firm. Care must be taken to ensure that all relevant aspects of the business are included in the package. For example, trademarks and patents may be as important as the physical assets of the firm. In a similar way, responsibilities for redundancy costs, etc., must be clearly defined.

Terminology – leveraged buyout

A leveraged buyout occurs when an investor, typically a private equity firm, acquires a controlling interest in a company's equity and where a significant percentage of the purchase price is financed through leverage (borrowing).

Leveraged buyouts involve institutional investors and financial sponsors (like private equity firms) making large acquisitions without committing all the capital required for the acquisition.

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Financing the MBO

In an MBO, unlike a corporate-backed takeover, the acquiring group usually lacks the financial resources to fund the acquisition.

For small buyouts the price may be within the capabilities of the management team, but it is unlikely that many managers could raise the large amounts involved in some buyouts.

Several institutions specialise in providing funds for MBOs. These include the following:

- venture capitalists;
- banks;
- private equity firms;
- other financial institutions.

Role of venture capitalist

Venture capitalists

Venture capitalists often provide their funds as a mix of equity and debt, in order to give themselves security (the debt) while allowing them to participate if things go well (the equity). Typically they will be prepared to advance funds for five to ten years, and will expect annual returns on the funds of 25% or more.

The types of finance and the conditions attached vary between the institutions. Points to be considered include the following.

The form of finance – Some institutions will provide equity funds. However, more commonly loan finance will be advanced. Equity funds will dilute the management team's ownership but, on the other hand, high gearing could put substantial strain on the firm's cash flow.

Exit strategy – The most important fact that any investing institution will want to know is how and when they will get their money back. The exit strategy is an important part of the agreement to advance money in the first place. Exit strategies are explained more fully later in this Chapter.

The involvement of the institution – Some institutions may require board representation as a condition of providing funds.

Ongoing support – The management team should also consider the institution's

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willingness to provide funds for later expansion plans. Some investors also offer other services such as management consultancy to their clients.

Details on financing MBOs

Financiers tend to favour established businesses with reliable cash flows (to pay down the debt) and a clear exit route.

They like definitive plans, but say they prefer them brief and to the point.

The emphasis should be on the competences of the team, and the market opportunity to be exploited, with detailed financial numbers (focusing on cash flow) put into an appendix. How services previously supplied by group departments, or fellow subsidiaries, will be replaced is likely to be a key item.

Managers will be required to invest some of their own money and this will take the form of shares with special features, for example a high proportion of any disposal value.

Suggested financial structure

Capital structures are inevitably complex, with several levels of risk / reward:

- **Secured loans** are usually obtained from a bank, with a first charge on the assets taken over by the venture.
- The provider of **senior debt** will require a first ranking security over all the assets involved in the MBO venture and, usually, over the capital of the MBO as evidenced by shares in the new entity. Security will also involve undertakings from the MBO team regarding the provision of financial information and the setting of restrictions on the MBO's capacity to raise other debt finance and to dispose of assets.
- **Junior debt** is usually called mezzanine finance, which is an intermediate stage between senior debt and equity finance and can comprise a mixture of debt interest and the ability to convert part of the debt into equity, perhaps by the conversion of warrants. By this means the lender can in time have a share in the premium resulting from eventual exit from the venture. The debt interest will carry a risk premium, as it is subordinate to the senior debt and with less security: it may even be unsecured.
- **Venture capital** is a form of equity provided mainly by institutional investors,

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whose reward will usually be in some form of dividends, probably preferential, combined with appreciation of their MBO equity holding which will build up a capital gain for when the investment is realized.

- The last link in the structural chain is the **equity holding granted to the MBO team** itself which, if their activities are successful, will provide a substantial capital gain when the venture is exited, either through flotation or by other means. Meanwhile, the MBO management will draw salaries or fees for their services.

MBOs – consideration for the financiers

Key points for investors – usually banks or other institutions – in deciding whether to support an MBO are as follows:

- What is actually for sale, and why? It may be a division or subsidiary of an entity which no longer fits that entity's strategy, or it may be separable assets such as a factory or group of retail outlets.
- Whether the activities are profitable and enjoy a satisfactory cash flow. The prospective returns must justify the operational and financial risks involved. Profits must be sustainable and cash flow adequate to sustain the level of activities proposed.
- Whether the management is sufficiently strong. This point is particularly significant if the MBO relates to loss – making activities, although sufficient allowance must be made for the possibility that its existing owners may be burdening it with excessive overheads. Financial competence and marketing skills in the MBO's sector are especially important.
- Whether the price is reasonable and a sufficient contribution is being made by the managers. The managers should have some financial involvement and the future prospects for the new entity should be demonstrable, especially in a 'turn-around' situation.

These points are important as the main risks associated with MBOs and, hence, the reasons why they may fail are:

- The bid price offered by the MBO team might be too high;
- A lack of experience in key areas such as financial management;
- A loss of key staff who either perceive the buyout as too risky, or do not have capital to invest;

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- A lack of finance;
- Problems in convincing employees and follow colleagues of the need to change working practices or to accept redundancy.

Investors, probably institutions, backing the MBO will initially hold majority of the equity, with a relatively small minority of shares held by the managers.

Although the backers must be prepared to hold their investment for the long-term, they and the managers will be looking to the entity growing successfully to the point where it can be launched on the stock exchange. At this stage, a market value can be obtained for the equity and, if desired, some portion of the investment can be realized.

Where the backers desire a lower risk element in their investment, they can require that some part of it will be in the form of redeemable convertible preference shares. This can give them priority in obtaining income through a preference dividend and preferential rights of repayment if the entity should fail. There is also the prospect of redemption if the entity should fail. There is also the prospect of redemption if the entity does not develop satisfactorily, or conversely, the convertible aspect will allow backers eventually to increase their equity holding if the entity should prove successful.

9 Exit Strategies

Overview of exit strategies

The investors and financiers in an MBO will want to realise a profit from their investment in the medium-term.

Debt finance will normally have a specified repayment date, so the debt providers will have a clear exit route (assuming the borrowing company has performed in line with expectations and can afford to repay the debt as planned).

Exit strategies for equity holders

For the providers of equity, the exit route is not as easy to identify. The most common exit route for an equity investor is the sale of the shares to another investor. This could be through one of the following methods.

Trade sale

If the MBO company receives an offer for all its shares from another company, the financiers will be able to realise their investment. However, in a trade sale, all the

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shares are normally acquired by the bidding company, so the management would have to sell their shares in their own company too. They may not be happy to do this, because the appeal of an MBO to managers is that they will own their own company rather than have to report to other shareholders.

IPO (Initial Public Offering)

An IPO gives the financiers who want to sell their shares the chance to do so on the stock market. If the managers want to keep hold of their shares, they will be able to do so.

The problem with an IPO is that the company will have to satisfy certain stringent criteria in order to join the stock exchange, and there will be significant costs associated with the listing.

After an IPO, the shares will be freely traded, which should increase their marketability and hence their value. On the other hand, the company becomes much more susceptible to takeover when its shares are listed.

Independent sale to another shareholder

The managers could try to increase their shareholdings in the company by 'buying out' the other financiers.

This would be expensive, but if the managers could afford it, it would prevent other external shareholders buying the shares and having a say in the running of the business.



Test your understanding 1 – ML Ltd.

- a) One theoretical method of valuing a company's shares is to calculate the present value of future dividends using a discount rate that reflects the risk of the business. In respect of large, listed companies, current evidence suggests that this is far too simplistic a view of how company values and share prices are determined.

Required:

Comment on the reasons why share prices may be substantially different from the level suggested by theory. Include brief comments on the relevance of P/E ratios and net asset values in share price determination.

- b) ML Ltd. is an expanding clothes retailing company. It is all equity financed by ordinary share capital of Rs. 10 million in shares of Rs. 5 nominal. The company's results to the end of March 20X9 have just been announced. Pre-tax profits were Rs. 4.6 million. The chair's statement included a forecast that earnings might be expected to rise by 5% per annum in the coming year and for the foreseeable future.

CO Ltd. a children's clothes group, has an issued ordinary share capital of Rs. 33 million in Rs. 10 shares. Pretax profits for the year to 31 March, 20X9 were Rs. 5.2 million. Because of a recent programme of reorganization and rationalization, no growth is forecast for the current year but subsequently constant growth in earnings of approximately 6% per annum is predicted. CO Ltd. has had an erratic growth and earnings record in the past and has not always achieved its often ambitious forecasts.

ML Ltd. has approached the shareholders of CO Ltd. with a bid of two new shares in ML Ltd. for every three CO Ltd. shares. There is a cash alternative of Rs 13.5 per share.

Following the announcement of the bid, the market price of ML Ltd. shares fell while the price of shares in CO Ltd. rose. Statistics for ML Ltd. CO Ltd. and two other listed companies in the same industry immediately prior to the bid announcement are shown below. All share prices are in Rs.

20X8		Company	Dividend yield	P/E
High	Low			
22.5	18.5	ML Ltd.	3.4	15
14.5	11.5	CO Ltd.	3.6	13
18.7	12.2	HR Ltd.	6	12
23.0	15.9	SZ Ltd.	2.4	17

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Both ML Ltd. and CO Ltd. pay tax at 33%.

ML Ltd.'s cost of capital is 12% per annum and CO Ltd.'s is 11% per annum.

Required:

Assume you are a financial analyst with a major fund manager. You have funds invested in both ML Ltd. and CO Ltd.

- Assess whether the proposed share for share offer is likely to be beneficial to the shareholders in ML Ltd. and CO Ltd. and recommend an investment strategy based on your calculations.
- Comment on other information that would be useful in your assessment of the bid. Assume that the estimates of growth given above are achieved and that the new company plans no further issues of equity.

State any assumptions that you make.

Test your understanding 2 – KING Ltd.

KING Ltd. is a medium-sized food manufacturing company. It has recently sold a subsidiary that traded in what the company considered to be non-core business. The sale raised Rs. 1.4 million in cash.

The company's long-term debt to equity ratio is relatively high compared with other companies in the industry and the directors have ruled out further borrowing at the present time. In fact, one of the directors thinks the cash raised from the sale of the subsidiary should be used to repay some of the company's outstanding debt.

This is not a view shared by the other directors who are evaluating three small but potentially profitable acquisition opportunities. The directors believe that the shareholders of all three target companies would not be opposed to a bid at this time, especially to a cash offer. However, to acquire all of them would require Rs. 2.3 million. The share price is standing at an all time high – a level considered unsustainable by the directors based on the company's projected earnings. The directors, therefore, intend to limit their expenditure to the Rs. 1.4 million cash raised by the sale of the subsidiary.

Expected aftertax cash flows

Company price	Year 1	Year 2	Year 3	Acquisition
	Rs. '000'	Rs. '000'	Rs. '000'	Rs. '000'
AB Ltd.	(100)	750	1,100	(1,100)
CD Ltd.	125	275	380	(550)
EF Ltd.	200	325	450	(650)

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Note: The cash flows are in real terms, i.e., they do not include inflation. KING Ltd.'s shareholders currently require a real return of 12% on their investment in the company. The company uses this rate to evaluate all its investment decisions, including acquisitions.

Required:

Assume you are a financial manager with KING Ltd. Write a report to the directors evaluating the potential acquisitions. You should include the following information in your report:

The expected net present value and profitability indexes of the three projects. Based solely on these calculations comment on which company(ies) should be chosen for acquisition and comment on the use of 12% as a discount rate in the circumstances here.

Recommendation of uses for any cash that is left over after the acquisitions have been made.

Comment on the directors' decisions:

- i) to invest rather than repay debt; and
- ii) to limit their investment for the current year to cash purchases rather than raise new capital in the form of debt or equity.

Comment on the advantages and disadvantages of growth by acquisition as compared with growth by internal (or organic) investment.

Test your understanding answers

Example 1

- Operating efficiencies – the unused capacity at GSL can be used to produce Williams products without adding to costs and capacity.
- Marketing synergies.
- If the cash flow streams of Williams and GSL are not perfectly positively correlated then by acquiring GSL – Williams may reduce the variability of their operating cash flow. This being more attractive to investors may lead to cheaper financing.
- The 'dedicated' herbalists of GSL and the R+D staff of Williams may be a complementary resource.

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- Fixed operating and administrative costs savings.
- Consolidation of manufacturing capacity on fewer and larger sites.
- There may be bulk buying discounts.
- Possibility of joint advertising and distribution.
- GSL is badly managed – thus the elimination of inefficiency could allow for financial synergy.

Example 2

Calculations

Value of Mavers Co. = Rs. 3.05 × 48 m shares = Rs. 146.4 m

Value of Power Co. = Rs. 6.80 × 13 m shares = Rs. 88.4 m

Total value (assuming no synergistic gains) = 146.4 + 88.4 = Rs. 234.8 m

Number of shares post-integration = 48 million + (2 × 13 million) = 74 million

So, the post-integration share price will be:

Rs. 234.8 m / 74 million = Rs. 3.173

	Shares	MV	Old wealth	Change
Mavers	48 m	Rs. 152.3 m	Rs. 146.4 m	+Rs. 5.9 m
Power	2 × 13 m = 26 m	Rs. 82.5 m	Rs. 88.4 m	–Rs. 5.9 m

Advice

The Power Co. shareholders will not accept a 2 for 1 share for share exchange since it causes their wealth to reduce.

Recommendation

In order for the Power Co. shareholders to be encouraged to accept the offer, it must offer them a gain in wealth.

To make sure that Mavers Co. is valuing Power Co. at its current market value, the value of the offer needs to be (Rs. 6.80 × 13 m shares) Rs. 88.4 m in total.

Given the current Mavers Co. share price of Rs. 3.05, this amounts to Rs. 88.4 m /

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Rs. 3.05 = 28.98 m shares in Mavers Co.

An exchange of 28.98 m Mavers Co. shares for the 13 m Power Co. shares represents a ratio of 28.98 m to 13 m or 2.23 to 1.

However, if the terms of the offer were to be exactly 2.23 Mavers Co. shares for every 1 share in Power Co. there would be no incentive for the Power Co. shareholders to sell (financially, they'd be indifferent between keeping their existing shares and exchanging them for Mavers Co. shares).

In order to encourage Power Co.'s shareholders to sell, a premium would have to be offered.

Hence, an offer of (say) 2.5 Mavers Co. shares for every 1 share in Power Co. would probably be needed to encourage the Power Co. shareholders to sell.

Position of Mavers Co. shareholders

In this situation, where no synergistic gains are included in the calculations, a gain to Power Co.'s shareholders will result in a corresponding loss to the Mavers Co. shareholders. Clearly Mavers Co. would not want to proceed with the takeover in these circumstances.

Unless some synergies can be generated, to improve the wealth of the overall company after the acquisition, there is no way of structuring the deal so that both sets of shareholders will be satisfied.

Test your understanding 1 – ML Ltd.

- a) Given the wording, you really need to explain why the dividend valuation model may break down, as it is the 'theory' specifically mentioned in the question. You probably have time only to mention a couple of drawbacks with each approach.

A common way of valuing the ordinary shares in a company is discounting all future dividends anticipated from holding the shares. Although having a ring of truth, it often fails to give a price which corresponds to the current market price, due to its inherent flaws:

- It requires constant dividend growth, which in turn implies a constant retention ratio and return on reinvested funds. It is possible to cope with varying growth rates but the calculation is awkward.
- It requires a continuous supply of investment opportunities through time to justify retention.

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- It can give nonsensical results e.g., zero current dividend generates zero value, thus ignoring the value of the firm's assets and / or its earnings stream.
- It is only suitable for valuing minority stakes in a firm because it ignores the opportunities for managers to restructure firms to improve earnings and cash flow. The key to value is not the portion of profit paid out to shareholders but the earning power of the business.

Price earnings (P/E) ratios

This is not a method of valuing shares of quoted firms. P/E ratios are the product of valuation. When the market sets a value, the resulting share price divided by the last reported earnings gives the P/E ratio. Generally, a high P/E ratio indicates that a company is expected to grow its earnings rapidly in the future.

The P/E ratio can be used to cross-check against the value of other companies. If their relative P/E ratios look out of line, it may suggest under or overvaluation somewhere. P/E ratios can also be used when valuing the shares of unquoted companies, taking due care when interpreting the accounting data used.

Net Asset Value (NAV)

The NAV is the value per share of the firm's assets net of all liabilities i.e., the owners' stake in the firm. It has some merit for unlisted companies whose shares are not traded, but it is highly unreliable for many reasons:

- Based on GAAP, statement of financial position values are primarily designed to satisfy the directors' duty to account for past performance.
- It can be distorted by accounting practices e.g., different depreciation policies.
- Revaluation of assets is not mandatory (except in the property sector) so asset values could seriously understate market values.
- It is only valid at one point in time, the reporting date.
- It (usually) ignores intangibles such as brands and market standing.
- It may exclude some liabilities 'off-statement of financial position' debts like operating lease obligations and warranty commitments.
- Stock values quickly outdate in some industries, and some debtors may be doubtful.

The NAV provides merely a floor to equity value: usually, the market value is many times the NAV because the market is valuing future earnings capacity. A discounted cash flow approach is the most appropriate method of valuation.

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- b) The length of answer that you can offer will be limited. The bulk of your time will be spent on computation. The solution presented here gives a step-by-step guide that you would need to follow, rather than just a summary of the results.

Basic information

	ML	Co.	Combined
Profit after tax (PAT) for each firm is			
ML: $(0.67 \times \text{Rs. } 4.6 \text{ m})$	Rs. 3.082 m	Rs. 3.484 m	Rs. 6.566 m
CO: $(0.67 \times \text{Rs. } 5.2 \text{ m})$			
Given respective P/E ratios, market values are:			
ML: $(15 \times \text{Rs. } 3.082)$	Rs. 46.23 m	Rs. 45.29 m	Rs. 91.52 m
CO: $(13 \times \text{Rs. } 3.484)$			
Given the number of shares, share price is:			
ML: $(\text{Rs. } 46.23/2 \text{ m})$	Rs. 23.12	Rs. 13.72	
CO: $(\text{Rs. } 45.29/3.3 \text{ m})$			
EPS:			
ML: $(\text{Rs. } 3.082/2 \text{ m})$	1.541	1.056	
CO: $(\text{Rs. } 3.484/3.3 \text{ m})$			

Analysis

Number of shares post-bid: $2,000 + (2/3 \times 3,300)$	= 4,200
Expected market prices post-bid	= Total market value/number of shares
	= $(\text{Rs. } 91,520/4,200) = \text{Rs. } 21.8$
Value of bid at post-issue price = $(2 \text{ shares} \times \text{Rs. } 21.8)$	= Rs. 43.6
Cash value of bid per 3 shares offered: $(\text{Rs. } 13.5 \times 3)$	= Rs. 40.5

Assessment

Assuming no changes in the level of market prices, and no re-rating of the sector, ML share price would fall post-acquisition to Rs. 21.8. At this price, the value of the 2 for 3 share offer should attract CO shareholders. They would be getting shares worth $(2 \times \text{Rs. } 21.8) = \text{Rs. } 43.6$ in exchange for shares currently worth $(3 \times \text{Rs. } 13.7) = \text{Rs. } 41.1$.

The share-for-share offer is also worth more than the cash alternative: Rs. 43.6 vs Rs. 40.5.

This is a 'reverse takeover', where the shareholders of the target end up holding a majority stake in the expanded company but who gains from this?

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Former Co. shareholders would hold $(2,200/4,200) \times \text{Rs. } 91.52 \text{ m} = \text{Rs. } 47.939 \text{ m}$ of the value of the expanded firm, a gain of $(\text{Rs. } 47.939 \text{ m} - \text{Rs. } 45.290 \text{ m pre-bid value of Co.}) = \text{Rs. } 2.649 \text{ m}$.

ML shareholders would lose Rs. 2.649 m, making the share-financed deal distinctly unattractive to them.

Conversely, the cash offer would create wealth for ML shareholders i.e., they give Rs. 40.5 for something worth Rs. 41.1 pre-bid.

The advice to the fund manager is: 'accept the bid in respect of Co. shares and sell ML shares in the market if you can achieve a price above Rs. 21.8'.

Other information required

The advice given hinges on the behavior of ML's share price: it has already fallen on the announcement, but by how much? It may already be too late if the market is efficient, as it would already have digested the information contained in the announcement.

Also:

- What benefits are expected from the merger i.e., cost savings and synergies? To make sense of the bid, ML must be setting the PV of these benefits above Rs. 2.649 m to yield a positive NPV for the acquisition.
- How quickly are these benefits likely to show through? Any delay in exploiting these lowers the NPV.
- It is feasible that the market might apply a higher P/E ratio to the expanded company: may be not as high as ML's but possibly at the market average, currently 14.25, compared to the weighted average P/E ratio for ML/CO of 14.
- Is ML likely to sell part of Co.'s operations? And to whom? If ML has already lined up a buyer, it must expect to turn a profit on the deal.
- Is the bid likely to be defended by the target's managers, fearful for their jobs? If so, a higher bid might be expected.
- Is a White Knight likely to appear with a higher bid on more favorable terms?
- Are there competition implications likely to attract the interest of the authorities?

Test your understanding 2 – KING Ltd.

Report

To: Board of Directors, KING Ltd.

Mergers and Acquisitions

From: Financial manager

Date: XX/XX/XX

Re: Acquisition opportunities

In this report I have evaluated the three potential target companies the board is considering. I have also considered the further finance issues surrounding the use of the cash raised from the recent sale of the subsidiary company, and the wider question of whether growth by acquisition is preferable to organic growth.

Investment evaluation

Each investment has been evaluated on the basis of the NPV of the real cash flows discounted at our real required rate of return of 12% (see Appendix). The results are summarized as follows:

	AB Ltd.	CD Ltd.	EF Ltd.
Net present value (NPV)	Rs. 191,700	Rs. 51,400	Rs. 108,000
Initial investment	Rs. 1,100,000	Rs. 550,000	Rs. 650,000
Profitability index (PI)	17.4%	9.3%	16.6%

Purely on the basis of these computations, and bearing in mind that we only wish to invest the Rs. 1.4 m realized from the subsidiary sale, the investment in AB Ltd. is preferable to the alternative of investing in both CD Ltd and EF Ltd. Having a positive NPV indicates that this option is also preferable to returning the money to the shareholders.

With regard to the use of the 12% required return as a discount rate for all three companies, two points need to be made:

- the discount rate used to evaluate a project should reflect the specific level of risk attached to its cash flows. The use of a blanket 12% rate assumes that all three companies operate in the same risk class, which also includes KING Ltd.
- 12% is a real required rate of return, and has been applied to real cash flows. This evaluation may be invalidated if the cash flows are expected to inflate at different rates, either from each other or from the general rate of inflation that shareholders may build into their money (nominal) required return.

Use of surplus cash

The investment in AB Ltd. will leave Rs. 300,000 from the subsidiary sales proceeds. This may be used to:

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- invest elsewhere, either in a smaller company, or internally, in working capital if this is justified by a possible increase in turnover;
- repay some of our borrowings;
- pay an increased dividend, if the company feels it cannot use it profitably either this year, or in the near future.

Current finance policies

The Board has decided not to use the Rs. 1.4 m to repay debt, nor to supplement this for investment by raising further equity or debt capital. This will mean that the gearing level of the firm will remain largely constant (although the impact of the investment is expected to marginally raise the market value of equity).

This implies that the Board feels that the company is currently operating at its optimal gearing level, where the costs and risks of its finance are balanced to produce the lowest overall cost and highest market value. Provided this is, in fact, the case, this is a reasonable policy to follow, although it should be kept under careful review as market conditions change.

The decision not to increase the level of investment in order to take advantage of all three (and possibly more) investment opportunities is perhaps a little more questionable. This can be done without significantly affecting the gearing level, by a mix of equity and debt, and will increase the wealth of KING shareholders. There should be few problems raising new finance in these circumstances.

However, if the Board is convinced that the share price is unsustainable at its current level, the expansion could be undertaken without further cash injection by making a share for share offer to CD Ltd. and EF Ltd.

External versus internal growth

In comparison with growth by internal (organic) investment i.e., expanding existing activities or setting up a new business from scratch, growth by acquisition has the following advantages and disadvantages:

Advantages

- It may be cheaper, if the shares of the target company(IES) are currently undervalued by the market for some reason, or the business is being mismanaged.
- The growth is achieved at a faster rate.
- The expertise and skills needed can be bought with the company.

Mergers and Acquisitions

- Whilst the acquiring company is increasing (or acquiring) market share, productive capacity of the market is maintained at the current level, avoiding the increased competitive 'squeeze' that comes from expanding an existing business in a limited market.

Disadvantages

- The indirect costs of acquisition are often under-estimated: the integration of the systems, management and culture of the new company can be a long, costly and sometimes unsuccessful process.
- The benefits expected from the merger are often not realised due to estimates being based upon inaccurate or incomplete information, or lack of management understanding of a new industry or market. The knowledge and experience base for organic expansion will generally be a lot firmer.

Appendix

Time	Cash flows Rs. '000'			12% df	PV Rs. '000'		
	AB Ltd.	CD Ltd.	EF Ltd.		AB Ltd.	CD Ltd.	EF Ltd.
0	(1,100)	(550)	(650)	1	(1,100)	(550)	(650)
1	(100)	125	200	0.893	(89.3)	111.6	178.6
2	750	275	325	0.797	597.8	219.2	259.0
3	1,100	380	450	0.712	783.2	270.6	320.4
NPV					191.7	51.4	108.0
PI					17.4%	9.3%	16.6%

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Performance Analysis

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Learn performance analysis
- Calculate profitability ratios
- Comprehend financial gearing
- Apprehend stock market ratios
- Explicate the use of published accounts for ratio analysis

CHAPTER 9

CHAPTER 9

Performance Analysis

1 Overview of Chapter



Performance analysis

Investors (both shareholders and lenders) will often appraise the performance of an organization, to assess whether the organization represents a good investment. If it is shown that the organization's performance is declining, the shareholders may decide to sell their shares, and the lenders might change their assessment of the organization's creditworthiness.

To appraise performance, it is necessary to first calculate ratios under the following headings:

- profitability ratios;
- liquidity ratios (essentially the working capital ratios);
- gearing ratios;
- stock market ratios.

With the exception of the liquidity ratios covered already, the calculation of

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these ratios is covered in this chapter.

Be aware that in the exam, it will also be important to comment on the ratios, any trends, and any likely future developments.

2 Profitability Ratios

The aim of an organization is to generate a return to the shareholders. In order to do this the company must generate profits to cover the costs of financing itself. Financing over the long-term will either be through debt instruments or equity. There are two measures critical to any analysis of profitability:

- 1) **Return on Capital Employed (ROCE)**
- 2) **Return on Equity (ROE)**

Return on capital employed (ROCE)

A measure of the underlying performance of the business before finance. It gives an indication of the health of the business in generating a return on its investments. Gearing has no impact on the return and hence this is the most important measure of profitability to calculate. The ratio is calculated before tax allowing return to be compared between companies under differing tax regimes.

$$\text{ROCE} = \frac{\text{Operating profit}}{\text{Capital employed}} \times 100$$

Operating profit

A measure of return after cost of sales and expenses excluding financing and tax costs, it is also usefully known as profit before finance charges and tax (PBFC & T).

Capital employed

The total funds invested in the business, it includes equity and long-term debt. Return on equity (ROE).

A measure of return relating solely to the shareholders. It is calculated after taxation and before dividends have been paid out. It gives an indication as to how well the company has performed in relation to its shareholders, the most important stakeholder. The impact of differing levels of gearing should have an impact on the return.

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$$\text{ROE} = \frac{\text{Profit after tax}}{\text{Equity}} \times 100$$

It is useful to compare the ROE to the ROCE to measure the amount of the return underlying the business that pertains to the shareholder. Please note, however, that they are not directly comparable, ROE being post tax and ROCE pretax.

Key working

Rs.	
PBIT	X
Less finance charges	(X)
	—
PBT	X
Less tax	(X)
	—
PAT	X
Less dividends	(X)
	—
Retained earnings	X
	—

Example 1

A company is considering two funding options for a new project. The new project may be funded by Rs. 10 m of equity or debt. Below are the financial statements given the project has been funded in either manner.

Statement of financial position extract

	Equity Rs. in m	Debt Rs. in m
Long term liabilities Debentures (10%)	0.0	10.0
	—	—
Capital		
Share capital (Rs. 10)	11.0	3.5
Share premium	4.0	1.5
Reserves	5.0	5.0
	—	—
	20.0	10.0
	—	—

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Income statement extract

	Rs. in m
Turnover	100.0
Gross profit	20.0
Less: expenses (excluding finance charges)	(15.0)
Operating profit	5.0

Corporation tax is charged at 30%.

Required:

- Calculate all profitability ratios and compare the financial performance of the company under either funding.
- What is the impact on the company's performance of financing by debt rather than equity?

Asset turnover

We may look at how many times the turnover of the business exceeds the capital employed of the business. This is normally an indicator of the type of business the company is running.

Low turnover suggests that the business is capital intensive, involved in manufacturing and perhaps concentrating on specialized products. High turnover alternatively would suggest a retailer of standardized products.

$$\text{Asset turnover} = \frac{\text{Turnover}}{\text{Capital employed}}$$

Operating profit margin

How much does each individual unit of sale generate towards profit? The arguments for this ratio are equal and opposite of those for asset turnover. In addition, the profitability will be an indicator of the relative attractiveness of the product range compared to the industry average. It may indicate which part of the market the company is targeting.

$$\text{Operating profit margin} = \frac{\text{PBIT}}{\text{Turnover}} \times 100$$

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Example 2

Required:

Using the data from the previous example, calculate the sub-analysis of the ROCE into:

- asset turnover;
- operating profit margin.

3 Financial Gearing

Change in capital structure will affect financial gearing. Financial gearing is the mix of debt to equity within a firm's permanent capital. There are two measures:

- Capital gearing a statement of financial position measure.
- Finance charges cover ("interest cover") an income statement measure.

Capital gearing a measure of capital structure

There are two key measures of capital gearing:

$$\text{Capital gearing} = \frac{\text{Debt}}{\text{Equity}} \times 100$$

$$\frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times 100$$

The calculation of capital gearing can be done in a number of different ways, the examiner may have to specify what he wants. Whatever the measure it will include debt and equity.

What do debt and equity contain?

Debt (also known as prior charge capital or PCC)

All permanent capital charging a fixed charge (interest) may be considered debt. This includes debentures and loans naturally. It may include bank overdraft if significant and considered part of the permanent financing.

Equity

All ordinary share capital and share premium together with reserves (they pertain to

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the ordinary shareholders).

A note on preference shares:

Preference shares to be treated in the following way: if they are irredeemable, treat as equity and, if redeemable, treat as debt.

Example 3

Statement of financial position for X Limited

	Rs. in m
Non-current assets (total)	23.0
Current assets (total)	15.0
TOTAL ASSETS	38.0
Equity and Liabilities	
Ordinary share capital	10.0
Ordinary share premium	4.0
Preference share capital (irredeemable)	1.5
Reserves	1.5
Non-current liabilities	
Debenture 10%	8.0
Current liabilities	
Trade creditors	8.0
Bank overdraft	5.0
TOTAL EQUITY & LIABILITIES	38.0

Required:

Calculate the capital gearing of the business.

Finance Charges cover (Interest cover)

This is an income statement measure that considers the ability of the business to cover the finance charges and capital repayments as they fall due.

$$\text{Finance charges cover} = \frac{\text{PBIT} \pm \text{T}}{\text{Finance Charges}}$$

Example 4

Y Limited income statement extract

	Rs. in m
Operating profit (PBIT)	10.0
Finance Charges	(2.5)

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Profit before tax (PBT)	7.5
Tax @ 30%	(2.25)
Profit after tax (PAT)	5.25

Required:

- Calculate the finance charges cover.
- Is this level of cover safe?

4 Stock Market Ratios

Investor ratios refer to both debt and equity.



Debt ratios

The single measure we need to understand is the simple coupon return, or yield i.e. the interest paid by the debenture in relation to the current value of the debt. This does not take into consideration the eventual redemption of the debenture which is considered at a later date.

$$\text{Simple finance charges (interest) yield} = \frac{\text{Finance charges paid}}{\text{Current market value}}$$

Equity ratios

Before we can calculate any ratios we need to calculate a key measure of return, the Earnings per share (EPS).

$$\text{Headline EPS} = \frac{\text{PAT less preference dividend}}{\text{Number of ordinary shares in issue}}$$

Example 5

The United Company earned profits after tax of Rs. 15m and has a preference

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dividend of Rs 3 m. There are 24 million shares in circulation.

Required:

What is the headline EPS?

There are three investor ratios that we must be able to calculate and understand:

- 1) P/E ratio.
- 2) Dividend cover.
- 3) Dividend yield.

The key to being able to calculate these ratios is to identify that there are three values that are used to calculate the above and to know the values needed, and you are more than halfway there!

- 1) Market value.
- 2) EPS.
- 3) DPS (dividend per share sometimes described as gross dividend).

P/E ratio

The P/E ratio is a measure of growth; it compares the market value (a measure of future earnings) to the current earnings.

$$\text{P/E ratio} = \frac{\text{Current share price}}{\text{Headline EPS}} = \frac{\text{Total MV}}{\text{Profit after tax}}$$

The higher the P/E ratio, the greater the market expectation of future earnings growth. This may also be described as market potential.

Example 6

Two companies have the following details:

	White	Black
Market value per share	Rs. 30	Rs. 9
Headline EPS	Re. 1	Re. 1

Required:

Which company does the market retain higher confidence in?

Dividend cover

This is the amount of profits attributable to shareholders that are actually paid out in

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the form of dividend. The level of dividend cover depends on a number of factors:

- the type of industry
- the requirements of the specific shareholders
- the investment opportunities available
- tax implications
- dividend policy.

$$\text{Dividend cover} = \frac{\text{EPS}}{\text{DPS}} = \frac{\text{PAT}}{\text{Total dividend}}$$

Example 7

Further to the previous example, we are told that White is paying 20 paise per share while Black is paying 60 paise per share dividend.

Required:

What is the dividend cover for each company?

Dividend yield

This is the relationship of the dividend paid to the current market value. It is of importance when deciding what type of investor we are trying to attract. If the yield is high this will appeal to the investor who requires an income from the share. A lower yield suggests that more is being reinvested back into the company which should attract those investors who want capital gain.

$$\text{Dividend yield} = \frac{\text{DPS}}{\text{Current share price}} = \frac{\text{Total dividend}}{\text{Total MV}}$$

Example 8

Continuing from the previous examples, calculate the dividend yield for both White and Black.

Altman's Z score

Altman studied bankrupt manufacturing companies in the USA in 1968 and concluded that the bankrupt firms shared common characteristics, which he incorporated in his Z score model. The Z score used ratio analysis to highlight firms which were likely to fail. It only incorporated 5 key ratios and was criticized for being

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too simplistic.

The original Z-score formula was as follows:

$$Z = 1.2T1 + 1.4T2 + 3.3T3 + 0.6T4 + 0.999T5$$

T1 = Working Capital / Total Assets. Measures liquid assets in relation to the size of the company.

T2 = Retained Earnings / Total Assets. Measures profitability that reflects the company's age and earning power.

T3 = Earnings Before Interest and Taxes / Total Assets. Measures operating efficiency apart from tax and leveraging factors. It recognizes operating earnings as being important to long-term viability.

T4 = Market Value of Equity / Book Value of Total Liabilities. Adds market dimension that can show up security price fluctuation as a possible red flag.

T5 = Sales / Total Assets. Standard measure for total asset turnover (varies greatly from industry to industry).

Altman found that the ratio profile for the bankrupt group fell at -0.25 avg., and for the non-bankrupt group at +4.48 avg.

The development of the ZETA® score

In order to address the limitations of the Z score, Altman and others carried out further research and developed the ZETA® score. This is a proprietary method and only available to subscribers to the company which owns the model – therefore it is not possible to give details of the formula here. The approach taken is similar to the Z score, but the ZETA® score is based on seven variables, with the addition of an assessment of the stability of the company's earnings over a period of five to ten years, and the size of the company based on its total assets.

5 The Use of Published Accounts for Ratio Analysis

When external stakeholders, such as potential investors and lenders, try to assess the performance of an entity, the most readily available source of information is the published accounts of the entity.

In trying to interpret the ratios calculated from the published accounts figures, it is important to understand the limitations of the published figures.

Limitations of published accounts figures for ratio analysis

- Published accounts are historic records, not forward looking. However, the Operating and Financial Review (OFR), which companies are encouraged to present as part of their published accounts, will contain the directors' view of the company's prospects.

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- The income statement is prepared using the accruals concept, so it is difficult to relate the figures to the entity's cash position. However the inclusion of the cash flow statement in the published accounts helps to give an impression of the cash position.
- The published accounts have historically contained only financial information. In recent years entities have been encouraged (under the Global Reporting Initiative) to report on environmental and social issues, so users of the accounts are able to see a fuller view of the entity's performance.

More on recent developments in financial reporting

Extending the scope of external reports

According to the IASB's Framework, the objective of financial statements is to 'provide information about the financial position, performance and changes in financial position of an entity that is useful to a wide range of users in making economic decisions'.

To help users make decisions, it may be helpful to provide information relating to the future as well as the historic information that financial statements provide.

However, the inclusion of forecasts is unlikely to be acceptable to the management team.

- What if forecasts aren't achieved?
- What if forecasts are deliberately pessimistic?
- Forecasts may provide too much information to competitors.
- Preparing forecast information may be costly.

There has also been increasing pressure for entities to provide more information in their annual reports beyond just the financial statements since nonfinancial information can also be important to users' decisions.

Entities have also begun to accept over recent years that they have responsibilities to stakeholders other than just shareholders, for example:

- customers and suppliers;
- local communities;
- society as a whole and the environment.

Social accounting and environmental reporting

Entities have increased their reporting on matters such as:

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- employment of disabled people;
- ethnic groups;
- gender diversity.

Entities have also become more accountable for their activities in relation to environmental damage e.g., greenhouse gas emissions. This may impact on the entity via tax charges / reliefs, additional costs and provisions.

Global reporting initiative

The Global Reporting Initiative (GRI), launched in 1997, issued a set of guidelines regarding sustainability reporting i.e., the environmental, social and economic aspects of performance. Applying these guidelines is voluntary.

The GRI suggests that entities report performance indicators so that users can monitor their performance from economic, environmental and social perspectives. Examples of such performance indicators may be:

Economic the impact of the entity on local, national and global economies.

e.g., proportion of spending with local suppliers, proportion of local workforce employed by entity, levels of taxes paid.

Environmental

e.g., % of recycled material used in production, levels of gas emissions, levels of organic ingredients used in products.

Social

e.g., breakdown of workforce by ethnic background, policies in respect of working hours, benefits provided to employees such as healthcare, gym membership.

Human resource accounting

There are suggestions that the human resources of an entity should be reflected as an asset on the statement of financial position (formerly the statement of financial position). Many companies are more service based and have low levels of traditional tangible assets such as machinery and inventory. It can therefore be argued that under current accounting rules, their statements of financial position do not appropriately reflect the value of their assets and the business as a whole.

This in turn can distort interpretation of their results since a ratio such as ROCE will

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be high due to the low level of capital employed on the statement of financial position.

Also, by recording the asset on the statement of financial position management of an entity are perhaps more likely to consider their value to the business and therefore take more responsibility for looking after their well-being.

However, one of the main arguments against capitalizing intellectual capital is that it does not meet the definition of an asset. This is because the entity cannot "control" human resources.

It will also be very difficult to reliably measure the value of intellectual capital. The problems associated with this area may result in manipulation of financial statements and also lack of comparability between the financial statements of different entities.

International financial reporting

As more and more companies operate globally, there has been an increasing need for accounting practices to become more harmonized.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Increased efficiency and decreased costs for global companies • Increase comparability • Increased competition in world markets 	<ul style="list-style-type: none"> • Costs for non global companies • Changing attitudes and traditions

6 Exam style question



Test your understanding 1 – STR

STR is a well-established marketing consultancy in a country with a low interest rate. STR is a successful business which has experienced rapid growth in recent years. There are 2 million Rs. 10 ordinary shares in issue. These ordinary shares are quoted on a recognized stock exchange and 40% are owned by the founders of the business. Dividends were Rs. 4 per share in 2003 and grew by 5% per annum between 2003 and 2006. This pattern is expected to continue beyond 2006. Dividends are paid in the year in which they are declared.

Extracts from the financial statements for the past three years are as follows:

Performance Analysis

	2004 Rs. in m	2005 Rs. in m	2006 Rs. in m
Profit before tax	21.6	24.4	26.7
Tax expense	7.7	2.6	4.3
Net cash generated after deducting interest, tax and net capital expenditure, but excluding ordinary dividends	19.2	(7.1)	18.8

Additional information:

- The opening cash balance in 2004 for cash and cash equivalents was Rs. 6 million;
- The opening book value of equity in 2004 was Rs. 60 million; Long-term borrowings remained at Rs. 50 million throughout the years and the annual gross interest cost on the borrowings was Rs. 1 million;
- There were a number of disposals of noncurrent assets in 2004 and an exceptionally high level of capital expenditure in 2005.

The directors have noticed the buildup of cash and cash equivalents. They are concerned that this might not be in the best interest of the shareholders and could have an adverse effect on the share price. Various proposals have been made to reduce the level of cash and cash equivalents.

Required:

- Calculate the following financial information for STR for each of the years 2004 to 2006:
 - Closing cash balance;
 - Closing book value of equity.

(3 marks)
- Analyse and discuss the financial performance of the entity from the viewpoint of both the lenders and shareholders, referring to the information calculated in part (a) above and making appropriate additional calculations. Up to 6 marks are available for calculations.

(10 marks)

Performance Analysis

- Discuss the comparative advantages and disadvantages of a share repurchase versus a one-off dividend payment. (7 marks)
- Advise the directors of STR on alternative financial strategies that they could consider that would reduce the level of surplus cash. (5 marks)

(Total for part (c) = 12 marks)
(Total: 25 marks)

Multiple choice question (MCQ):

- High gearing results in:
 - Higher dividend cover
 - Lower interest cover
 - Higher interest cover
 - Lower P/E ratio

Test your understanding answers

Example 1

- Return on capital employed = $\frac{\text{Rs. 5 m}}{\text{Rs. 20 m}} \times 100 = \frac{\text{Rs. 5 m}}{\text{Rs. 20 m}} \times 100 = 25\%$ Equity finance Debt finance
 $= 25\%$ $= 25\%$

Working

	Rs. in m	Rs. in m
PB FC & T	5.0	5.0
Finance charges	0.0	(1.0)
PBT	5.0	4.0
Tax (@ 30%)	(1.5)	(1.2)
PAT	3.5	2.8
Return on equity	$= \frac{\text{Rs. 3.5 m}}{\text{Rs. 20 m}} \times 100 = 17.5\%$	$= \frac{\text{Rs. 2.8 m}}{\text{Rs. 10 m}} \times 100 = 28\%$

Performance Analysis

The financial performance of the two funding options is exactly the same for ROCE. This should not be a surprise given that ROCE is an indication of performance before financing, or underlying performance.

- b) When considering the ROE we see that the geared option achieves a higher return than the equity option. This is because the debt (10%) is costing less than the return on capital (25%). The excess return on that part funded by debt passes to the shareholder enhancing their return.

The only differences between ROCE and ROE will be due to taxation and gearing.

Example 2

- a) Asset turnover = Rs. 100 m / Rs. 20 m = 5.0 times
b) Operating profit margin = Rs. 5 m / Rs. 100 m × 100 = 5%

Example 3

Capital gearing

Debt	= Rs. 5 m + Rs. 8 m	= Rs. 13 m
Equity	= Rs. 10 m + Rs. 4 m + Rs. 1.5 m + Rs. 1.5 m	= Rs. 17 m
Either	= Rs. 13 m / Rs. 17 m × 100	= 76.5%
Or	= Rs. 13 m / (Rs. 13 m + Rs. 17 m) × 100	= 43.3%

Example 4

- a) Finance charges cover = Rs. 10 m / Rs. 2.5 m = 4 times
b) Whether the level of cover is safe depends on a number of factors, namely:
i. at what stage in the economic cycle are the company's results;
ii. the volatility of the pretax profits;
iii. the amount of cash held by the business.

The measure attempts to equate the earning of profits with ability to pay interest as it falls due. There will be some correlation between the two; however, it is very risky to equate profits earned to cash flow.

A value of above 3.0 is normally considered safe.

Example 5

$$\text{Headline EPS} = \frac{\text{Rs. 15 m} - \text{Rs. 3 m}}{24 \text{ m shares}} = 50 \text{ paise per share}$$

Performance Analysis

Example 6

PE Ratio

$$\begin{array}{ll} \text{Rs. } 30 \div 1 & \text{Rs. } 9 \div 1 \\ = 30 \text{ times} & = 9 \text{ times} \end{array}$$

Example 7

Dividend cover

$$\begin{array}{ll} \text{Re } 1 \div 20 \text{ paise} & \text{Re } 1 \div 60 \text{ paise} \\ = 5 \text{ times} & = 1.67 \text{ times} \end{array}$$

Example 8

Dividend yield

$$\begin{array}{ll} 2\text{p} \div 30\text{p} & 6\text{p} \div 90\text{p} \\ = 0.67\% & = 6.67\% \end{array}$$

Test your understanding 1 – STR

Key answer tips

In part (a) ensure that your workings are clearly set out. In part (b) it is vital that you discuss any ratios calculated rather than simply presenting the examiner with a set of numbers. Part (c) is bookwork and a good reminder that you need to be familiar with all aspects of the syllabus.

a) Cash balances

	2004 Rs. in m	2005 Rs. in m	2006 Rs. in m
Net cash flow before dividends	19.2	(7.1)	18.8
Dividends (W1)	(8.4)	(8.8)	(9.3)
Net cash flow	10.8	(15.9)	9.5
Cash b/f	6	16.8	0.9
Cash c/f	16.8	0.9	10.4

Book value of equity

	2004 Rs. in m	2005 Rs. in m	2006 Rs. in m
Profit before interest and tax (bal)	22.6	25.4	27.7
Interest	(1.0)	(1.0)	(1.0)
	350		

Performance Analysis

Profit before tax	21.6	24.4	26.7
Tax expense	(7.7)	(2.6)	(4.3)
Profit after tax	13.9	21.8	22.4
Dividends (W1)	(8.4)	(8.8)	(9.3)
Retained profit	5.5	13.0	13.1
Book value of equity b/f	60	65.5	78.5
Book value of equity c/f	65.5	78.5	91.6

(W1) Dividends

2004: dividend = 2 million × Rs. 4 × 1.05 = Rs. 8.4 million

2005: dividend = Rs. 8.4 million × 1.05 = Rs. 8.82 million

2006: dividend = Rs. 8.82 million × 1.05 = Rs. 9.261 million

b) Additional calculations

	2004	2005	2006
Interest cover	22.6%	25.4%	27.7%
Dividend cover	1.65%	2.48%	2.41%
Earnings per share (paise)	69.5	109	112

Gearing = debt net of cash / (debt + equity)

	2004	2005	2006
Debt	50	50	50
Cash	16.8	0.9	10.4
Debt net of cash	33.2	49.1	39.6
Equity	65.5	78.5	91.6
Debt (net) + equity	98.7	127.6	131.2
Gearing	33.6%	38.5%	30.2%

Return on equity

	2004	2005	2006
Profit after tax	13.9	21.8	22.4
Equity	65.5	78.5	91.6
Return on equity	21.2%	27.8%	24.5%

Return on capital employed, using net debt + equity

	2004	2005	2006
Profit before interest and tax (bal)	22.6	25.4	27.7
Debt (net) + equity	98.7	127.6	131.2
Return on capital	22.9%	19.9%	21.1%

Performance Analysis

Comments

The financial performance from the shareholders' point of view has generally been encouraging:

- Both earnings per share and the book value of equity have been increasing.
- Dividends have increased.
- Return on equity has consistently been above 20%.
- Financial gearing has fallen in 2006 and dividend cover is now over two, indicating lower risk attached to the dividends.

The only area of worry, however, is that return on equity fell from 2005 to 2006.

The financial performance from the lenders' point of view has been less convincing. On a positive note:

- Interest cover is very high and rising, suggesting a low default risk.
- Gearing fell in 2006, again suggesting less risk for lenders.

However,

- STR had poor cash flow in 2005. Lenders may wish to see more detailed analysis of cash flow to determine if any underlying problems persist.

i) The relative advantages of a share repurchase verses a one-off dividend are as follows:

Share repurchase	One-off dividend
<ul style="list-style-type: none"> • A repurchase may be more tax efficient than a dividend for some shareholders. • A reduction in the number of shares should boost EPS. • Increased gearing as equity is reduced. This is only an advantage if STR is moved closer to its optimal gearing level. • Does not create an expectation of higher future dividends. On the contrary, less cash will be needed for future dividends due to fewer. 	<ul style="list-style-type: none"> • A dividend may be more tax advantageous for some shareholders. • All shareholders are treated fairly. • The amount of cash paid is more certain - with a repurchase it will not be known in advance how many shareholders will choose to sell.

Performance Analysis

ii) Alternative strategies for reducing a cash surplus include the following:

- increase the growth rate of dividends;
- long-term equity investments – e.g., acquire other firms ;
- and / or buy stakes in rivals, customers, etc.;
- reduce debt by repaying loans;
- increase capital expenditure;
- increase investment in research and development – e.g., to enter new markets.

Answer to MCQ:

1) b

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International Investment

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

- Understand international investment
- Comprehend basis and risk
- Prepare international investment appraisal

CHAPTER 10

CHAPTER 10

International Investment

1 Overview of Chapter



In practice this is a difficult and highly controversial area; however, the exam treats the subject in a very straight forward way.

As a starting point it is assumed that candidates bring through their knowledge of basic investment appraisal, and in particular NPV analysis.

2 Basic Foreign Project Appraisal

The NPV analysis of an overseas project (FDI) requires some additional complexities to those found with an NPV analysis of a domestic project.

(Please see table on next page)

International Investment

Year	0	1	2	3	4	5
	Rs. '000	Rs. '000	Rs. '000	Rs. '000	Rs. '000	Rs. '000
Receipts		x	x	x	x	
Payments:						
Wages		(x)	(x)	(x)	(x)	
Materials		(x)	(x)	(x)	(x)	
Variable / fixed overheads		(x)	(x)	(x)	(x)	
Administration / distribution expenses		(x)	(x)	(x)	(x)	
Taxable cash flow		x	x	x	x	
Tax: Corporate tax			(x)	(x)	(x)	(x)
: Capital allowances			x	x	x	x
Initial outlay	(x)					
Net receivable value					x	
Working capital	(x)				x	
Net cash flow in Rs.	(x)	x	x	x	x	x
Exchange rate IRP of PPP	(x)	x	x	x	x	x
Net cash flows	x	x	x	x	x	x
Discount rate (e.g., 10%)	1	0.909	0.826	0.751	0.683	0.621
Present value	(x)	x	x	x	x	(x)
Net present value	xxx					

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In scenarios (i) and (ii) there would be no further domestic tax to pay on the project's foreign profits. But in scenario (iii) the project's profits would be taxed at 33% : 25% in the foreign country and a further 8% tax payable in the home country.

Inter-company cash flows

Inter-company cash flows also impinge on the tax computations. In reality the whole issue of whether or not an inter-company cash flow (such as royalty payments made by an international project to the foreign parent) are or are not allowable for tax purposes is a very politically sensitive issue.

In the exam assume such cash flows are allowable (and state it) unless the question says otherwise.

The key point to remember is that, if an inter-company cash flow is allowable for tax relief in the foreign country, there will be a corresponding tax liability in the home country.

Transfer prices are particularly problematical. By manipulating the transfer prices charged it may be possible to minimise the global taxation cost for the group. For instance, suppose we have two companies within a group that are based in different countries.



Company A will report low income, therefore, limiting its tax charge where as company B will be reporting high income as it pays less tax.

By manipulating the transfer price the overall tax charge can be lowered. The problem is that the government of country A will not look favourably on this action.

Assume that the tax authorities will only allow 'arm's length' / open market prices for tax relief and will not allow an artificially high or low transfer price.

A second problem may also arise. Although the above may decrease the taxation,

3 Additional Complexities in Foreign NPV Calculations

In particular, in exam questions, look out for complexities involving:

- tax;
- intercompany cash flows (such as management or royalties charges);
- remittance restrictions where the foreign government restricts the amount of the project's cash flow that can be remitted back each year to the parent;
- forecasting future spot rates.

Taxation

There are three possible tax scenarios for an exam question:

Home tax rate	Foreign tax rate
i) 33%	< 40%
ii) 33%	= 33%
iii) 33%	> 25%

The question will always assume a doubletax treaty. Therefore a project's profits get taxed at whatever is the **highest** rate between the two countries.

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the profits will end up in country B. If the currency of country B is weak relative to the holding company, then loss from the depreciation of the currency may be more than the tax saving.

Illustration 1

An example helps to illustrate many of these points. Take just the Year 2 cash flow of a US project; assume tax is paid at 25% in the US and 33% in the Pakistan; assume royalty payments of \$10m; and assume a forecast spot rate of \$1 = Rs. 100.

Year 2	\$m
Revenues	100
Costs	(30)
Royalties	(10)
Pre-tax profit	60
25% US tax	15
Remit to parent	45
	Rs. m
x Rs Spot rate	x 100
Rs Cash flow	4,500
Royalties (\$10m x Rs.100) Rs/\$ =100	1,000
Pakistan Tax 33%	(8,10)*
After tax cash flows	4,690

Pakistan tax computation:

8% Pakistan tax on \$ profits:	\$ 60 m × 0.08	\$ 4.8 m
33% @ Pakistan tax on royalties:	\$ 10 m × 0.33	\$ 3.3 m
Total Pakistan tax liability		= \$ 8.1 m
x spot rate		x 100
Pakistan tax payable		= Rs. 810 m*

Remittance restrictions

Remittance restrictions are where the overseas government places a limit on the funds that can be repatriated back to the holding company. By doing so this may change the cash flows that are received by the holding company.

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Suppose there are no tax complications. The project's after foreing tax \$ cash flow is as follows (\$ m):

Year	0	1	2	3
	(10)	3	4	6

In any one year, only 50% of cash flows generated can be remitted back to the parent. The blocked funds can be released back to the parent in the year after the end of the project.

Cash flows to parent (\$ m):

Year	1	2	3	4
	1.5	2	3	6.5

It is these cash flows that have to be put through the NPV calculation.

It is the parent company's cash flow that should now be converted into Rs. terms and discounted to NPV as we always need to evaluate the overseas investment from the parent company's viewpoint (and that of their shareholders): what money does the parent put in and what money is available for the parent company to take out?

Forecasting future spot rates

The exam question may provide you with estimated exchange rates over the life of the project, but it is more likely you will have to estimate them using either:

- Purchasing Power Parity; or
- Interest Rate Parity.

The formulae are given in the exam as follows:

For purchasing power

$$\text{Future spot rate} = \text{Spot rate (Currency A/Currency B)} \times \frac{1 + \text{inflation (Currency A)}}{1 + \text{inflation (Currency B)}}$$

For interest rate parity

$$\text{Future spot rate} = \text{Spot rate (Currency A/Currency B)} \times \frac{1 + \text{interest (Currency A)}}{1 + \text{interest (Currency B)}}$$

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Note: The phrase "spot rate Currency A/Currency B" means "the number of units of "currency A" which are equivalent to 1 unit of "currency B".

Explanation of the law of one price

Purchasing Power Parity (PPP) is sometimes known as the law of one price. The theory states that the exchange rates will move to eliminate the difference in the interest rates between two countries. For example:

	UK	Exchange rate	USA
Price today	£ 1,000	\$ 1.5	\$ 1,500
Inflation	5%		5%
Price in 1 year	£ 1,050	\$ 1.5714	\$ 1,050

The exchange rate will move so that £1,050 will equal \$1,650 (i.e., $1.5714 = £1$)

The same calculation can be undertaken by using the formula given in the examination.

Using the previous information:

$$\text{Future spot rate } \$/\text{£} = \text{Spot rate } \$/\text{£} \times \frac{1 + \text{inflation } \$}{1 + \text{inflation } \text{£}}$$

$$1 \text{ year rate} = 1.50 \times \frac{1.10}{1.05} = \$ 1.5714$$

Examination problem

In the examination you may be required to calculate many exchange rates for several years into the future. For instance:

The current spot rate Rs. /\$ is 100 (that is Rs. 100 = \$1). The anticipated rate of inflation in the USA is 4% per annum whilst in the Pakistan it is expected to be 8%. The exchange rates can be calculated as follows:

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$$\text{Year 1} \quad \text{Rs. } 100 \times \frac{1.08}{1.04} = \text{Rs. } 103.85$$

$$\text{Year 2} \quad \text{Rs. } 103.85 \times \frac{1.08}{1.04} = \text{Rs. } 107.84 \text{ etc.,}$$

Notice that the exchange rate at the end of one year becomes the **basis** of the next year's calculation.

Appreciating and depreciating currencies

As an alternative to IRP/PPP, you may be asked to calculate exchange rates given currency appreciation / depreciation rates.

For example, the spot rate is Rs. /\$ 100 (that is Rs. 100 = \$1) and the Rs. is depreciating against the \$ at 10% per annum. This means that, in future years, the \$ can buy more Rs. The exchange rate in 1 year's time will be Rs. $100 \times 1.1 = \text{Rs. } 110 = \1 and in two years' time it will be Rs. $121 = \$1$.

Alternative approach to computations

An alternative method is available for calculating foreign project NPVs which could be examined. This is carried out as follows:

Step 1 Estimate the project's relevant cash flows in the foreign currency.

Step 2 Assuming Interest Rate Parity (IRP) will apply, convert the domestic cost of capital to the foreign equivalent.

Step 3 Use this adjusted cost of capital to discount the foreign cash flows to produce an NPV in foreign currency.

Step 4 Convert the NPV into its domestic currency equivalent using the spot rate for translation.

If IRP holds, this will give the same sterling NPV as the more conventional approach explained earlier.

Example 1

A manufacturing company based in the Pakistan is evaluating an investment project

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overseas – in UAE. It will cost an initial 5.0 million UAE Dirham (AED) and it is expected to earn posttax cash flows as follows:

Year	1	2	3	4
Cash flow (AED 000)	1,500	1,900	2,500	2,700

The following information is available:

- Real interest rates in the two countries are the same. They are expected to remain the same for the period of the project.
- The current spot rate is Rs. /AED 25 (that is Rs. 25 = 1 AED).
- The risk free rate of interest in UAE is 7% and in Pakistan 9%.
- The company requires a Rs. return from this project of 16%.

Required:

Calculate the Rs. net present value of the project using both the following methods:

- by discounting annual cash flows in Rs.;
- by discounting annual cash flows in AED.

(12 marks)

Basis and basis risk

Basis

Basis: Future price of a foreign currency is never the same as the spot market rate. For example Rs. /\$ future is @ \$1 = Rs. 97.2800 when current spot exchange rate is \$1 = Rs. 97.2500. The difference of 0.0300 or 300 point is called "basis".

Basis risk

Basis risk is risk when future position is closed, the size of actual basis will be different from the expectation of what the basis should be.

4 Political Risk (or Country Risk)

This is the risk, faced by an overseas investor, that the host country government may take adverse action against the project, after the company has invested.

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Types of government interference

Type of political interference	Non discriminatory interference	Discriminatory interference	Discriminatory sanctions	Wealth deprivation
Description	Affects not only direct investment but also joint ventures.	Designed to give local producers an advantage over	Designed to eventually put foreign owned firms out of	Designed to put foreign owned firms immediately out
Examples	<ul style="list-style-type: none"> • Minimum number of local nationals to be employed • Temporary suspension of currency convertibility • Price fixing by government • Minimum % of local components 	<ul style="list-style-type: none"> • Joint ventures only • Special taxes on foreign firms • Encouraging boycotts • Invalidating patents 	<ul style="list-style-type: none"> • Creeping expropriation • Claiming compensation for past actions • Very high taxes on foreign-owned firms 	<ul style="list-style-type: none"> • Expropriation of assets

Managing political risk

- Measure it.
- Avoid it.
- Prior negotiation (concession agreements and planned divestment).
- Structuring investment:
 - local sourcing;
 - location of facilities;
 - control of distribution;
 - control of technology;
 - financial measures;
 - organizational measures.

More detail on political risk

Before undertaking a foreign direct investment, a company needs to try and assess its exposure to political risk by:

- Using political risk ranking tables such as the Euromoney Magazine Tables.

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- Evaluating the macroeconomic situation of the country that might heighten political risk exposure:
 - balance of payments;
 - IMF involvement;
 - unemployment;
 - per capita income;
 - dependency on commodity prices;
 - inflation;
 - exchange rate policy;
 - rate of economic growth;
 - foreign debt.
- Evaluating the current government's popularity, stability and attitude to foreign investment, together with the attitude of opposition parties.
- Looking at the historical stability of the political system and the size, power and influence of the armed forces.
- Changing religious and cultural attitudes.
- Taking advice from:
 - the company's bank, particularly if it has a 'representative office' in the overseas country;
 - British embassy in the overseas country;
 - the company's trade association / local chamber of commerce;
 - Department of Trade and Industry (DTI).

Finally, how can political risks be taken into account in the investment appraisal process?

- Exercise of managerial judgement.
- Use of sensitivity analysis.
- Use of a higher discount rate, to act as a risk premium.

5 Exam Style Questions



Test your understanding 1 – Ghani Ltd.

Ghani Ltd. is a Pakistan-based retailing company that operates in the USA and Pakistan. The company is evaluating the potential for expansion into UAE. A detailed assessment of the costs and likely incremental revenues of opening stores in two major cities has been carried out. The initial cost of the investment is AED 80 million. The nominal cash flows, all positive and net of all taxes, are summarized below.

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	Year 1	Year 2	Year 3
Cash flow (AED million)	35.50	42.50	45.00

The company's treasurer provides the following information:

- The expected inflation rate in AED is 4% each year and in the Pakistan 6% each year.
- Real interest rates in the Pakistan and AED are the same. They are expected to remain the same for the foreseeable future.
- The current spot rate is Rs. /AED 25.
- The risk free annual rate of interest in UAE is 6% and in the Pakistan 8%. These nominal rates are not expected to change in the foreseeable future.
- The company's post tax weighted average cost of capital (WACC) is 15%, which it uses to evaluate all investment decisions. The expansion will be financed by a combination of internal funds generated in the Pakistan and long-term fixed interest rate debt raised in AED. The company plans to purchase in UAE the majority of its goods for resale.

Required:

- a) Calculate the Rs. net present value of the project, using both the following methods:
 - i) by discounting annual cash flows in Rs.
 - ii) by discounting annual cash flows in AED, using an adjusted discount rate and explain, briefly, the reasons why the two methods give almost identical answers.

(9 marks)
- b) Assume that the company's management is considering purchasing from outside UAE a substantial proportion of its goods to be sold in the UAE stores. Approximately 50% of total goods for resale might be purchased in the West and a further 25% in the Pakistan. Discuss how a decision to change buying patterns might affect the evaluation and funding of the investment.

(9 marks)
- c) Assume that inflation in UAE turns out to be higher than forecast for the whole period of evaluation, with corresponding impact on the other economic factors. Inflation in Pakistan is slightly less than forecast. Discuss how the financial returns on the investment might be affected, and advise on a funding strategy that could minimize the impact of such inflationary effects.

(8 marks)

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(Total: 25 marks)

Multiple choice question (MCQ)

- 1) Purchasing power parity theory assumes that:
- Exchange rate of currency with higher interest rate will strengthen
 - Exchange rate of currency with lower interest rate will strengthen
 - Exchange rate of currency with higher inflation rate will strengthen
 - Exchange rate of currency with lower inflation rate will strengthen

Calculate the adjusted discount rate using the interest rate parity formula.

Future spot rate Rs. /AED = Spot rate Rs. /AED \times (1 + discount rate Rs.) / (1 + discount rate AED)

$$25.47 = 25 \times 1.16 / (1 + \text{discount rate AED})$$

$$29 / 25.47 = 1.1387$$

$$\text{Discount rate} = 13.87\%$$

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Test your understanding answers

Example 1

Method 1

Calculation of exchange rates

Using the interest rate parity theory:

Year 1	$25 \times 1.09/1.07$	= 25.47
Year 2	$25.47 \times 1.09/1.07$	= 25.94
Year 3	$25.94 \times 1.09/1.07$	= 26.43
Year 4	$26.43 \times 1.09/1.07$	= 26.92

Year	0	1	2	3	4
Cash flow (AED 000)	(5,500)	1,500	1,900	2,500	2,700
X: Exchange rate	25	25.47	25.94	26.43	26.92
Cash flow Rs.	(125,000)	38,205	49,286	66,075	72,684
PV factor 16%	1.000	0.862	0.743	0.641	0.552
PV	(125,000)	32,933	36,620	42,354	40,122

NPV = Rs. 27,029 k

Method 2

Calculate the adjusted discount rate using the interest rate parity formula.

Future spot rate Rs. /AED = Spot rate Rs. /AED \times (1 + discount rate Rs.) / (1 + discount rate AED).

$$25.47 = 25 \times 1.16 / (1 + \text{discount rate AED}).$$

$$29 / 25.47 = 1.1387.$$

$$\text{Discount rate} = 13.87\%.$$

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Year	Cash flow AED	PVF 13.87%	PV
0	(5,000)	1.000	
1	1,500	0.878	
2	1,900	0.771	
3	2,500	0.678	1,695
4	2,700	0.594	1,604
			<u>AED 1,081</u>

$$NPV = 1,081 \times 25 = \text{Rs. } 27,025 \text{ k}$$

The difference between the two results is due to rounding.

Test your understanding 1 – Ghani Ltd.

Key answer tips

For (a) there is a need to recognize the requirement to calculate exchange rates for alternative (i) and apply the Rs. discount rate to the Rs. cash flows. For alternative (ii) it should have been recognized that the cash flows in AED should be discounted at an adjusted discount rate.

For (b) there is a need to recognize important considerations such as the effect of transaction costs and taxes and also the effect of currency risks.

For (c) there is a need to recognize that the NPV of the investment will be higher because the Rs. is weakening against AED.

a)

i) Method 1: Converting cash flows to sterling and discounting at sterling required rate of return

Spot rates

Current	25	
In 1 year	25.48	$25 \times (1.06/1.04)$
In 2 years	25.97	
In 3 years	26.47	

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Year	0	1	2	3
Cash flow (AED m)	(80)	35.5	42.5	45
Converted at spot rates (Rs. m)	(2,000)	904.54	1,103.73	1,191.15
Discounted at 15%	1	0.87	0.756	0.658
DCF (Rs. m)	(2,000)	786.94	834.42	783.77

$$NPV = \text{Rs. } 405.13 \text{ m}$$

ii) Method 2: Discounting HKD at risk adjusted rate

Risk adjusted rate for AED cash flows can be found using the IRP formula:

$$\text{Future spot rate in 1 year (Rs/AED)} = \text{Spot rate} \times (1 + \text{Pak interest}) / (1 + \text{UAE interest})$$

So,

$$25.48 \text{ (from above)} = 25 \times 1.15 / (1 + \text{UAE rate})$$

Hence,

$$(1 + \text{UAE rate}) = 1.15 \times 25 / 25.48 = 1.1283$$

$$\text{i.e., UAE rate} = 12.83\%$$

Alternative (short cut) calculation:

Risk premium is:

$$(1.15/1.08) - 1 = 6.48\%$$

Required return on AED cash flow is therefore:

$$(1.06 \times 1.0648) - 1 = 12.87\%$$

Year	0	1	2	3
Cash flow (AED m)	(80)	35.5	42.5	45
Discounted at 12.87%	1	0.886	0.785	0.695
DCF	(80)	31.453	33.363	31.275

When converted at the spot rate of 25 this gives an NPV of Rs. 402.3 m.

Two basic assumptions allow these calculations:

– Interest rates are determined in the market. There is a relationship between foreign exchange and money markets. A currency with a higher short term interest rate will sell at a discount in the forward market, and the one with a lower interest rate

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will sell at a premium.

–The expected difference in inflation rates between two countries equals, in equilibrium, the expected movement in spot rates.

b) In practice there are considerations such as:

- Sourcing goods from elsewhere increases exchange rate risks and there may be a need to hedge future transactions.
- Relative prices in the various countries, adjusted for transport costs and taxes. The 'West' may contain many different countries and varied tax regimes.
- The imposition of legal restrictions on the purchase or movement of goods from the West will need to be considered.
- The discount rate might need to be adjusted to accommodate the additional risks and uncertainties of dealing in different currencies.
- As the AED is forecast to appreciate against Rs, the benefits of buying in a depreciating currency might be available (depending to some extent on any credit period allowed / taken).
- Funding the expansion in AED might be disadvantageous – debt will be repaid in appreciated currency.

c) Inflation, interest rates and exchange rates are strongly connected. A rise in inflation is likely to be associated with higher interest rates. In turn this will mean that the AED will sell at a higher discount in the forward market (this assumes that interest rate parity and purchasing power parity hold).

Hence if inflation is higher in UAE it is likely that the return on the investment in Rs. terms will be lower. This will, however, also depend on how the company is able to raise its own prices, where goods are sourced, and the impact of inflation on different elements of cost.

One issue to consider in relation to funding is the currency in which interest is paid. If this is paid in AED in UAE then there is an advantage to this method of financing.

There is no indication of how the debt principal is to be repaid. Assuming it is paid at the end of the period, then it will be paid in depreciated currency.

Answer to MCQ:

1) d

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Working Capital Management

ICMA Pakistan

ICMA Pakistan

Working Capital Management

Chapter Learning Objectives

Upon completion of this chapter you will be able to:

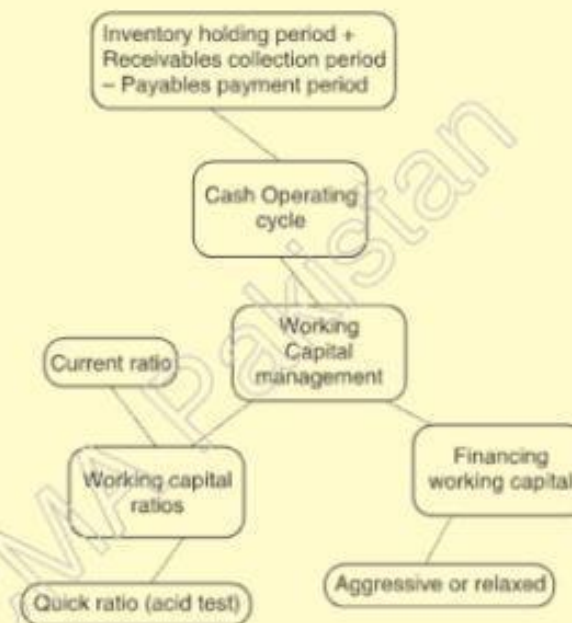
- Apply working capital management
- Understand the management of working capital
- Comprehend working capital investment decision
- Apprehend working capital financing decision
- Explicate working capital cycle
- Elucidate working capital ratios

CHAPTER II

CHAPTER II

Working Capital Management

1 Overview of Chapter



Working capital: The capital available for conducting the day-to-day operations of an entity; normally, the excess of current assets over current liabilities.

The key components of working capital are inventories, receivables, payables and cash.

2 The Management of Working Capital

Liquidity and profitability

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.

Working Capital Management

Examples of the liquidity versus profitability trade off

Working capital is the firms' current assets, less its current liabilities, i.e., inventory, receivables, cash and payables. The firm faces a trade off with regard to each of these items, since too much or too little working capital can cause problems for the firm as follows:

Advantage of large inventories Few stock outs = good for sales (profitability)	Inventory	Advantage of low inventories Little cash tied up = good for preserving cash flow (liquidity)
Advantage of granting several months of credit Customers like credit = good for sales (profitability)	Receivables	Advantage of granting little trade credit Little cash tied up = good for preserving cash flow (liquidity)
Advantage of high cash balances Bills can be paid = good for relations with creditors	Cash	Advantages of low cash balances More cash can be invested = good for earning profits
Advantage of taking extended credit Preserves own cash (liquidity) = cheap source of finance	Payables	Advantage of adhering to reasonable credit terms Suppliers are content = good relations and few disruptions

Investment and financing decision

An entity'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.

3 The Working Capital Investment Decision

All entities require working capital, but there is no standard fixed requirement.

The actual amount required will depend on many factors, such as :

- the industry within which the firm operates in some industries, customers expect long payment periods (impacting receivables) whereas in other industries cash payments are the norm (low receivables);

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- the type of products sold – a business selling perishable products will have to keep a lower level of inventory;
- whether products are manufactured or bought in – a manufacturing company will have high levels of raw material and work in progress inventory as well as finished goods;
- the level of sales – if sales are high, it is likely that receivables will be high too;
- inventory management, receivables collection and payables payment policies – these impact on the length of the operating cycle – explained in detail later in this Chapter;
- the efficiency with which working capital is managed.

For example, a retail company will usually have very low receivables (because most sales are for cash) but high levels of inventories. In contrast, an IT support company will tend to have high levels of receivables (long credit terms offered to attract customers) and high levels of work in progress (inventories). Even comparing businesses in the same business sector can reveal different levels of working capital caused by different working capital management policies (aggressive, moderate and conservative policies are covered below), and one firm being more efficient at collecting debts than another.

It is essential that an appropriate amount of working capital is budgeted for to meet anticipated future needs.

In conditions of uncertainty, entities must hold some minimal level of cash and inventories based on expected revenue, plus an additional safety buffer.

Aggressive, moderate and conservative approaches

With an aggressive working capital policy, a firm would hold minimal inventory. Such a policy would minimise costs, but it could lower revenue because the firm may not be able to respond rapidly to increases in demand.

Conversely, a conservative working capital policy would call for large inventory. Generally, the expected return is lower under a conservative policy than under an aggressive one, but the risks are greater under the aggressive policy.

A moderate policy falls somewhere between the two extremes in terms of risk and returns.

More detail on aggressive, moderate and conservative policies

A company could pursue a more aggressive approach towards the management of working capital or a more conservative (relaxed) approach.

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Benefits of a more aggressive approach:

- 1) Lower levels of current assets therefore lower financing costs.
- 2) The lower financing costs should result in better profitability.
- 3) Quicker cash turnover may allow more reinvestment and hence allow the business to expand more quickly.

Benefits of a more conservative approach:

- 1) Lower liquidity risk i.e., less risk of the company running out of cash or going into liquidation.
- 2) Greater ability to meet a sudden surge in sales demand.
- 3) More relaxed credit policy for receivables may improve sales.

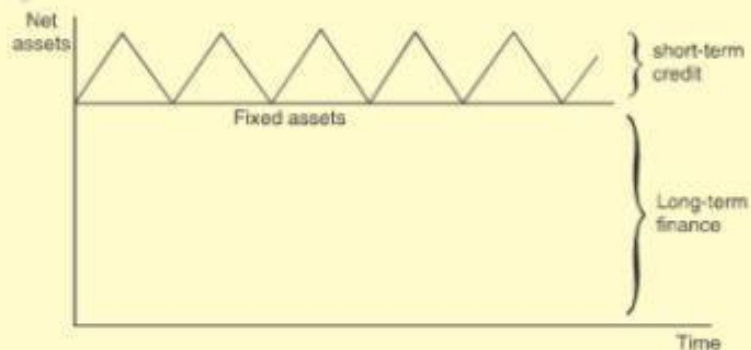
Note:

Generally, the more conservative the approach, the lower the risk, but the higher the cost in terms of money tied up in working capital.

4 The Working Capital Financing Decision

The traditional approach to working capital funding

Traditionally current assets were seen as fluctuating, originally with a seasonal pattern. Current assets would then be financed out of short-term credit, which could be paid off when not required, whilst fixed assets would be financed by long-term funds (debt or equity).

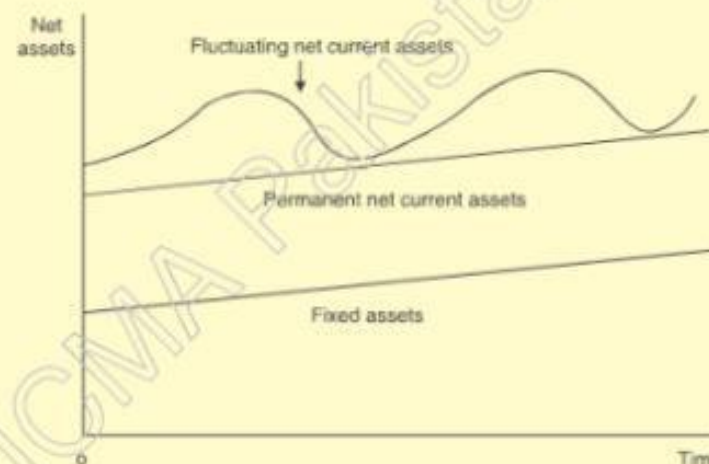


Working Capital Management

This analysis is rather simplistic. In most businesses a proportion of the current assets are fixed over time, being thus expressed as 'permanent'.

For example, certain base levels of inventory are always carried, or a certain level of trade credit is always extended. If growth were added to this situation a more realistic business picture would be as follows:

Working capital requirements with growth



The modern approach to working capital funding

Given the permanent nature of a large proportion of current assets, it is generally felt prudent to fund a proportion of net current assets with long-term finance.

Short-term financing is generally cheaper than long-term finance, since short-term interest rates are generally lower than long-term rates. However, the price paid for reduced cost is increased risk for the borrower, because of:

- **Renewal problems** – short-term finance may need to be continually renegotiated as various facilities expire and renewal may not always be guaranteed.
- **Stability of interest rates** – if the company is constantly having to renew its funding arrangements it will be at the mercy of fluctuations in short-term interest rates.

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The term structure of interest rates

One of the primary considerations in evaluating the use of borrowings is the likely movement in interest rates. This will affect the relative costs of long and short-term borrowings, as well as increasing or decreasing the preference for fixed interest rates. In practice, long-term rates will normally be higher than short-term rates, owing to the additional risk borne by the lender. Hence an interest premium is required to attract investors to longer-term securities.

This effect may be magnified or reversed by investor's expectations of future rates, and anticipated rate rise producing higher longer term rates. This difference between long and short term rates is known as term structure. The term structure of interest rates is shown by the yield curve (a graph of interest rates against time to maturity).

The yield curve

The yield curve will normally be upward-sloping in order to compensate investors for tying up their money for longer periods of time. In extreme cases, this may justify an entity using short-dated borrowings which are replaced regularly – although the level of transaction costs makes this unlikely.

Sometimes the yield curve will be downward, or inverse, with short-term interest rates higher than long-term rates. In the UK, the Bank of England Monetary Policy Committee meets monthly to set interest rates. Their influence is directed primarily towards short-term interest rates, as a means of managing inflation. If however, interest rates are expected to fall in the future once the risk of inflation has been countered, long-term interest rates may be lower than short-term rates, and the yield curve would therefore be downward sloping.

Factors that influence term structure

In general terms, an increasing term structure results from two factors:

- Increased terms, an increasing term structure results from two factors;
- Anticipated general interest – rate rises.

Aggressive, moderate and conservative financing policies

The financing of working capital depends upon how current and noncurrent asset funding is divided between long-term and short-term sources of funding.

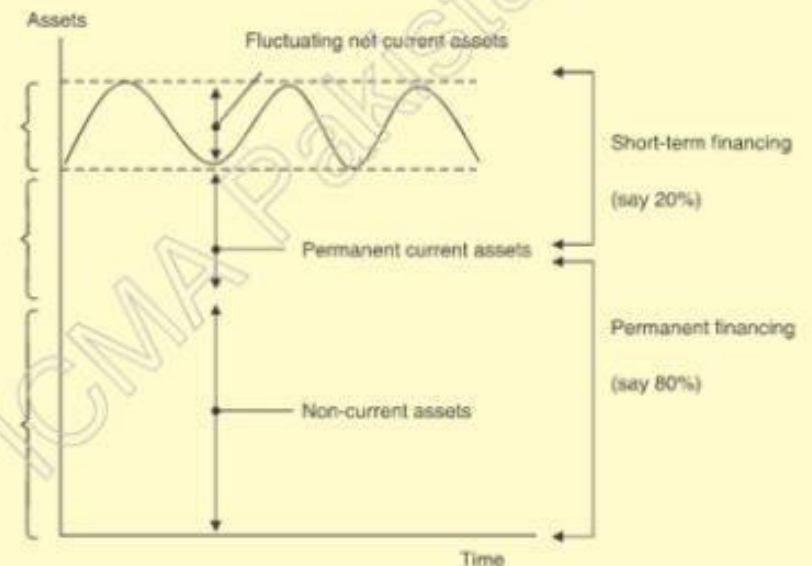
The choice is a matter for managerial judgement, and depends to an extent on the cost versus risk tradeoff described above.

Working Capital Management

Three possible policies exist, as follows:

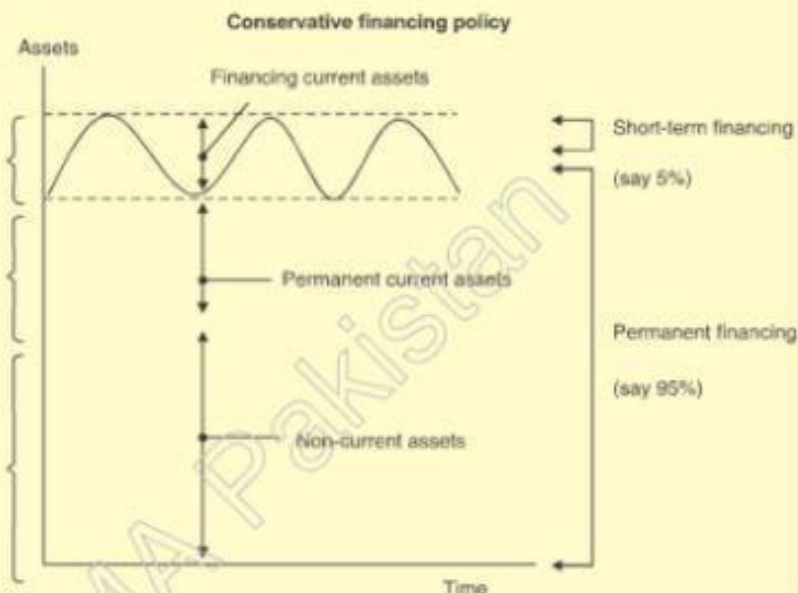
An **aggressive policy** for financing working capital uses short-term financing to fund all the fluctuating current assets as well as some of the permanent part of the current assets. This policy carries the greatest risk of illiquidity, as well as the greatest returns.

Aggressive financing policy



A conservative policy is where all of the permanent assets – both noncurrent assets and the permanent part of the current assets (i.e., the core level of investment in inventory and receivables, 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.

Working Capital Management



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 noncurrent assets.

5 The Working Capital Cycle



Definition

The working capital cycle is the length of time between paying out cash for purchases and receiving cash for the subsequent sale. It can be calculated as follows:

$$\text{Length of Cycle} = \text{Average inventory holding period} + \text{Average receivables collection period} - \text{Average payables payment period}$$

More explanation of the operating cycle

The operating cycle is the length of time between the entity's outlay on raw materials, wages and other expenditures, and the inflow cash from the sale of the goods.

Working Capital Management

In a manufacturing business this is the average time that raw materials remain in stock less the period of credit taken from suppliers plus the time taken for producing the goods plus the time the goods remain in finished inventory plus the time taken by customers to pay for the goods. On some occasions this cycle is referred to as the cash cycle, or the working capital cycle.

This is an important concept for the management of cash or working capital because the longer the operating cycle, the more financial resource the entity needs. Management needs to watch that this cycle does not become too long.

Allowances should be made for any significant changes in the level of stocks taking place over the period. If, for example the entity is deliberately building up its level of inventory, this lengthen the operating cycle.

Businesses will generally seek to shorten the operating cycle as much as possible consistent with:

- providing good customer service;
- allowing reasonable credit period for sales; and
- paying suppliers within an acceptable time.

As seen above, the management of working capital requires management to find an appropriate balance between profitability and liquidity.

A key consideration here is that shortening the operating cycle to improve liquidity may have an adverse effect on the entity's profitability.

Shortening the operation cycle

If the operating cycle can be shortened, this should improve the entity's liquidity.

In general terms, the volume of receivables balances could be cut by a quicker collection of debt, finished goods could be turned over more rapidly, the level of raw materials inventory could be reduced or the production period could be shortened.

More specifically, a number of steps could be taken to shorten the operating cycle, as follows:

Reduce raw materials stockholding This may be done by reviewing slow-moving lines and reorder levels. Inventory control models may be considered if not already in use. More efficient links with suppliers could also help. Reducing inventory may involve loss of discounts for bulk purchases, loss of cost savings from price rises, or could lead to production delays due to stock outs.

Working Capital Management

- **Obtain more finance from suppliers by delaying payments** This could result in deterioration in commercial relationships or even loss of reliable sources of supply. Discounts may be lost by this policy.
- **Reduce work in progress** by reducing production volume (with resultant loss of business and the need to cut back on labor resources) or improving production techniques and efficiency (with the human and practical problems of achieving such change).
- **Reduce finished goods inventory** perhaps by reorganizing the production schedule and distribution methods. This may affect the efficiency with which customer demand can be satisfied and result ultimately in a reduction of revenue.
- **Reduce credit given to customers** by involving and following up incentives. The main disadvantages would be the potential loss of custom as a result of this policy.

6 Working Capital Ratios

Operating cycle calculations

$$\text{Receivables collection period (in days)} = \frac{\text{Average receivables}}{\text{Average daily sales}} \quad \text{or} \quad = \frac{\text{Average receivables} \times 365}{\text{Total sales}}$$

$$\text{Payables payment period (in days)} = \frac{\text{Average payables}}{\text{Average daily purchases}} \quad \text{or} \quad = \frac{\text{Average payables} \times 365}{\text{Total purchases}}$$

Inventory holding period (days)

$$\text{a) Raw Materials (RM)} = \frac{\text{Average inventory of RM}}{\text{Average daily purchases}} \quad \text{or} \quad = \frac{\text{Average inventory of RM} \times 365}{\text{Total purchases}}$$

$$\text{b) Work in progress (WIP)} = \frac{\text{Average WIP}}{\text{Average daily cost of production}} \quad \text{or} \quad = \frac{\text{Average work in progress} \times 365}{\text{Total cost of production}}$$

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$$\text{c) Finished goods (FG)} = \frac{\text{Average inventory of FG}}{\text{Average daily cost of sales}} \quad \text{or} \quad = \frac{\text{Average inventory of FG} \times 365}{\text{Total cost of sales}}$$

Other working capital ratios

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

$$\text{Quick ratio/Acid test} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Inventory turnover} = \frac{\text{Total cost of sales}}{\text{inventory} + \text{WIP}}$$

Interpreting ratios

The Current ratio provides a broad measure of liquidity.

A high current ratio would suggest that the business would have little difficulty meeting current liabilities from available assets. However, if a large proportion of current assets are represented by inventory, this may not be the case as inventory is less liquid than other current assets.

The **quick ratio**, or acid test, indicates the ability to pay suppliers in the short term. The quick ratio recognizes that inventory may take some time to convert into cash and so focuses on those current assets that are relatively liquid.

There are no general norms for these ratios and 'ideal' levels vary depending on the type of business being examined.

Manufacturers will normally require much higher liquidity ratios, than retailers. When analyzing these liquidity ratios, the absolute figure calculated for a particular year is less important than the trend over time.

Illustration 1 – The operating cycle

The table below gives information extracted from the annual accounts of Dani for the past 2 years.

Working Capital Management

Dani – Extracts from annual accounts

	Year 1 Rs.	Year 2 Rs.
Inventory: raw materials	108,000	145,800
Inventory: work in progress	75,600	97,200
Inventory: Finished goods	86,400	129,600
Purchases	518,400	702,000
Cost of goods sold	756,000	972,000
Revenue	864,000	1,080,000
Receivables	172,800	259,200
Accounts payable	86,400	105,300

Required:

Calculate the length of the operating cycle for each of the 2 years.

Solution

Note that, owing to the nature of the simplified information provided, end-of-year values – rather than average values – have been used for inventories, receivables and payables.

Year 1	Days	Year 2	Days
RM holding period $(108/518.4) \times 365$	76	$(145.8/702) \times 365$	76
WIP (production) period $(75.6/756) \times 365$	37	$(97.2/972) \times 365$	37
FG holding period $(86.4/756) \times 365$	42	$(129.6/972) \times 365$	49
Receivables collection period $(172.8/864) \times 365$	73	$(259.2/1,080) \times 365$	88
Payables payment period $(86.4/518.4) \times 365$	(61)	$(105.3/702) \times 365$	(55)
	<u>167</u>		<u>195</u>

Example 1

Income statement extract	Rs.
Turnover	350,000
Cost of sales	(250,000)
Gross profit	<u>100,000</u>

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Statement of financial position extract	Rs.
Current assets	
Inventory	105,000
Receivables	35,000
Current liabilities	
Payables	55,000

Required:

Calculate the length of the working capital cycle.

7 Over-trading

Over-trading can be a problem for new, or fast growing firms.

As sales increase, the levels of inventories and receivables also increase, and the liquidity position of the firm deteriorates.

External finance is often needed to help the firm manage its liquidity position.

Careful working capital management, together with increased investment in non-current assets to support the higher level of sales, can help to overcome the problem of over-trading.

Symptoms of over-trading

The common symptoms of over-trading are:

- there is a fall in liquidity ratios;
- there is a rapid increase in revenue;
- there is a sharp increase in the sales to noncurrent assets ratio;
- there is an increase in inventory in relation to revenue;
- there is an increase in receivables;
- there is an increase in the accounts payable period;
- there is an increase in short-term borrowing and a decline in cash balances;
- there is an increase in gearing;
- the profit margin decreases.

Preventing over-trading

Over-trading can result in the failure of an entity through liquidity problems. To prevent over-trading, an entity will have to formulate an immediate response, and then focus in the longer term on more efficient working capital management policies.

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The longer term focus on efficient working capital management policies is covered above.

Potential immediate responses to the over-trading problem

- Introduce new capital. An overdraft is often used as a short term solution, since it is easy to negotiate with the bank, and very flexible. However, overdrafts are repayable on demand, so are risky. Alternatively, the entity could issue new share capital, or organize a long-term loan. The downside of long term financing options is that the entity will have to continue paying returns to investors for a long period after the immediate over-trading problem has been addressed.
- Reduce distributions. This may not be a welcome suggestion, but not paying dividends or taking less salary or fees if a partnership or sole trader any need to be considered.
- Cost cutting. Reducing costs or finding efficiencies should increase cash flow and reduce the impact of over-trading. This may include delaying capital expenditure if possible.
- Factoring or invoice discounting. Factoring involves selling invoices to a specialist finance entity who takes on the administration and cost of recovering the invoice payments. With invoice discounting, a loan is raised from a finance entity against the value of invoices, but the responsibility and cost of recovering invoice payments is not passed to the invoice discounter.
- Lease or hire purchase assets. Both approaches can help smooth cash flows to obtain noncurrent assets. Alternatively, a sale and leaseback agreement involves selling an asset to generate cash immediately, and then leasing it from the new owner for a period. The benefit is the immediate cash inflow, but the downside of a sale and leaseback is that the entity loses the potential appreciation in value of the asset (usually property) in the future.

Multinational working capital management

The aims of a multinational entity in relation to cash management will be similar to those for a purely domestic entity, which will be to:

- Ensure fast collection of cash;
- Take longer to pay out cash;
- Optimize cash flow within the entity;
- Generate the best return on cash surpluses.

Achieving these aims will be more difficult in a multinational entity due to the longer

Working Capital Management

distances involved, the number of parties involved, and the risk of governments placing restrictions on the transfers of funds out of certain countries.

Granting credit is often an essential condition to undertake international business. In addition to the normal risks of default, firm granting credit, exchange rate fluctuations between the time of sale and the time the debt is collected provide an additional risk.

Management of inventory is also similar to but more complex than for a purely domestic enterprise. The balance between minimizing inventory and being able to meet customer demands is more difficult to judge. The movement in exchange rates will also influence the timing of purchases, and the level of inventory held in a particular currency.

Political risk is a further consideration; multinationals will need to allow for the prospect of import for export quotas or tariffs being imposed, in certain countries, the risk of expropriation of inventory will lead to minimal inventory holdings being maintained. Some countries have property taxes on assets, including inventory, where the tax payable is based on holdings on a particular date in the year, which again will influence the strategy adopted for inventory management by a multinational.

8 Short Term Financing Options

The working capital financing decision (discussed above) considers the balance between long-term and short-term finance.

Long-term financing options, such as equity, preference shares and bonds, were covered in the previous Chapters.

Short-term financing options include:

Bank overdraft

With an overdraft, an entity arranges to borrow, through its current account, a fluctuating amount up to a pre-agreed amount. An overdraft is an extremely flexible form of finance. However, an overdraft is repayable on demand; i.e., an overdraft facility is an uncommitted facility.

Term loan

A term loan is a bank loan which runs for a specified term, agreed with the bank when the money is borrowed. Term loans can be short-term, or indeed medium-term or long-term.

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Under a term loan, a specified payment schedule has to be followed, to repay the capital and interest over the term of the loan (or sometimes at the end of the term).

Term loans are quick and easy to set up, and give certainty to the borrower that the money will be available for the whole of the term.

Money market borrowings

Large entities can also borrow on the money markets.

The term 'money market' can be confusing since the money market is not actually a 'market' in the normal sense of the term, but a large number of one-to-one borrowing/deposit agreements between two banks (or other large financial institutions) or a bank and a company. The money market is dominated by the major banks and other financial institutions, but large entities also borrow and lend on the money market.

A money market line (an uncommitted borrowing facility) can be arranged with an individual bank. A large entity can then borrow (or deposit) funds from that bank as required up to the maximum total agreed borrowing level. Each borrowing is for a fixed period of time, with interest payable on maturity.

These bank borrowings are referred to as 'money market borrowings'.

Terms on money market borrowings and deposits generally range from overnight to 12 months.

Revolving Credit Facilities (RCFs)

A term loan generally specifies an agreed payment profile and the amounts repaid cannot normally be re-borrowed. An RCF allows the borrower to draw down funds in the form of short term borrowings over the life of the facility, up to the overall limit agreed without further credit checks at the time of drawdown.

An RCF has the important advantage over an overdraft and a money market line of being a committed facility. That is, it cannot be withdrawn before the end of the term of the facility. However, this comes at a cost in terms of fees payable for guaranteed access to future borrowings.

Supplier credit

By taking credit from suppliers, organizations reduce the amount of other short-term finance needed. Supplier credit can often be used on a very informal basis to deal with a short-term cash flow problem.

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However, taking too much credit from suppliers can be expensive (if prompt payment discounts are foregone) and can adversely affect an entity's credit rating.

Bills of exchange

Bills of exchange enable suppliers to receive the benefit of payment well before the customer actually pays, providing a useful source of receivables finance for entities that are involved in selling goods on credit terms.

A bill of exchange is similar to a postdated cheque in that it is a written commitment by the customer to pay a specified amount to the supplier of goods or services on a future specified date. The supplier can hold the bill until the maturity date, or it can be traded with a bank if the cash is needed earlier at a discount.

Acceptance credits

An acceptance credit is an authorization given by a bank to a specified beneficiary to draw drafts upon the bank up to a given amount.

Acceptance credits are available only to large companies with good credit ratings. They may be called 'bank bills', and are often drawn down under an RCF agreement. They provide a flexible source of short term bank funding.

Commercial paper (CP)

CP is an unsecured promissory note, promising to repay the principal on maturity to the holder of the note. It is tradable paper.

Using CP enables a company to raise funds without using the banking system. CP provides liquidity to the investor as it is a traded instrument and so can be sold on before maturity.

Interest is not usually payable on short term CP instead it is issued at a discount (i.e., a price that is lower than the principal value that is repayable on maturity) so the maturity value is greater than the amount lent.

Supply chain financing

This is sometimes used between retailers and their suppliers to satisfy both parties' needs i.e., the supplier's desire to be paid quickly and the retailer's desire to extend credit terms.

It works by the supplier selling its invoices to a bank at a rate dependent on the credit rating of the retailer. The bank then pays the supplier when the supplier wants to be paid, and the retailer pays the bank in line with normal credit terms.

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Debt factoring

Factoring is defined as follows:

'The sale of debts to a third party (the factor) at a discount, in return for prompt cash. A factoring service may be with recourse, in which case the supplier takes the risk of the debt not being paid or without recourse when the factor takes the risk.'

More detail on factoring and invoice discounting

Debt factoring

Specialist finance entities (usually subsidiaries of banks) offering factoring arrangements will provide three main services:

- Provide finance by advancing, say 80% of invoice value immediately, the remainder being settled when the client's customer settles the debt (but net of a charge for interest, for example 3% per annum above base rate).
- Take responsibility for the operation of the client's sales ledger, including assessment of creditworthiness and dealing with customers for an additional service charge, typically 2% of turnover.
- They may, for an additional fee, offer non-recourse finance, that is guarantee settlement even if they are not paid by the customer.

In order to do this economically, they have developed their expertise in credit control in term of market intelligence (including credit scoring), information management (sophisticated databases, processing and decision support systems) and the skills required for dealing with customers especially those who are in no hurry to pay.

Invoice discounting

Alternatively, they may offer a confidential invoice discounting facility under which they provide the finance as above, but do not get involved with the operation of the sales ledger or hence become known to the customers.

This has, to date, been more popular than the overt factoring arrangement. It is cheaper, and avoids creating a barrier between the entity and its customers. It is less attractive to the providers of finance, however, being in the nature of supplying a commodity rather than adding value through expertise.

Working Capital Management

9 Exam style questions



Test your understanding 1 – Eden Ltd.

Eden Ltd. is a medium sized company producing a range of engineering products which it sells to wholesale distributors. Recently, its sales have begun to rise rapidly following a general recovery in the economy as a whole. However, it is concerned about its liquidity position and is contemplating ways of improving its cash flow. Eden's accounts for the past two years are summarized below:

Income statements for the year ended 31 December

	20X2 Rs. '000'	20X3 Rs. '000'
Turnover	12,000	16,000
Cost of goods sold	7,000	9,150
Operating profit	5,000	6,850
Interest	200	250
Profit before tax	4,800	6,600
Taxation (after capital allowances)	1,000	1,600
Profit after tax	3,800	5,000
Dividends	1,500	2,000
Retained profit	2,300	3,000

Statement of financial position as at 31 December

	20X2 Rs. '000'		20X3 Rs. '000'	
Non-current assets		9,000		12,000
Current assets				
Inventory	1,400		2,200	
Receivables	1,600		2,600	
Cash	1,500		100	
Total Assets		4,500 13,500		4,900 16,900

Required:

Identify the reasons for the sharp decline in Eden's liquidity and assess the extent to which the company can be said to be exhibiting the problem of 'over-trading'.

Illustrate your answer by reference to key performance and liquidity ratios.

Working Capital Management

Multiple choice question (MCQ)

- 1) Working capital cycle can be reduced by:
- Allowing more credit to debtors
 - Paying creditors earlier
 - Obtaining short term loan
 - Applying Just in Time theory for inventory purchase

Working Capital Management



Test your understanding answers

Example 1

Working capital cycle

		Days
Inventory holding period	105,000 — x 365 =	153
Receivables period	250,000 35,000 — x 365 =	37
Less: Period of credit taken (payables days)	350,000 55,000 — x 365 =	(80)
Total	250.00	110

Test your understanding 1 – Eden Ltd.

Liquidity measures the amount of cash the company can expect to realise in the short term. In this case, Eden's cash balance has fallen from Rs. 1.5 million in 20X2 to a net overdraft of Rs. 0.1 million, a decline in liquidity of Rs. 1.6 million. This is in stark contrast to the apparently healthy profit for the year, indicating that cash has been used to finance balance sheet assets.

Indeed, analysis of the statement of financial position indicates that at least Rs. 3 million has been ploughed into noncurrent assets. It is not possible to say whether this investment has been in new technology, or perhaps some kind of acquisition, but the result appears to be that turnover has increased by 33 percent.

At the same time, the company's working capital has been funded, to the tune of Rs. 0.8 million in inventory and Rs. 1 million in receivables, probably at the expense of trade payables which have lengthened by Rs. 0.5 million. More significantly, no long-term finance has been raised which appears to be in conflict with the maxim that we should match the length of the finance with the length of the project.

This may be a case of over-trading where a company undergoes a rapid expansion without the support of long-term financing.

Growth here has been financed short term, at the expense of cash and payables. As sales increase, so too do inventory and receivables, leading to further liquidity problems.

We can now look at more specifics in the form of ratio analysis.

Working Capital Management

Current ratios

These have fallen from 2.3 to 2.0, but once we remove inventory to give us the acid test ratio the fall is from 1.6 to 1.1, which may be significant if Eden experiences bad debts and, therefore, severe short-term liquidity constraints.

Working capital cycle

Inventory days have increased from 73 in 20X2 to 88 days in 20X3, almost three months; this appears high but should be measured against the industry average.

Receivables days have lengthened from 49 days to 59 days, almost two months, which will significantly pressure liquidity. Credit terms may have to be reviewed and enforced.

Payables days have lengthened marginally from 78 to 80 days. Again this must be compared to the terms offered and industry averages, but any increase may result in a loss of goodwill from suppliers.

The net effect is that the working capital cycle has lengthened from 44 days to 67 days.

Return on capital employed

The ROCE (operating profit as a percentage of shareholders' funds and long-term loans) has in fact risen from 43 percent to 47 percent. This could be explained either by the net profit margin or by the asset turnover.

The net profit margin has remained stable at 42 percent versus 43 percent, which indicates first that the turnover increase is not due to price reductions, and second that ROCE has improved due to asset turnover by 1.04 versus 1.10. This has not lengthened too much in that the increase in turnover appears to have been asset backed.

In summary although liquidity is certainly a problem, the expansion does appear to be backed by fixed assets and, therefore, Eden may not necessarily over-trade. It would perhaps be advantageous to obtain long-term financing if Eden is to maintain its growth.

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Note: The following ratios have been used.

Current ratio	=	$\frac{\text{Current assets}}{\text{Current liabilities}}$
Acid ratio	=	$\frac{\text{Current assets} - \text{Inventory}}{\text{Current Liabilities}}$
Inventory days	=	$\frac{\text{Cost of sales}}{\text{Receivables}}$
Receivable days	=	$\frac{\text{Sales}}{\text{Payables}}$
Payables days	=	$\frac{\text{Sales}}{\text{Operating profit}}$
ROCE	=	$\frac{\text{Shareholders' funds} + \text{Long-term loans}}{\text{Operating profit}}$
Net profit	=	$\frac{\text{Sales}}{\text{Sales}}$
Asset turnover	=	$\frac{\text{Sales}}{\text{Shareholders' funds} + \text{Long-term loans}}$

In doubt about using a ratio, always define the way you have calculated

Answers to MCQ

1) d

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