London School of Business & Finance

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ACCA Paper F9

Financial Management

Class Notes

March/June 2017

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Contents

Introduction to the paper

AIM OF THE PAPER

The aim of the paper is to develop knowledge and skills expected of a financial manager, relating to issues affecting investment, financing and dividend policy decisions.

OUTLINE OF THE SYLLABUS

A. Financial management function

B. Financial management environment

C. Working capital management

D. Investment appraisal

E. Business finance (including Cost of Capital)

F. Business valuation

G. Risk management

FORMAT OF THE EXAM PAPER

The syllabus is assessed by a three hour and 15 minute paper-based examination, All questions are compulsory.

Section A of the exam comprises 15 multiple choice questions of 2 marks each.

Section B of the exam comprises three scenarios each with 5 multiple choice questions of 2 marks each.

Section C of the exam comprises two 20 mark questions.

FAQs

What level of mathematical ability is required in F9?

You will be required to apply formulae either given or memorised. This may require limited manipulation of formulae. The level of computational complexity is normally inversely related to the conceptual difficulty of the topic.

What do I need to bring to class?

You will need pen, paper, these notes and revision kit. In addition you will need a standard scientific calculator which may be purchased in any large newsagents or supermarket.

Is there any assumed knowledge?

The only real overlap is with basic concepts explored in paper F2 and also elements of decision making and cost behaviour covered in paper F5.

Formulae given in the examination paper

FORMULAE

Economic Order Quantity

$$= \sqrt{\frac{2C_0D}{C_H}}$$

Miller-Orr Model

Return point = Lower limit + (1/3 × spread)

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

The Capital Asset Pricing Model

$$E(r_i) = R_f + \beta_i\,(E\,(r_m) - R_f)$$

The Asset Beta Formula

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

The Growth Model

$$P_0 = \frac{D_0(1+g)}{(K_e - g)} \text{ or } P_0 = \frac{D_0(1+g)}{(r_e - g)}$$

Gordon's Growth Approximation

$$g = br_e$$

The weighted average cost of capital

$$\text{WACC} = \left[\frac{V_e}{V_e + V_d}\right] k_e + \left[\frac{V_d}{V_e + V_d}\right] k_d\,(1-T)$$

The Fisher formula

$$(1 + i) = (1 + r)(1 + h)$$

Purchasing Power Parity and Interest Rate Parity

$$S_1 = S_0 \times \frac{(1+h_c)}{(1+h_b)}$$

$$F_0 = S_0 \times \frac{(1+i_c)}{(1+i_b)}$$

Present Value Table

Present value of 1 i.e. $(1 + r)^{-n}$

Where r = discount rate
n = number of periods until payment

Discount rate (r)

Periods

(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	**1**
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	**2**
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	**3**
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	**4**
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	**5**
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	**6**
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	**7**
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	**8**
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	**9**
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	**10**
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	**11**
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	**12**
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	**13**
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	**14**
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	**15**

(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	**1**
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	**2**
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	**3**
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	**4**
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	**5**
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	**6**
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	**7**
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	**8**
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	**9**
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	**10**
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	**11**
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	**12**
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	**13**
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	**14**
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	**15**

Annuity Table

Present value of an annuity of 1 i.e. $\frac{1-(1+r)^{-n}}{r}$

Where r = discount rate
n = number of periods

Discount rate (r)

Periods

(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	**1**
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	**2**
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	**3**
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	**4**
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	**5**
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	**6**
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	**7**
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	**8**
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	**9**
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	**10**
11	10.37	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	**11**
12	11.26	10.58	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	**12**
13	12.13	11.35	10.63	9.986	9.394	8.853	8.358	7.904	7.487	7.103	**13**
14	13.00	12.11	11.30	10.56	9.899	9.295	8.745	8.244	7.786	7.367	**14**
15	13.87	12.85	11.94	11.12	10.38	9.712	9.108	8.559	8.061	7.606	**15**

(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	**1**
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	**2**
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	**3**
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	**4**
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	**5**
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	**6**
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	**7**
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	**8**
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	**9**
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	**10**
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	**11**
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	**12**
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	**13**
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	**14**
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	**15**

Chapter 1

Financial management: an introduction

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CHAPTER CONTENTS

WHAT IS FINANCIAL MANAGEMENT?

May be considered as:

The management of all matters associated with the cash flow of the organisation both short and long-term.

Financial management and the accounting equation

The three key decisions

Financial management is often described in terms of the three basic decisions to be made:

- the investment decision,
- the financial decision,
- the dividend decision.

Each of these decisions have to be looked at in far greater detail later on in the course but as an outline these are the basic considerations:

1. The investment decision

A company may invest its funds in one of three basic areas:

1. Capital assets
2. Working capital
3. Financial assets

Capital assets

A critical decision because of the strategic implications of many investments, the decision would include the following financial considerations:

1. Return
2. Risk
3. Cash flow
4. Profit.

Working capital

The cash resource available to the business on a day-to-day basis and used to fund the current assets such as inventory and receivables. The key to identifying the level of investment is to balance the risk of insolvency against the cost of funding.

Financial assets

Not a core area of the course, we tend to focus on financing from the perspective of a company rather than the investor. This being the case the only financial investment to consider is short-term saving. In this circumstance then the key considerations are, in order:

1. Risk
2. Liquidity
3. Return.

2. The financing decision

When looking at the financing of a business there are 4 basic questions to consider:

1. total funding required,
2. internally generated vs externally sourced,
3. debt or equity,
4. long-term or short-term debt.

Total funding required

The funding requirement will be determined by an assessment of the following

Application of funds	Source of funds
Existing asset base	Existing funding
New assets	Redemption of existing debt
Disposals	Funds generated through trading
Change in Working Capital	

Internally vs externally generated funds

A company may be able to fund business growth via internally generated funds such as retained earnings. If those funds are limited or the company wishes to grow at a faster rate then external sources of funding must be tapped.

Debt vs equity

The gearing decision which forms the basis of two later chapters. A critical issue in terms of risk and cost of funding.

Short-term vs long-term debt

A consideration focussed upon in the funding of working capital, short-term funding may have benefits of flexibility and lower cost but is inherently risky.

3. The dividend decision

The amount of return to be paid in cash to shareholders. This is a critical measure of the companies ability to pay a cash return to its shareholders. The level of dividend paid will be determined by the following:

1. Profitability
2. Cash flow
3. Growth
4. Legal restrictions
5. Shareholder expectations.

Possible dividend policies:

- Constant dividend payout

  The company pays out the same dividend each year (this may be adjusted for inflation).

- Constant payout ratio

  The company pays out the same proportion of available earnings each year.

- Residual dividend policy

  The company pays out any remaining earnings after all investment opportunities increasing shareholder wealth have been financed.

- Dividend irrelevance theory

  The theory states that shareholders can create a cash dividend if they so require, or use dividends to purchase more shares if they wish to increase their capital wealth.

Corporate strategy and financial management

The role of the financial manager is to align the aims of financial management team with those of the wider corporate strategy. The strategy of the business may be separated into corporate, business and operational objectives. Financial managers should be attempting to fulfil those objectives.

The nature of financial management means that it is fundamental to the translation of strategic aims into financial transactions.

Financial objectives

Financial objectives of commercial companies may include:

1. Maximising shareholders' wealth
2. Maximising profits
3. Satisficing.

1. Maximising shareholders' wealth

A fundamental aim within financial management is to create and sustain shareholders' wealth. Wealth being the ongoing value of shares of the organisation. The importance of this concept is that there is no time period to the wealth and that it is determined by the relative risk/ return balance of the business. All aspects of financial management are based on this basic premise.

2. Maximising profits

Within organisations it is normal to reward management on some measure of profit such as ROI or RI. In simple terms we would expect a close relationship between profit and shareholders' wealth. There are, however, ways in which they may conflict such as:

1. Short-termism.
2. Cash vs accruals.
3. Risk.

Short-termism

A profit target is normally calculated over one year, it is relatively easy to manipulate profit over that period to enhance rewards at the expense of future years.

Cash vs accruals

As we will see later, wealth is calculated on a cash basis and ignores accruals.

Risk

A manager may be inclined to accept very risky projects in order to achieve profit targets which in turn would adversely affect the value of the business.

3. Satisficing

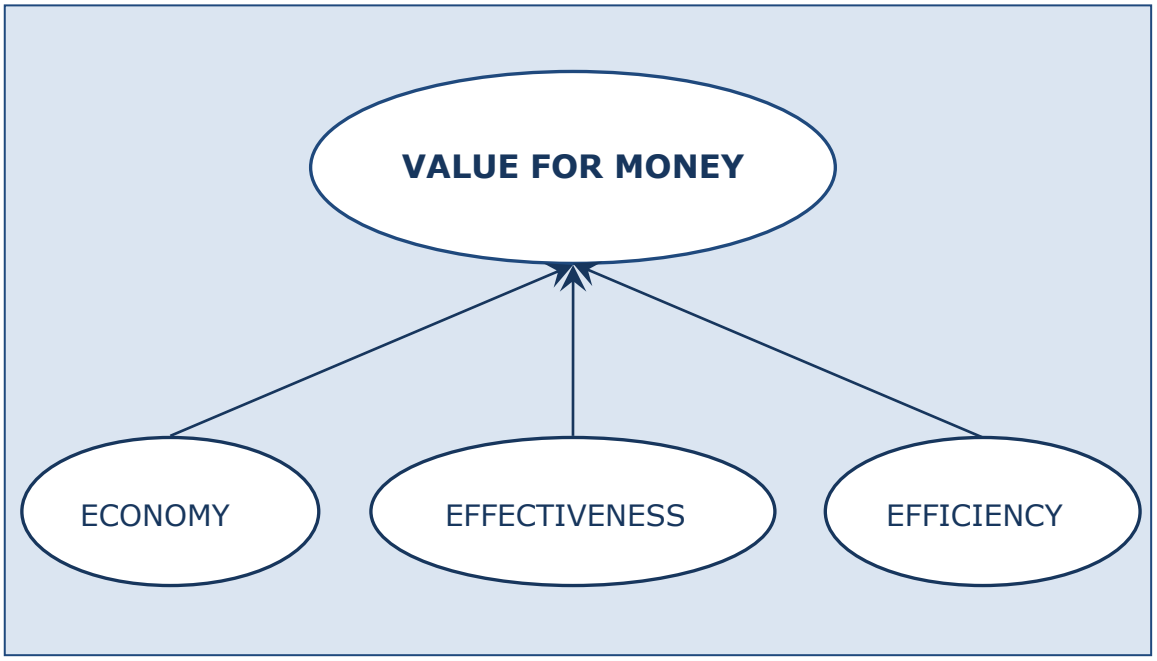
Many organisations do not profit maximise but instead aim to satisfice. This means that they attempt to generate an acceptable level of profit with a minimum of risk. It reflects the fact that many organisations are more concerned with surviving than growth.

4. Objectives of not-for-profit organisations

These organisations are established to pursue non-financial aims but are to provide services to the community. Such organisations like profit-seeking companies need funds to finance their operations. Their major constraint is the amount of funds that they would be able to raise. As a result not-for-profit organisations should seek to use the limited funds so as to obtain value for money.

Value for money

Value for money means providing a service in a way, which is economical, efficient and effective. It simply means that getting the best possible service at the least possible cost. Public services for example are funded by the taxpayers and in seeking value for money; the needs of the taxpayer are being served, insofar as resources are being used in the best manner to provide essential services.



Economy measures the cost of obtaining the required quality inputs needed to produce the service. The aim is to acquire the necessary input at the lowest possible cost.

Effectiveness means doing the right thing. It measures the extent to which the service meets its declared objectives.

Efficiency means doing the right thing well. It relates to the level of output generated by a given input. Reducing the input: output ratio is an indication of increased efficiency.

Stakeholders

We tend to focus on the shareholder as the owner and key stakeholder in a business. A more comprehensive view would be to consider a wider range of interested parties or stakeholders.

Stakeholders are any party that has both an interest in and relationship with the company. The basic argument is that the responsibility of an organisation is to balance the requirements of all stakeholder groups in relation to the relative economic power of each group.

Group task

Required

Identify as many stakeholder groups as you can for a commercial organisation.

Conflict between stakeholder groups

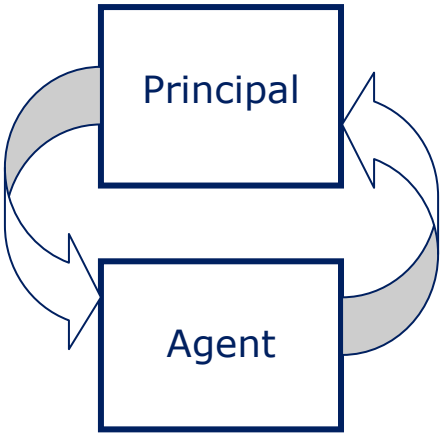
The very nature of looking at stakeholders is that the level of 'return' is finite within an organisation. There is a need to balance the needs of all groups in relation to their relative strength.

Group task

Required

Using the stakeholder groups already identified suggest 5 possible conflicts of interest that need to be considered.

Agency theory



Agency relationships occur when one or more people employ one or more persons as agent. The persons who employ others are the principals and those who work for them are called the agent

In an agency situation, the principal delegate some decision-making powers to the agent whose decisions affect both parties. This type of relationship is common in

business life. For example shareholders of a company delegate stewardship function to the directors of that company. The reasons why an agents are employed will vary but the generally an agent may be employed because of the special skills offered, or information the agent possess or to release the principal from the time committed to the business.

Goal Congruence

Goal congruence is defined as the state which leads individuals or groups to take actions which are in their self-interest and also in the best interest of the entity.

For an organisation to function properly, it is essential to achieve goal congruence at all level. All the components of the organisation should have the same overall objectives, and act cohesively in pursuit of those objectives.

In order to achieve goal congruence, there should be introduction of a careful designed remuneration packages for managers and the workforce which would motivate them to take decisions which will be consistent with the objectives of the shareholders.

Money as a prime motivator

The most direct use of money as a motivator is payment by results schemes whereby an employee's pay is directly linked to his results. However, research has shown that money is not a single motivator or even the prime motivator.

Question

Identify 5 key areas of conflict between directors and shareholders and suggest what can be done to encourage goal congruence between the two parties.

Chapter 2

Investment appraisal techniques

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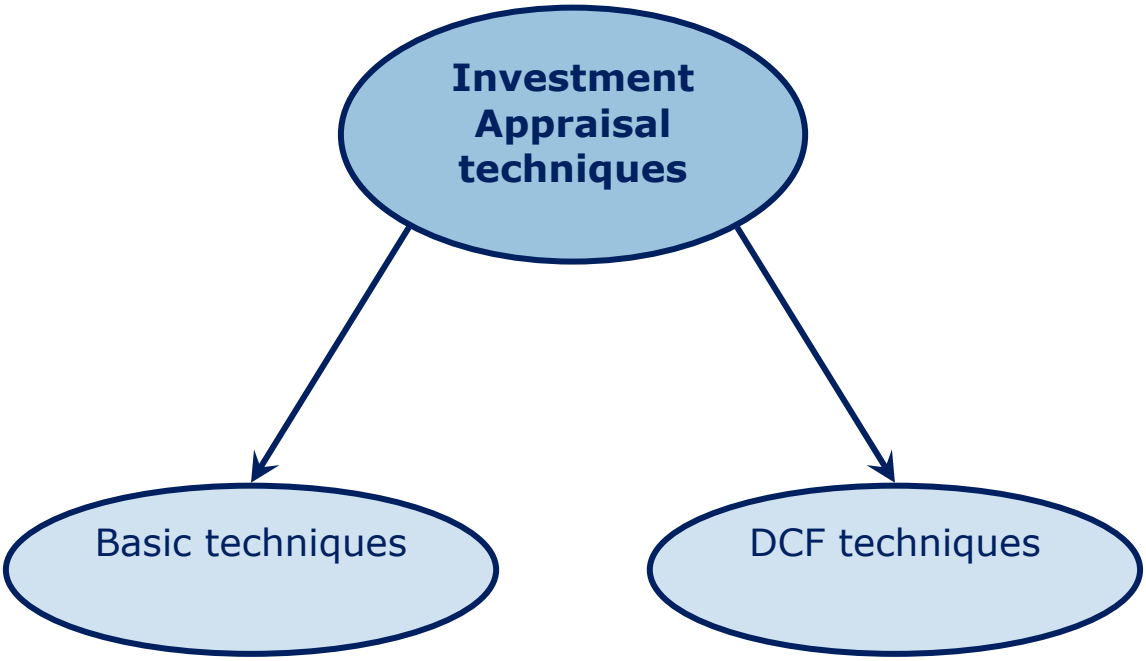
SYLLABUS CONTENT

- Payback
- ARR
- Time value of money
- Discounted cash flow
- NPV
- IRR
- Annuities
- Perpetuities

CHAPTER CONTENT DIAGRAM



- Payback
- Accounting rate of return (ARR)

- Net present value (NPV)
- Internal rate of return (IRR)
- Annuities
- Perpetuities

CHAPTER CONTENTS

INVESTMENT APPRAISAL AND CAPITAL BUDGETING

A form of decision-making where the investment occurs predominantly today and the benefits of the investment occur in the future. Investment appraisal is of particular importance because of the following:

1. Long-term
2. Size (in relation to the business)
3. Outflow today (relatively certain), inflow in the future (uncertain).

There are 4 basic methods to be mastered

1. Payback
2. Return on Capital Employed (ROCE)
3. Net present value (NPV)
4. Internal rate of return (IRR).

We shall use the following example to illustrate how each method is calculated.

Example 1 Reina Ltd

Reina Ltd has the opportunity to invest in an investment with the following initial costs and returns:

		A ($000s)
Initial investment		(100)
Cash flows	Yr 1	50
	Yr 2	40
	Yr 3	30
	Yr 4	25
	Yr 5	20
Residual value	Yr 5	5

The cost of capital is 10%.

Required:

Should the project be accepted?

Payback

The length of time it takes for **cash inflows** from trading to pay back the initial investment.

Example 1 contd

	A
Initial investment	
	Periodic / **Cumulative**
Net cash flows ($)	
Yr 1	
Yr 2	
Yr 3	
Yr 4	

Required:

Alternate computation with equal cash flows each year.

Example 2 Finnan Ltd

Net cash inflow per annum	$25,000
Investment	$60,000

Required:

Payback period.

Decision criteria

Accept the project in the event that the time period is within the acceptable time period. What is an acceptable time period? It depends!!

Advantages

1. It is simple to use (calculate) and easy to understand
2. It is a particularly useful approach for ranking projects where a company faces liquidity constraints and requires a fast repayment of investment.
3. It is appropriate in situations where risky investments are made in uncertain market that are subject to fast design and product changes or where future cash flows are particularly difficult to predict.
4. The method is often used in conjunction with the NPV or IRR method and act as the first screening device to identify projects which are worthy of further investigation.
5. Unlike the other traditional methods payback uses cash flows, rather than accounting profits, and so is less likely to produce an unduly optimistic figure distorted by assorted accounting conventions.

Disadvantages

1. It does not give a measure of return, as such it can only be used in addition to other investment appraisal methods.
2. It does not normally consider the impact of discounted cash flow although a discounted payback may be calculated (see later).
3. It only considers cash flow up to the payback, any cash flows beyond that point are ignored.
4. There is no objective measure of what is an acceptable payback period, any target payback is necessarily subjective.

Accounting Rate of Return (ARR)

A measure that considers the impact of the investment on accounting profit. It is similar in concept to the ROCE performance measure, but is not the same.

	Investment appraisal	**Performance appraisal**
Time period	Over the life of the project	A single year
When?	Future	Past
Use	Decision making	Appraisal and reward structures

$$\text{ARR} = \frac{\text{Estimated annual profit}}{\text{Average investment}} \times 100$$

Example 1 contd

A

Average annual profit

Total profit

Less depreciation

Total net cash flow

÷ number of years

= average profit

Average investment

Initial investment

Plus residual value

÷ 2

Equals ave. investment

ARR

Decision criteria

A profit measure that must be compared to a target profit. This profit is likely to be related to the target performance measure already discussed

Advantages

1. It is easy to understand and easy to calculate.
2. The impact of the project on a company's financial statement can also be specified
3. ROCE is still the commonest way in which business unit performance is measured and evaluated, and is certainly the most visible to shareholders
4. Managers may be happy in expressing project attractiveness in the same terms in which their performance will be reported to shareholders, and according to which they will be evaluated and rewarded.
5. The continuing use of the ARR method can be explained largely by its utilisation of balance sheet and P&L account magnitudes familiar to managers, namely profit and capital employed.

Disadvantages

1. It fails to take account of the project life or the timing of cash flows and time value of money within that life
2. It uses accounting profit, hence subject to various accounting conventions.
3. There is no definite investment signal. The decision to invest or not remains subjective in view of the lack of objectively set target ARR.
4. Like all rate of return measures, it is not a measurement of absolute gain in wealth for the business owners.
5. The ARR can be expressed in a variety of ways and is therefore susceptible to manipulation.

Example 3 Armcliff (exam standard question)

Armcliff Limited is a division of Sherin plc which requires each of its divisions to achieve a rate of return on capital employed of at least 10 per cent per annum. This rate of return is also applied as a hurdle rate for new investment projects. Divisions have limited borrowing powers and all capital projects are centrally funded.

The following is an extract from Armcliff's divisional accounts.

Profit and loss account for the year ended 31 December 20X6

	$m
Turnover	120
Cost of sales	(100)
Operating profit	20

Assets employed as at 31 December 20X6

	$m	$m
Fixed assets (net)		75
Current assets (including stocks $25m)	45	
Current liabilities	(20)	
		25
Net capital employed		100

Armcliff's production engineers wish to invest in a new computer-controlled press. The equipment cost is $14 million. The residual value is expected to be $2 million after four years operation. The new machine is capable of producing a higher volume. The firm's marketing team is confident of selling the increased volume. The expected additional sales are as follows.

Year 1 2,000,000 units
Year 2 1,800,000 units
Year 3 1,600,000 units
Year 4 1,600,000 units

Sales volume is expected to fall over time because of emerging competitive pressures. Competition will also necessitate a reduction in price by $0.5 each year from the $5 per unit proposed in the first year. Operating costs are expected to be steady at $1 per unit, and allocation of overheads (none of which are affected by the new project) by the central finance department is set at $0.75 per unit.

Required:

(a) Determine whether the proposed capital investment is attractive to Armcliff, using the average rate of return on capital method, defined as average profit to average capital employed, ignoring debtors and creditors.

Suggest three problems which arise with the use of the average return method for appraising new investment.

DISCOUNTED CASH FLOW

The application of the idea that there is a **TIME VALUE OF MONEY**. What this means is that money received today will have more worth than the same amount received at some point in the future.

Why would you rather have $1,000 now rather than in one year's time?

Reasons **1**

2

3

Reminder - compound interest

Example 4

If we invest $100 now (Yr. 0) what will the value of that investment be in 1, 2, 3, 4 years at a compound rate of 10%?

	Present Value	Calculation	Future Value
1	**$100**		
2			
3			
4			

Therefore we are able to express Present Values in terms of Future Values using the following formula:

$$FV = PV \times (1 + r)^n$$

Where PV - Present value.

FV - Future value.

r - Rate of interest or cost of capital.

n - Number of periods (years)

Discounting

The opposite of compounding, where we have the future value (eg an expected cash inflow in a future year) and we wish to consider its value in present value terms.

Illustration

Revising the formula

$$PV = FV \times \frac{1}{(1 + r)^n} = FV \times (1 + r)^{-n}$$

Use tables to calculate the present values of example 4 on the previous page.

Year	Future Value $	Discount factor (from tables) at 10%	Present Value $
1	110		
2	121		
3	133.1		
4	146.41		

Net present value (NPV)

The key investment appraisal method, it incorporates the time value of money in calculating an absolute value of the project. It is called the NET present value because there will be a range of outflows and inflows in the typical investment.

Decision criteria

If the investment has a positive NPV then the project should be accepted (negative rejected). A positive NPV means that the project will increase the wealth of the company by the amount of the NPV at the current cost of capital.

Example 1 contd

($000s)

	Project A	Discount factor	Project A
Year		**@**	
0			
1			
2			
3			
4			
5			
		NPV	

Advantages

1. A project with a positive NPV increases the wealth of the company's, thus maximise the shareholders wealth.
2. Takes into account the time value of money and therefore the opportunity cost of capital.
3. Discount rate can be adjusted to take account of different level of risk inherent in different projects.
4. Unlike the payback period, the NPV takes into account events throughout the life of the project.
5. Superior to the internal rate of return because it does not suffer the problem of multiple rates of return.
6. Better than accounting rate of return because it focuses on cash flows rather than profit.
7. NPV technique can be combined with sensitivity analysis to quantify the risk of the project's result.
8. It can be used to determine the optimum policy for asset replacement.

Disadvantages

1. NPV assumes that firms pursue an objective of maximising the wealth of their shareholders.
2. Determination of the correct discount rate can be difficult.
3. Non-financial managers may have difficulty understanding the concept.
4. The speed of repayment of the original investment is not highlighted.
5. The cash flow figures are estimates and may turn out to be incorrect.
6. NPV assumes cash flows occur at the beginning or end of the year, and is not a technique that is easily used when complicated, mid-period cash flows are present.

Internal rate of return (IRR)

The rate of return at which the NPV equals zero.

Decision criteria

If the IRR is greater than the cost of capital accept the project.

Example 5 Carragher Ltd

A project costing $1000 will return $1,160 in the following year.

Required:

What will be the NPV at 10% and 20% discount rates?

Illustration

Linear interpolation

We must attempt to guess the IRR by linear interpolation. This uses the following formula.

$$\textbf{Interpolated IRR} = L + \left(\frac{N_L}{N_L - N_H} \right) \times (H - L)$$

Where:

L = Lower discount rate

H = Higher discount rate

N_L = NPV at lower discount rate

N_H = NPV at higher discount rate

Advantages

1. Like the NPV method, IRR recognises the time value of money.
2. It is based on cash flows, not accounting profits.
3. More easily understood than NPV by non-accountant being a percentage return on investment.
4. For accept/ reject decisions on individual projects, the IRR method will reach the same decision as the NPV method.

Disadvantages

1. Does not indicate the size of the investment, thus the risk involve in the investment.
2. Assumes that earnings throughout the period of the investment are re-invested at the same rate of return.
3. It can give conflicting signals with mutually exclusive project.
4. If a project has irregular cash flows there is more than one IRR for that project (multiple IRRs).
5. Is confused with accounting rate of return.

NPV and IRR compared

Single investment decision

A single project will be accepted if it has a positive NPV at the required rate of return. If it has a positive NPV then, it will have an IRR that is greater than the required rate of return.

Mutually exclusive projects

Two projects are mutually exclusive if only one of the projects can be undertaken. In this circumstance the NPV and IRR may give conflicting recommendation.

The reasons for the differences in ranking are:

1. NPV is an absolute measure but the IRR is a relative measure of a project's viability.
2. Reinvestment assumption. The two methods are sometimes said to be based on different assumptions about the rate at which funds generated by the project are reinvested. NPV assumes reinvestment at the company's cost of capital, IRR assumes reinvestment at the IRR.

Annuities

An annuity is a series of equal cash flows.

Example 6 Agger Ltd

A project costing $2,000 has returns expected to be $1,000 each year for 3 years at a discount rate of 10%.

Required:

(a) NPV using existing analysis.

(b) NPV using annuity tables

(c) Solely considering the annuity, what if the cash flows commenced in:

1. **Year 4,**
2. **Year 6,**
3. **Year 0?**

Perpetuities

A form of annuity that arises forever (in perpetuity). In this situation the calculation of the present value of the future cash flows is very straightforward. This is of particular importance when considering cost of capital later.

$$\text{Present value of the perpetuity} = \frac{\text{Cash flow per annum}}{\text{Interest rate}}$$

Example 7 Riise Ltd

A company expects to receive $1,000 each year in perpetuity. The current discount rate is 9%.

Required:

1. **What is the present value of the perpetuity?**
2. **What is the value if the perpetuity starts in 5 years?**

Chapter 3

Advanced Investment Appraisal

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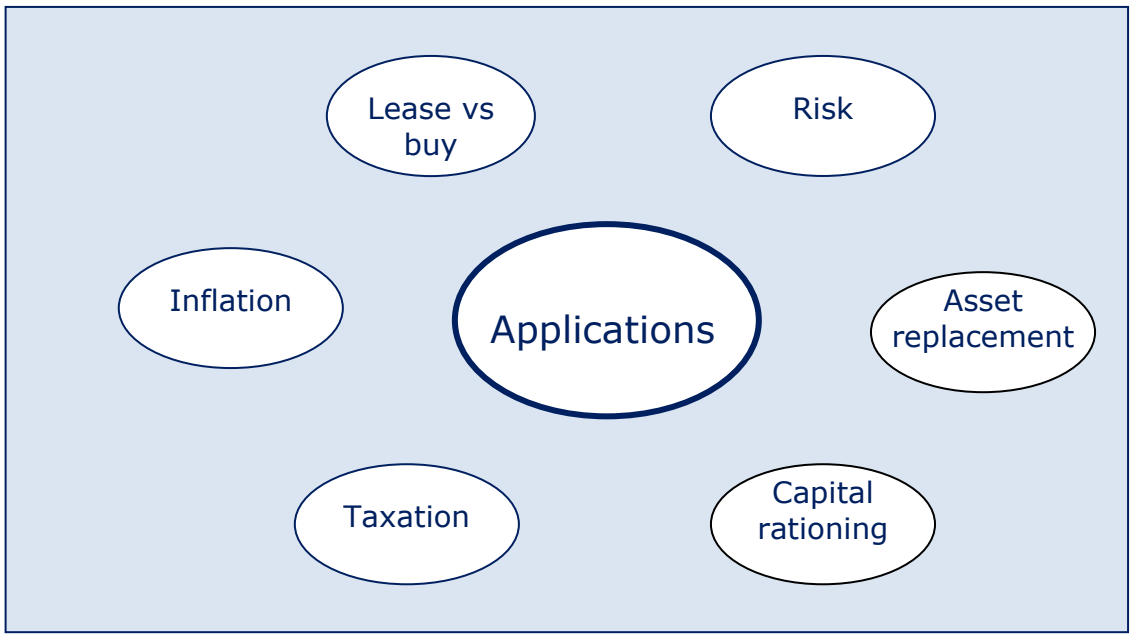
SYLLABUS CONTENT

- Relevant cost analysis
- Inflation
- Tax
- Asset replacement
- Capital rationing
- Risk
- Lease or buy decision.

CHAPTER CONTENT DIAGRAM



CHAPTER CONTENTS

DECISION MAKING THEORY

Investment appraisal is a form of decision making. As such, it uses decision making theory. The decision is based on relevant costs.

Relevant cost

A relevant cost has 3 criteria that must be fulfilled:

1. It must arise in the future
2. It must be a cash flow
3. It must arise as a direct consequence of the decision.

Examples

Relevant costs

1. Opportunity cost
2. Variable cost
3. Incremental cost.

Non-relevant costs

1. Sunk costs
2. Committed costs
3. Overhead absorbed arbitrarily
4. Non cash flows (e.g. depreciation).

INFLATION AND D.C.F.

There two ways of dealing with inflation:

1. Include inflation by inflating up the cash flows year on year.
2. Exclude inflation (and take the cash flows in year 0 terms).

Include inflation (money analysis)	**Exclude inflation (real analysis)**
Inflate cash flows by the inflation rates given	Leave cash flows in year 0 terms
and	**and**
Use a money rate of return	Use a real rate of return
Exam tip	**Exam tip**
Must use where there is more than one inflation rate in the question	*Can use where a single inflation rate is given for an easier computation*

The Fisher effect

The relationship between real and money interest is given below (also see tables)

$$(1 + m) = (1 + r)(1 + i)$$

or

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

Where

r = real discount rate

m = money discount rate

i = inflation rate

Example 1

r = 8% i = 5%

Required:

What is the money rate of interest?

Example 2

m = 10.6% i = 5%

Required:

What is the real rate of return?

Example 3

A company has invested $50,000 in a project. The project generates net cash inflows of $14,000 each year for 5 years in year 0 terms. The rate of return is 12% and inflation is expected to be 3.6%

Required:

Calculate the NPV using both the money and real analyses.

TAXATION AND D.C.F.

There are three additional considerations associated with including taxation:

Good – Any investment in a capital asset will give rise to a capital allowance. The capital allowance will lead to a reduction in the amount of tax subsequently paid – CASH INFLOW

Bad – We would expect the investment to generate additional profits, these in turn would lead to additional tax payable – CASH OUTFLOW

Ugly – Sometimes the examiner may delay all cash flow associated with taxation by one year, this is done to reflect the delays between tax arising and being paid. Take care and read the question carefully.

Key Pro forma (THE BIG 5)

1. **Net trading revenue –** The inflows and outflows from trading
2. **Tax payable -** The net trading revenue × tax rate
3. **Tax allowance –** separate working for the capital allowances
4. **Investment**
5. **Residual value**

Writing down allowances

The tax allowance methodology can be whatever the examiner wants. There is a single technique that we must learn in detail, any alternative technique will be simpler and will have to be explained fully be the examiner. The allowance we must learn is based on the reducing balance method of depreciation at 25%.

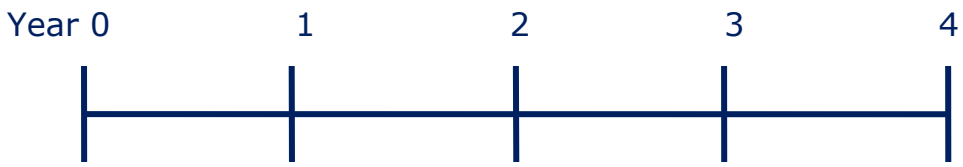
Example 4

An asset is bought on the first day of the year for $20,000 and will be used for four years after which it will be disposed of (on the final day of year 4) for $5,000. Tax is payable at 30% one year in arrears.

Required:

Calculate the writing down allowance and hence the tax savings for each year.

Cash flow



Tax

Year	Allowance	Tax saving	Timing
1 Investment			
W.D.A.			
2 W.D.V.			
W.D.A.			
3 W.D.V.			
W.D.A.			
4 W.D.V			
Proceeds			
BA/BC			

Example 5

Continuing from the previous example. We are further told that net cash from trading is $8,000 per annum from trading. The cost of capital is 10%.

Required:

Calculate the net present value (NPV).

ASSET REPLACEMENT

The decision **how** to replace an asset. The asset **will** be replaced but we aim to adopt the most cost effective replacement strategy. The key in all questions of this type is the **lifecycle** of the asset in years.

Key ideas/assumptions:

1. Cash inflows from trading (revenues) are not normally considered in this type of question. The assumption being that they will be similar regardless of the replacement decision.
2. The operating efficiency of machines will be similar with differing machines or with machines of differing ages.
3. The assets will be replaced in perpetuity or at least into the foreseeable future.

Example 6

A company is considering the replacement of an asset with the following two machines:

	Machine	
	P	H
	$000s	$000s
INVESTMENT COST	60	30
Life	3 years	2 years
Running costs	10 p.a.	Yr 1: 20 Yr 2: 15
Residual value	5	nil

Required:

Determine which machine should be bought using a NPV analysis at a cost of capital of 10%.

Answer pro forma

Year	Cash flow		Discount factor	Present value	
	P	H		P	H
	$000s	$000s		$000s	$000s
0	60	30	1.000		
1	10	20	0.909		
2	10	15	0.826		
3	5		0.751		
		NPV =			

Equivalent annual cost (EAC)

After calculating the NPV in the normal way we are then able to calculate some measure of equal cost for each year by using the following calculation:

$$\text{Equivalent annual cost} = \frac{\text{NPV of Asset}}{\text{Annuity factor}}$$

	P ($000s)	H ($000s)
Net present value		
Annuity factor		
EAC		

CAPITAL RATIONING

A limit on the level of funding available to a business, there are two types:

Hard capital rationing

Externally imposed by banks.

Due to:

1. Wider economic factors (e.g. a credit crunch)
2. Company specific factors
   (a) Lack of asset security
   (b) No track record
   (c) Poor management team.

Soft capital rationing

Internally imposed by senior management.

Issue: Contrary to the rational aim of a business which is to maximise shareholders' wealth (i.e. to take all projects with a positive NPV)

Reasons:

1. Lack of management skill
2. Wish to concentrate on relatively few projects
3. Unwillingness to take on external funds
4. Only a willingness to concentrate on strongly profitable projects.

Single period capital rationing

There is a shortage of funds in the present period which will not arise in following periods. Note that the rationing in this situation is very similar to the limiting factor decision that we know from decision making. In that situation we maximise the contribution per unit of limiting factor.

Example 7

The funds available for investment are $200,000. All investments must be started now (Yr 0):

Project	Initial investment (Yr 0) $000s	NPV $000s
A	100	25
B	200	35
C	80	21
D	75	10

Required:

Which project(s) should we invest in to maximise the return to the business?

Scenario 1: divisibility

ie each project can be taken in part and the returns (NPV) will be proportionate to the amount of investment.

Key working: Profitability index (P.I.)

P.I. = NPV/Investment

Project	Working	P.I.	Ranking
A			
B			
C			
D			

Funds available	Projects undertaken	NPV earned

Scenario 2: non-divisible projects

The projects are taken as a whole or not at all

Key

We identify all possible mixes and establish which mix generates the maximum NPV.

Example 8

Required:

Which project(s) should we invest in to maximise the return to the business given the projects are now non-divisible?

Scenario 3: divisibility and mutual exclusivity

ie Where again we can take any part of a project and the return is proportionate to the investment and the taking of one project precludes the taking of another.

Key

There are three possible types of profit maximising mix each of which must be considered in isolation and then compared with each other. They are that the investment must include either:

1. Project A
2. Project C,
3. or neither Project.

Example 9

But projects A and C are mutually exclusive.

Required:

What is the optimal mix of projects?

Multi-period capital rationing

A more complex environment where there is a shortage of funds in more than one period. This makes the analysis more complicated because we have multiple constraints and multiple outputs. Linear programming would have to be employed.

Example 10 Horge Co

Horge Co is reviewing investment proposals that have been submitted by divisional managers. The investment funds of the company are limited to $800,000 in the current year. Details of three possible investments, none of which can be delayed, are given below.

Project 1

An investment of $300,000 in work station assessments. Each assessment would be on an individual employee basis and would lead to savings in labour costs from increased efficiency and from reduced absenteeism due to work-related illness. Savings in labour costs from these assessments in money terms are expected to be as follows:

Year	**1**	**2**	**3**	**4**	**5**
Cash flows ($'000)	85	90	95	100	95

Project 2

An investment of $450,000 in individual workstations for staff that is expected to reduce administration costs by $140,800 per annum in money terms for the next five years.

Project 3

An investment of $400,000 in new ticket machines. Net cash savings of $120,000 per annum are expected in current price terms and these are expected to increase by 3.6% per annum due to inflation during the five-year life of the machines.

Horge Co has a money cost of capital of 12% and taxation should be ignored.

Required:

(a) Determine the best way for Horge Co to invest the available funds and calculate the resultant NPV:

(i) on the assumption that each of the three projects is divisible;

(ii) on the assumption that none of the projects are divisible.

(10 marks)

(b) Explain how the NPV investment appraisal method is applied in situations where capital is rationed. (3 marks)

(c) Discuss the reasons why capital rationing may arise. (7 marks)

(20 marks)

RISK

Assessment of risk is particularly important when performing investment appraisal due to:

1. Long timescale
2. Outflow today, inflow in the future
3. Large size in relation to the size of the company
4. Strategic nature of the decision.

Techniques available:

1. Sensitivity analysis
2. Expected values
3. Adjusted discount rates
4. Payback.

Sensitivity Analysis

A technique that considers a single variable at a time and identifies by how much that variable has to change for the decision to change (from accept to reject).

Example 11

An investment of $50,000 in year 0 is expected to give rise to inflows of $22,000 for each of years 1 to 3. The discount rate is 10%.

The net cash inflow p.a. is made up of fixed cost per annum of $8,000. Selling price of $10/unit and variable cost of $7/unit. Volume is estimated at 10,000 units.

Required:

(a) Should we accept or reject the investment based on NPV analysis?

(b) By how much would the values have to change for the decision to alter for:

(i) initial investment;

(ii) cash inflows (in detail);

(iii) discount factor?

Key working

$$\text{Sensitivity Margin} = \frac{\text{Net Present Value}}{\text{Present Value of the cash flow under consideration}}$$

Expected values

Where there are a range of possible outcomes which can be identified and a probability distribution can be attached to those values. In this situation then we may use a variety of techniques to establish some sort of 'average' return. The measure of average return is then assumed to be the value that we should use. The expected value is the arithmetic mean of the outcomes as expressed below:

$$\mathbf{EV = \Sigma px}$$

Where P = the probability of an outcome
x = the value of an outcome

Example 12

A new project is being launched. There are four possible outcomes identified with the investment financial impact (NPV) is given in $m. The management team attached the best estimate of probability to the outcomes:

Outcome	Profit/Loss (x)	Probability (p)	Working (px)
Strong success	$25m	0.10	
Reasonable success	$10m	0.25	
Weak success	$3m	0.35	
Failure	($20m)	0.30	

Required:

(a) What is the expected value of the project?

(b) Suggest flaws with the analysis

Adjusted discount rates

The discount rate we have assumed so far is that reflecting the cost of capital of the business. In simple terms this means that the rate reflects either the cost of borrowing funds in the form of a loan rate or it may reflect the underlying return of the business (i.e. the return required by the shareholder), or a mix of both.

An individual investment or project may be perceived to be more risky than existing investments. In this situation the increased risk could be used as a reason to adjust the discount rate up to reflect the additional risk.

Payback

As discussed earlier in the notes payback gives a simple measure of risk. The shorter the payback period, the lower the risk.

LEASE OR BUY DECISION

A specific decision that compares two specific financing options, the use of a finance lease or buying outright financing via a bank loan.

Key information

1. Discount rate = post tax cost of borrowing

   The rate is given by the rate on the bank loan in the question, if it is pre-tax then the rate must be adjusted for tax. If the loan rate was 10% pre-tax and corporation tax is 30% then the post -tax rate would be 7%. (10% x (1 – 0.3)

2. Cash flows

Bank loan	Finance Lease
1/ Cost of the investment	1/ Lease rental - in advance
2/ WDA tax relief on investment	- annuity
3/ Residual value	2/ Tax relief on rental

Example 13

Smicer plc is considering how to finance a new project that has been accepted by its investment appraisal process.

For the four year life of the project the company can either arrange a bank loan at an interest rate of 15% before corporation tax relief. The loan is for $100,000 and would be taken out immediately prior to the year end. The residual value of the equipment is $10,000 at the end of the fourth year.

An alternative would be to lease the asset over four years at a rental of $30,000 per annum payable in advance.

Tax is payable at 33% one year in arrears. Capital allowances are available at 25% on the written down value of the asset.

Required:

Should the company lease or buy the equipment?

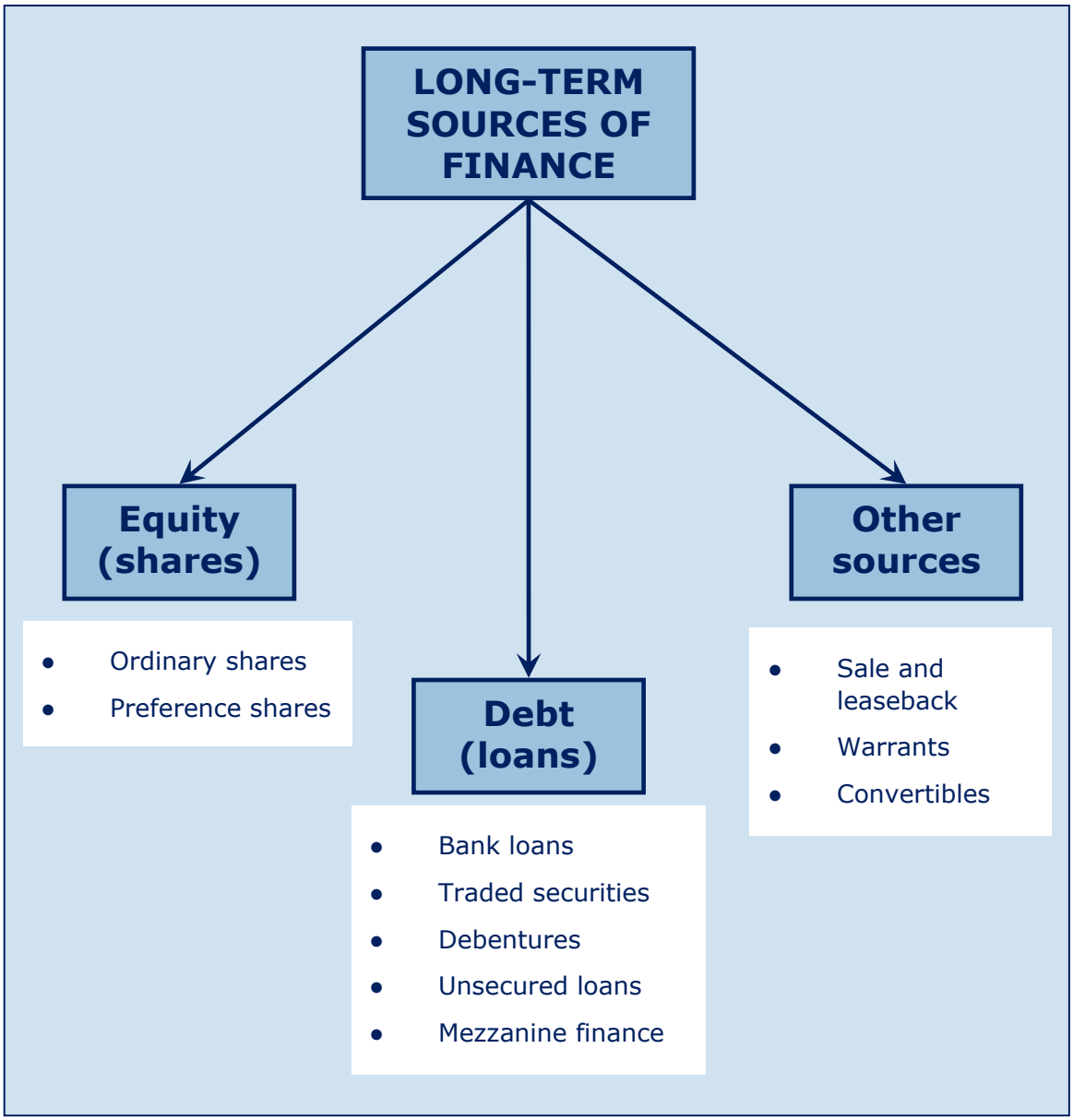
Other considerations

1. Who receives the residual value in the lease agreement? It is possible that the residual value may be received wholly by the lessor or almost completely by the lessee.
2. There may be restrictions associated with the taking on of leased equipment. The agreements tend to be much more restrictive than bank loans.
3. Are there any additional benefits associated with lease agreement? Many lease agreements will include within the payments some measure of maintenance or other support services.

Chapter 4

Long term sources of finance

CHAPTER CONTENT DIAGRAM



CHAPTER CONTENTS

EQUITY

Equity relates to the ownership rights in a business.

Ordinary shares

1. Owning a share confers part ownership.
2. High risk investments offering higher returns.
3. Permanent financing.
4. Post-tax appropriation of profit, not tax efficient.
5. Marketable if listed.

Advantages

1. No fixed charges (e.g. interest payments).
2. No repayment required.
3. Carries a higher return than loan finance.
4. Shares in listed companies can be easily disposed of at a fair value.

Disadvantages

1. Issuing equity finance can be expensive in the case of a public issue 9see later).
2. Problem of dilution of ownership if new shares issued.
3. Dividends are not tax-deductible.
4. A high proportion of equity can increase the overall cost of capital for the company.
5. Shares in unlisted companies are difficult to value and sell.

Preference shares

1. Fixed dividend
2. Paid in preference to (before) ordinary shares.
3. Not very popular, it is the worst of both worlds, ie
   - not tax efficient
   - no opportunity for capital gain (fixed return).

DEBT

The loan of funds to a business without any ownership rights.

1. Paid out as an expense of the business (pre-tax).
2. Risk of default if interest and principal payments are not met.

Security

Charges

The debtholder 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.

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**
2. **Financial ratios**
3. **Financial reports**
4. **Issue of further debt.**

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 port 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'.

This is a confidential agreement that is by negotiation between both parties.

Traded investments

Debt instruments sold by the company, through a broker, to investors. Typical features may include:

1. The debt is denominated in units of $100, this is called the nominal or par value and is the value at which the debt is subsequently redeemed.
2. Interest is paid at a fixed rate on the nominal or par value.
3. The debt has a lower risk than ordinary shares. It is protected by the charges and covenants.

Types of issued debt

They include:

Debentures

Debt secured with a charge against assets (either fixed or floating), low risk debt offering the lowest return of commercially issued debt.

Unsecured loans

No security meaning the debt is more risky requiring a higher return.

Mezzanine finance

High risk finance raised by companies with limited or no track record and for which no other source of debt finance is available. A typical use is to fund a management buy-out.

OTHER SOURCES

Sale and Leaseback

1. Selling good quality fixed assets such as high street buildings and leasing them back over many (25+) years.
2. Funds are released without any loss of use of assets.
3. Any potential capital gain on assets is forgone.

Grants

1. Often related to regional assistance, job creation or for high tech companies.
2. Important to small and medium sized businesses (ie unlisted).
3. They do not need to be paid back.
4. Remember the EU is a major provider of loans.

Retained earnings

The single most important source of finance, for most businesses the use of retained earnings is the core basis of their funding.

Warrants

1. An option to buy shares at a specified point in the future for a specified (exercise) price.
2. The warrant offers a potential capital gain where the share price may rise above the exercise price.
3. The holder has the option to buy the share. On a future date at a pre-determined date.
4. The warrant has many uses including:
   - additional consideration when issuing debt.
   - incentives to staff.

Convertible loan stock

A debt instrument that may, at the option of the debtholder, be converted into shares. The terms are determined when the debt is issued and lay down the rate of conversion (debt: shares) and the date or range of dates at which conversion can take place.

The convertible is offered to encourage investors to take up the debt instrument. The conversion offers a possible capital gain (value of shares › value of debt).

ISLAMIC FINANCE

What is Islamic finance?

A form of finance that specifically follows the teachings of the Qu'ran.

The teachings of the Qu'ran are the basis of Islamic Law or Sharia. Sharia Law is, however, not codified and as such the application of both Sharia Law and, by implication, Islamic Finance is open to more than one interpretation.

Prohibited activities

In Shariah Law there are some activities that are not allowed and as such must not be provided by an Islamic financial institution, these include:

1. **Gambling (Maisir)**
2. **Uncertainty in contracts (Gharar)**
3. **Prohibited activities (Haram)**

Riba

Interest in normal financing relates to the monetary unit and is based on the principle of time value of money. Sharia Law does not allow for the earning of interest on money. It considers the charging of interest to be usury or the 'compensation without due consideration'. This is called Riba and underpins all aspects of Islamic financing.

Instead of interest a return may be charged against the underlying asset or investment to which the finance is related. **This is in the form of a premium being paid for a deferred payment when compared to the existing value.**

There is a specific link between the charging of interest and the risk and earnings of the underlying assets. Another way of describing it is as the **sharing of profits** arising from an asset between lender and user of the asset.

Forms of Sharia compliant finance

There are some specific types of finance that are deemed compliant and allow Islamic finance to offer similar financial products to those offered in normal financing, these include:

- **Murabaha – trade credit**

  The sale price of goods is agreed to cover all costs and generate a profit margin. The time value of money is incorporated in the costs. There is a reassurance that the 'credit' is based on trade and not simply a financing transaction.

- **Mudaraba – equity finance**

  A profit sharing contract where one party provides capital and the other the expertise to invest the capital and manage the activities. There is a pre-agreed ratio of profit share.

- **Musharaka – venture capital**

  Has more in common with a joint venture than an equity investment. All (or most) investors will have an active role in managing the business. 'Diminishing musharaka' allows for business ownership to gradually be transferred over a period of time to a single owner, in a similar way to venture capitalists creating an exit strategy based upon sale of shares.

- **Ijara – lease finance**

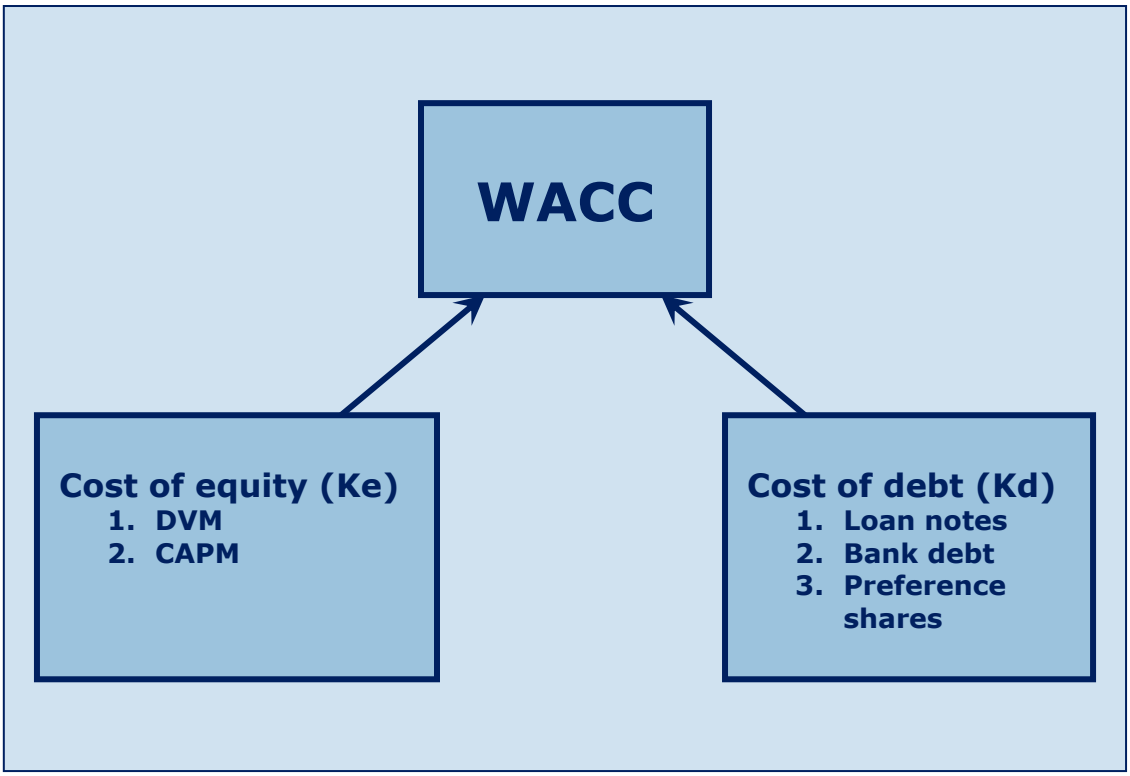
  A bank makes an asset available to a customer for a fixed period in exchange for a fixed price. At the end of the period, the customer often has the option to pay a fixed price in return for transfer of ownership of the asset from the bank.

- **Sukuk – debt finance**

Chapter 5

Cost of capital

CHAPTER CONTENT DIAGRAM



CHAPTER CONTENTS

BASICS OF COST OF CAPITAL

A fundamental calculation for all companies is to establish its financing costs, both individually for each component of finance and in total terms. These will be of use both in terms of assessing the financing of the business and as a cost of capital for use in investment appraisal.

Risk and return

The relationship between risk and return is easy to see, the higher the risk, the higher the required to cover that risk. Importantly this helps as a starting point to the calculation of a cost of capital.

Overall return

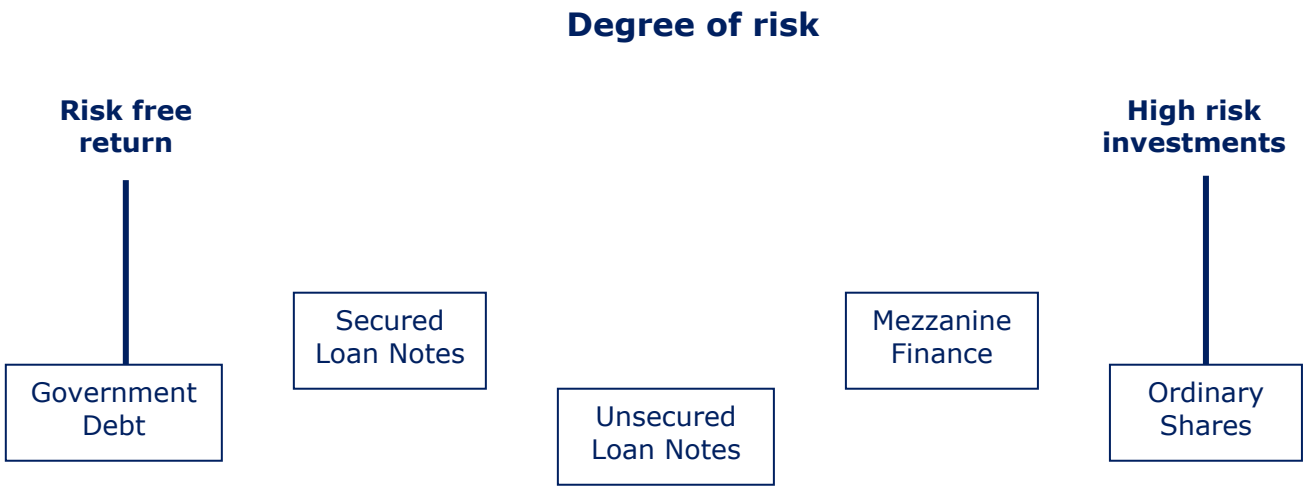
A combination of two elements determine the return required by an investor for a given financial instrument.

1. Risk-free return – The level of return expected of an investment with zero risk to the investor.
2. Risk premium – the amount of return required above and beyond the risk-free rate for an investor to be willing to invest in the company

Risk-free return

The risk-free rate is normally equated to the return offered by short-dated government bonds or treasury bills. The government is not expected (we would hope!) to default on either interest payments or capital repayments.

The risk-free rate is determined by the market reflecting prevailing interest and inflation rates and market conditions.



Cost of equity

The rate of return required by a shareholder. This may be calculated in one of two ways:

1. Dividend Valuation Model (DVM).
2. Capital Asset Pricing Model (CAPM).

Dividend valuation model

The valuation of the share in terms of the cash returns of dividends into the future. The cash inflow is normally an perpetuity to reflect the permanent nature of the share capital.

Perpetuity formula

$$\text{PV of a perpetuity} = \frac{\text{Cash inflow p.a.}}{\text{Rate of return}}$$

Introducing terminology

$$\text{Share price} = \frac{\text{Dividend p.a.}}{\text{Cost of Equity}}$$

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

where K_e = cost of equity

d = is a constant dividend p.a.

P_0 = the ex-div market price of the share

We can rearrange the formula to get the one below:

The dividend valuation model with constant dividends

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

Example 1

The ordinary shares of Kewell Ltd are quoted at $5 per share ex div. A dividend of 40p per share has just been paid and there is expected to be no growth in dividends.

Required:

What is the cost of equity?

Example 2

The ordinary shares of Gerrard Ltd are quoted at $2 per share. A dividend of 15p is about to be paid. There is expected to be no growth in dividends.

Required:

What is the cost of equity?

Introducing growth

The dividend valuation model with constant growth

$$K_e = \frac{d_1}{P_0} + g \quad \text{or} \quad K_e = \frac{d_0(1+g)}{P_0} + g$$ LEARN THIS

where g = a constant rate of growth in dividends
d_1 = dividend to be paid in one year's time
d_0 = current dividend

Example 3

Alonso Ltd has a share price of $4.00 ex-div and has recently paid out a dividend 20p. Dividends are expected to growth at an annual rate of 5%

Required:

What is the cost of equity?

Estimating Growth

There are 2 main methods of determining growth:

1 THE AVERAGING METHOD

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

where d_o = current dividend
d_n = dividend n years ago

Example 4

Sissoko Ltd paid a dividend of 20p per share 4 years ago, and the current dividend is 33p. The current share price is $6 ex div.

Required:

(a) Estimate the rate of growth in dividends.

(b) Calculate the cost of equity.

Example 5

Mascherano Ltd paid a dividend of 6p per share 8 years ago, and the current dividend is 11p. The current share price is $2.58 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 Torres Ltd are quoted at $5.00 cum div. A dividend of 40p is just about to be paid. The company has an annual accounting rate of return of 12% and each year pays out 30% of its profits after tax as dividends.

Required:

Estimate the cost of equity.

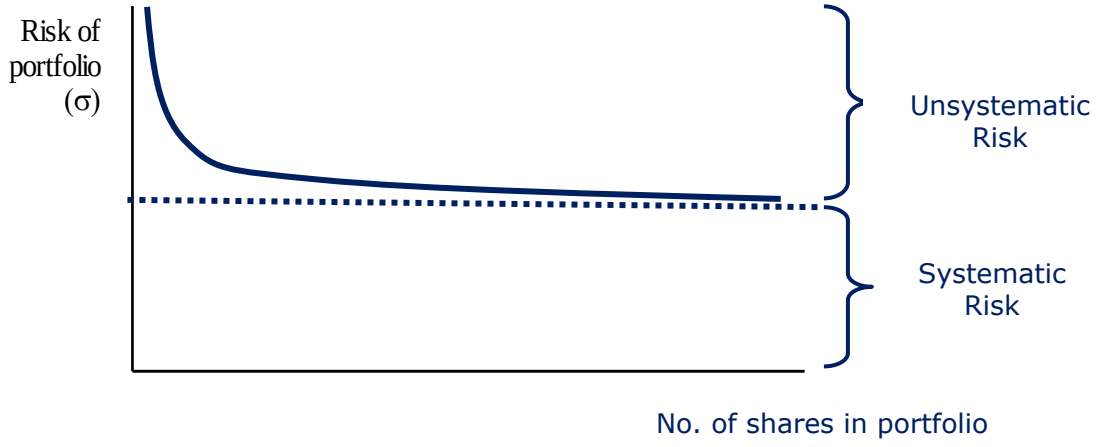
THE CAPITAL ASSET PRICING MODEL (CAPM)

A model that values financial instruments by measuring relative risk. The basis of the CAPM is the adoption of portfolio theory by investors.

Portfolio theory

Risk and Return

The basis of portfolio theory is that an investor may reduce risk with no impact on return as a result of holding a mix of investments.



Capital asset pricing model

Systematic and non-systematic risk

If we start constructing a portfolio with one share and gradually add other shares to it we will tend to find that the total risk of the portfolio reduces as follows:

Initially substantial reductions in total risk are possible; however, as the portfolio becomes increasingly diversified, risk reduction slows down and eventually stops.

The risk that can be eliminated by diversification is referred to as *unsystematic risk*. This risk is related to factors that affect the returns of individual investments in unique ways, this may be described as **company specific risk**.

The risk that cannot be eliminated by diversification is referred to as *systematic risk*. To some extent the fortunes of all companies move together with the economy. This may be described as **economy wide risk.**

The relevant risk of an individual security is its systematic risk and it is on this basis that we should judge investments. **Non systematic risk can be eliminated and is of no consequence to the well-diversified investor**.

Implications

1. If an investor wants to avoid risk altogether, he must invest in a portfolio consisting entirely of risk-free securities such as government debt.
2. If the investor holds only an undiversified portfolio of shares he will suffer unsystematic risk as well as systematic risk.

3. If an investor holds a 'balanced portfolio' of all the stocks and shares on the stock market, he will suffer systematic risk which is the same as the average systematic risk in the market.

4. Individual shares will have systematic risk characteristics which are different to this market average. Their risk will be determined by the industry sector and gearing (see later). Some shares will be more risky and some less.

β (beta) factor

The method adopted by CAPM to measure systematic risk is an index β. 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.

For example, suppose that it has been assessed statistically that the returns on shares in XYZ plc tend to vary twice as much as returns from the market as a whole, so that if market returns went up by 6%, XYZ's returns would go up by 12% and if market returns fell by 4% then XYZ's returns would fall by 8%, XYZ would be said to have a β factor of 2.

The security market line

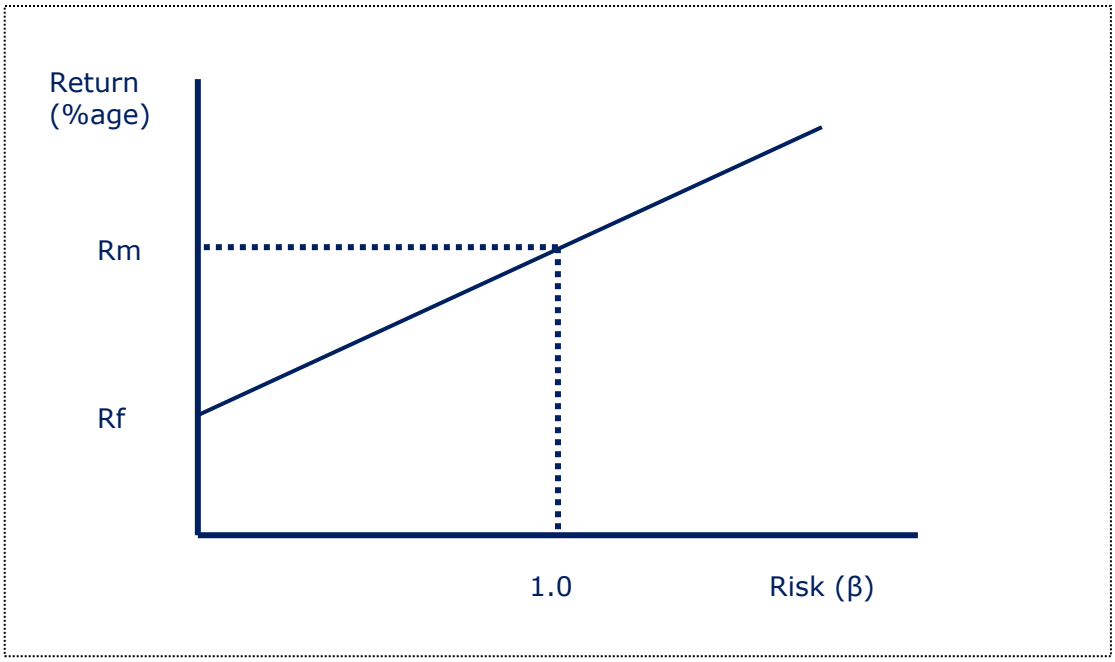
The security market line gives the relationship between systematic risk and return. We know 2 relationships.

1 The risk-free security

This carries no risk and therefore no systematic risk and therefore has a **βeta** of zero.

2 The market portfolio

This represents the ultimate in diversification and therefore contains only systematic risk. It has a **βeta** of 1.



From the graph it can be seen that the higher the 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

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 βeta 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 they are 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.

Example 7 Kuyt Ltd

The market return is 15%. Kuyt Ltd has a beta of 1.2 and the risk free return is 8%.

Required:

What is the cost of capital?

Example 8 Crouch plc

The risk-free rate of return is 8%

The market risk premium is 6%

The beta factor for Crouch plc is 0.8

Required:

What would be the expected annual return?

K_D – THE COST OF DEBT

The cost of debt is the rate of return that debt providers require on the funds that they provide. We would expect this to be lower than the cost of equity.

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

Terminology

1. Loan notes, bonds and debentures are all types of debt issued by a company. Gilts and treasury bills are debt issues by a government.
2. Traded debt is always quoted in $100 nominal units or blocks
3. Interest paid on the debt is stated as a percentage of nominal value ($100 as stated). This is known as the coupon rate. It is not the same as the cost of debt.
4. Debt can be:
   (i) Irredeemable – never paid back
   (ii) redeemable at par (nominal value)
   (iii) or redeemable at a premium or discount (for more or less).
5. Interest can be either fixed or floating (variable). All questions are likely to give fixed rate debt.

K_d for irredeemable debt

Irredeemable debt is very rare. (The reason for learning the valuation is that it gives a quick way to calculate the cost of debt if the current market value and the redemption value of the debt are the same (see example 14).)

$$K_d = \frac{i(1 - T)}{P_0}$$

where i = interest paid

T = marginal rate of tax

P_0 = ex interest (similar to ex div) market price of the loan stock.

Example 9 Rafa

The 10% irredeemable loan notes of Rafa plc are quoted at $120 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:

Year	Cash flow	
0	Market value of the loan note	P_0
1 to n	Annual interest payments	i(1 - T)
n	Redemption value of loan	RV

Example 10 Warnock Ltd

Warnock Ltd has 10% loan notes quoted at $102 ex int redeemable in 5 years' time at par. Corporation tax is paid at 30%.

Required:

What is the net of tax cost of debt?

Technique

1. 7 columns
2. Identify the cash flows
3. discount at 5% and 10%
4. slot values in the IRR formula
3. discount at 10%
4. if npv is positive discount at 15%, if negative, discount at 5%
5. slot values in the IRR formula.

K_d for redeemable debt (when redeemed at current market value)

We could just use the technique outlined above but if the current market value and the redemption value are the same instead the irredeemable debt formula can be used.

Example 11 Rafa

The 10% loan notes of Rafa plc are quoted at $120 ex int. Corporation tax is payable at 30%. They will be redeemed at a premium of $20 over par in 4 years time

Required:

What is the net of tax cost of debt

(a) Using redeemable debt calculation?

(b) Using irredeemable debt calculation?

Convertible debt

A loan note with an option to convert the debt into shares at a future date with a predetermined price. In this situation the holder of the debt has the option therefore the redemption value is the greater of either:

1. The share value on conversion or
2. The cash redemption value if not converted.

Example 12 Dudek

Dudek has convertible loan notes in issue that may be redeemed at a 10% premium to par value in 4 years. The coupon is 10% and the current market value is $95.

Alternatively the loan notes may be converted at that date into 25 ordinary shares. The current value of the shares is $4 and they are expected to appreciate in value by 6% per annum

Required:

What is the cost of the redeemable debt?

Non-tradeable debt

A substantial proportion of the debt of companies is not traded. Bank loans and other non-traded loans have a cost of debt equal to the coupon rate adjusted for tax.

K_d = Interest (Coupon) rate x (1 – T)

Example 13 Traore

Traore has a loan from the bank at 12% per annum. Corporation tax is charged at 30%

Required:

What is the cost of debt?

Preference shares

A fixed rate charge to the company in the form of a dividend rather than in terms of interest. Preference shares are normally treated as debt rather than equity but they are not tax deductible. They can be treated using the dividend valuation model with no growth

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

Example 14 Hamann

Hamann's 9% preference shares ($1) are currently trading at $1.4 ex-div.

Required:

What is the cost of the preference shares?

WACC – WEIGHTED AVERAGE COST OF CAPITAL

The weighted average cost of capital is the average of cost of the company's finance (equity, loan notes, bank loans, 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 if the following conditions apply:

1. The project is insignificant relative to the size of the company;
2. Or the company adopts a 'pooled funds' approach and:
   (i) The company will maintain its existing capital structure in the long run (i.e. same financial risk);
   (ii) The project has the same degree of systematic (business) risk as the company has now.

Example 15 Baros plc- change

Baros plc has 20m ordinary 25p shares quoted at $3, and $8m of loan notes quoted at $85.

The cost of equity has already been calculated at 15% and the cost of debt (net of tax) is 7.6%

Required:

Calculate the weighted average cost of capital.

Chapter 6

Capital structure and risk adjusted WACC

CHAPTER CONTENTS

CAPITAL STRUCTURE AND THE COST OF CAPITAL

Does the capital structure have a bearing on shareholders' wealth?

Key relationship

$$\text{Market Value} = \frac{\text{Future cash flows}}{\text{WACC}}$$

Impact of debt financing on the WACC

Two competing effects

Reduction in WACC

Kd ‹ Ke, an increase in debt funding should lead to a fall in WACC

Debt finance is cheaper because:

1. Less risky to investor
2. Tax efficient

Increase in WACC

Debt introduces financial risk which increases Ke, should lead to an increase in WACC

The risk associated with debt

Financing is born by the shareholders

GEARING THEORIES

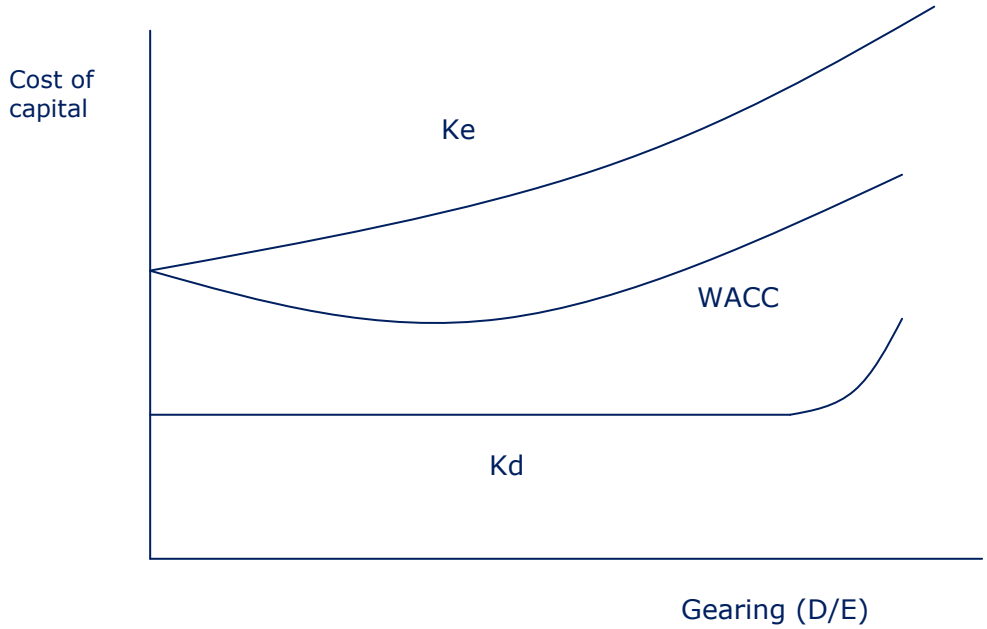
The traditional view of capital structure

Cost of equity

At relatively low levels of gearing the increase in gearing will have relatively low impact on Ke. As gearing rises the impact will increase Ke at an increasing rate.

Cost of debt

There is no impact on the cost of debt until the level of gearing is prohibitively high. When this level is reached the cost of debt rises.



Key point

There is an optimal level of gearing at which the WACC is minimized and the value of the company is maximised

Modigliani and Miller (M&M) – no taxes

Cost of equity

Ke rises at a constant rate to reflect the level of increase in risk associated with gearing.

Cost of debt

There is no impact on the cost of debt until the level of gearing is prohibitively high.

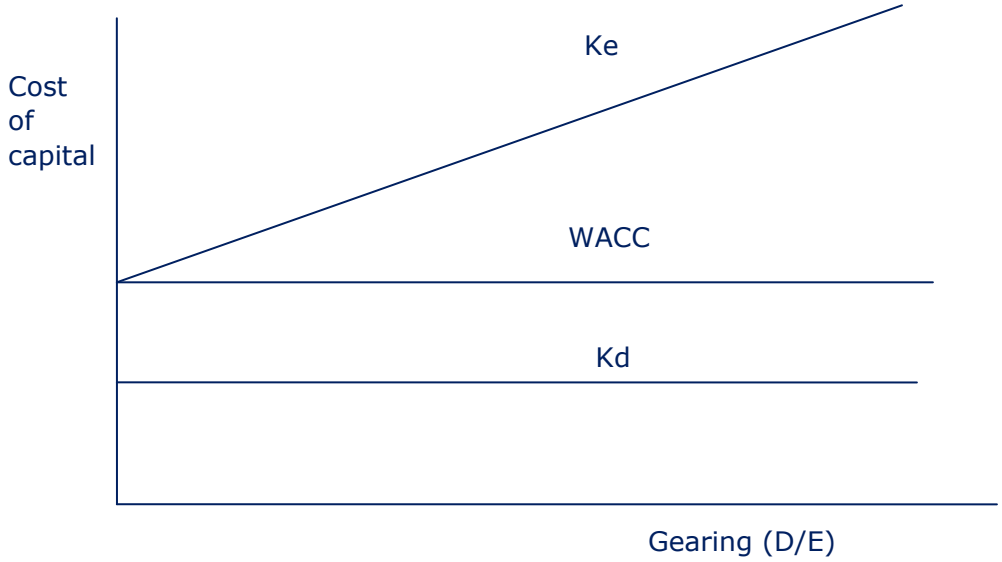
The assumptions

M&M in 1958 was based on the premise of a perfect capital market in which:

1. Perfect capital market exist where individuals and companies can borrow unlimited amounts at the same rate of interest.
2. There are no taxes or transaction costs.
3. Personal borrowing is a perfect substitute for corporate borrowing.
4. Firms exist with the same business or systematic risk but different level of gearing.
5. All projects and cash flows relating thereto are perpetual and any debt borrowing is also perpetual.
6. All earnings are paid out as dividend.
7. Debt is risk free.

Big idea

The increase in Ke directly compensates for the substitution of expensive equity with cheaper debt. Therefore the WACC is constant regardless of the level of gearing.



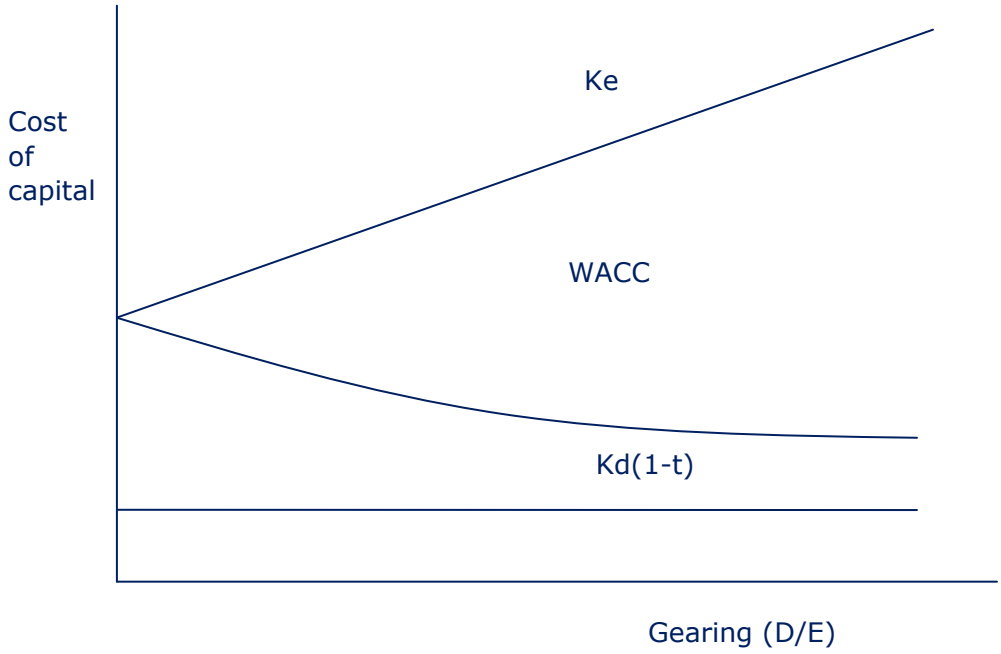
If the weighted average cost of capital is to remain constant at all levels of gearing it follows that any benefit from the use of cheaper debt finance must be exactly offset by the increase in the cost of equity.

Modigliani and Miller – with tax

In 1963 M&M modified their model to include the impact of tax. Debt in this circumstance has the added advantage of being paid out pre-tax. The effective cost of debt will be lower as a result.

Implication

As the level of gearing rises the overall WACC falls. The company benefits from having the highest level of debt possible.



Problems with high gearing

It is rare to find firms who seek to have very high gearing. This is due to problems such as:

- bankruptcy
- tax exhaustion
- loss of borrowing capacity
- risk attitude of potential investors.

Pecking order theory

A reflection that funding of companies does not follow theoretical rules but instead often follows the 'path of least resistance'.

A suggested order is as follows:

1st retained earnings

2nd bank debt

3rd issue of equity.

CAPM IN PROJECT APPRAISAL

In project appraisal we use a cost of capital for a discount rate. Normally we can use the WACC providing that risk has not changed.

If project risk differs to the company's risk profile we need another way to calculate a discount rate.

The CAPM provides a means by which a project's risk can be considered in relation to market risk.

The assumptions underpinning CAPM must hold:

1. Rational shareholders
2. Shareholders are well diversified
3. The project is an investment in its own right.

Key point

The project is assessed on its ability to earn a return in relation to its own level of risk.

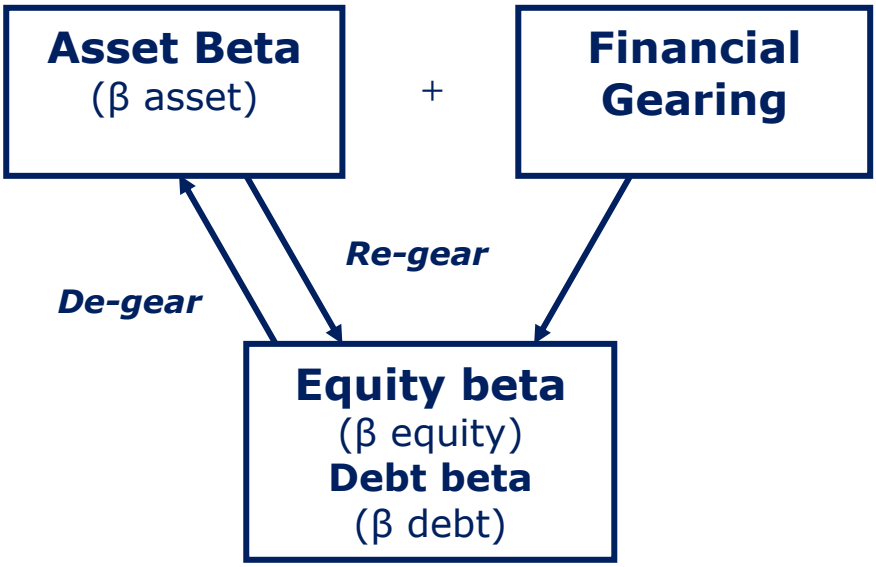
Advantages over use of WACC

1. Possible to assess all projects providing the level of risk (beta) can be determined.
2. By considering only systematic risk we have a better theoretical basis for setting a discount rate.
3. It reflects the position of large companies which are likely to be well.

CAPM AND FINANCIAL GEARING

So far we have assumed no gearing when calculating the level of risk for a company. If we introduce debt financing the level of risk will rise and hence the cost of equity Ke will rise.

Differing beta values



Equity beta

A measure of risk incorporating both systematic risk and unsystematic risk

Asset beta

A measure solely of systematic risk. The asset beta will be the same for all companies in the same industry.

Key formula

$$\beta \text{ asset (ungeared)} = \beta \text{ equity (geared)} \times \frac{E}{E + D(1 - t)}$$

Question approach

1. Equity beta

Identify a suitable equity beta – we need a value from a company in the similar industry. This beta will probably include gearing risk (if the company has any debt finance).

2. De-gear

Use the formula given to strip out the gearing risk to calculate the asset beta for the project. The asset beta will be the same for all companies/ projects in a similar industry.

3. Average asset beta

To calculate a meaningful asset beta it is useful to use a simple average of a number of proxy asset betas. This way a better assessment of the level of systematic risk suffered by the industry is calculated.

4. Re-gear

Re-work the same formula to add back the unique gearing relating to the project.

5. Use CAPM

Calculate the cost of equity using the CAPM formula.

Example 1 Voronin plc

Voronin plc is a matruska doll manufacturer with a equity:debt ratio of 5:3. The corporate debt, which is assumed to be risk free, has a gross redemption yield of 10%. The beta value of the company's equity is 1.2. The average return on the stock market is 16%. The corporation tax rate is 30%.

The company is considering a rag doll manufacturing project. The following three companies are currently operating in the ragdoll industry.

Company	**T**	**L**	**C**
Equity beta	1.05	1.10	1.18
Debt (%)	30	35	40
Equity (%)	70	65	60

Voronin plc maintains its existing capital structure after the implementation of the new project.

Required:

What would be a suitable cost of capital to apply to the project?

Example 2 Toshack

Toshack, an all equity agro-chemical firm, is about to invest in a diversification in the consumer pharmaceutical industry. Its current equity beta is 0.8, whilst the average equity β of pharmaceutical firms is 1.3. Gearing in the pharmaceutical industry averages 40% debt, 60% equity. Corporate debt is considered to be risk free.

R_m = 14%, R_f = 4%, corporation tax rate = 30%.

Required:

What would be a suitable discount rate for the new investment if Toshack were to finance the new project in each of the following ways:

(a) by 30% debt;

(b) 70% equity?

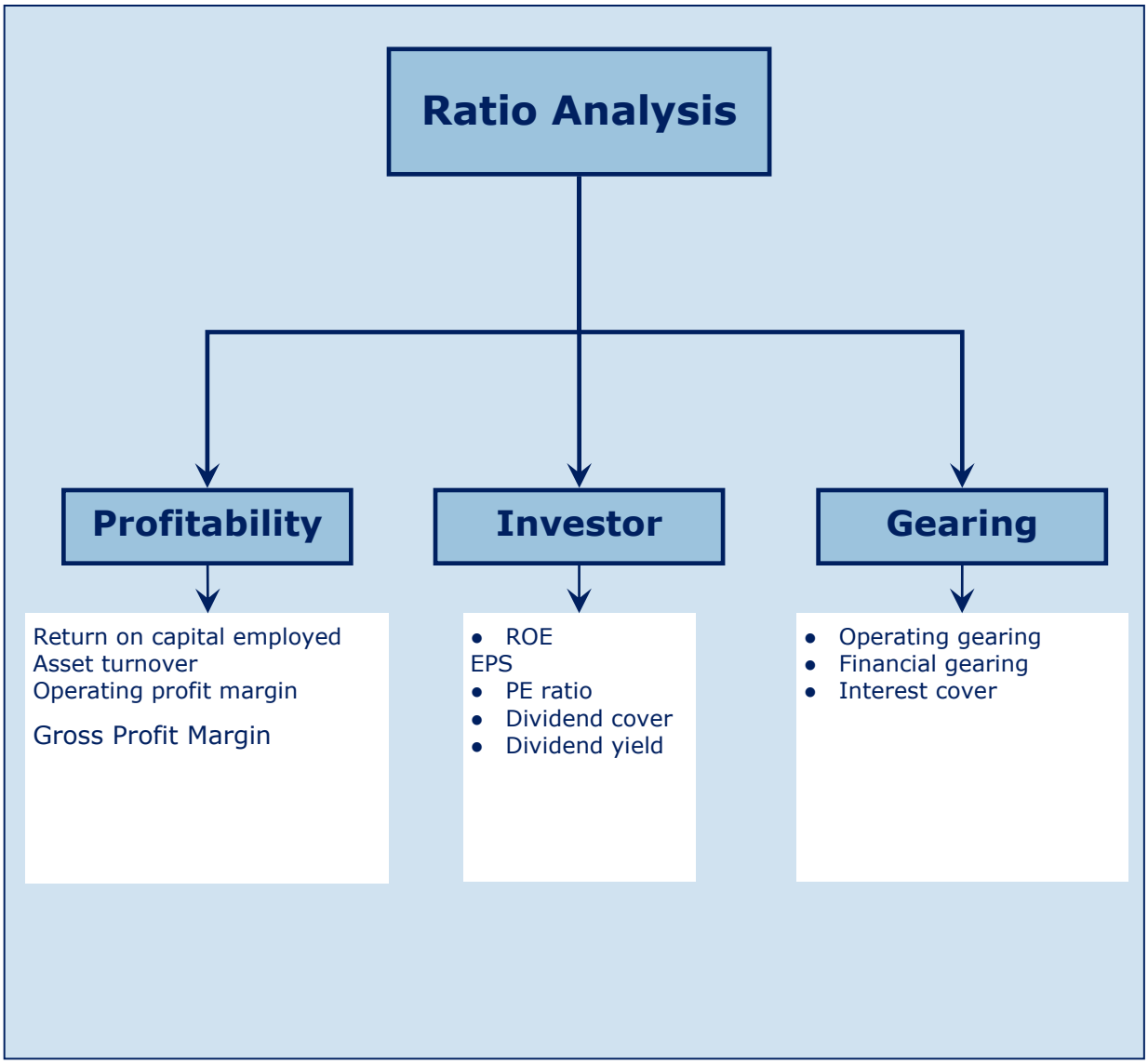
Key Formula (see tables)

$$\beta \text{ asset (ungeared)} = \beta \text{ equity (geared)} \times \frac{E}{E + D(1 - t)}$$

Chapter 7

Financial performance measurement

CHAPTER CONTENT DIAGRAM



CHAPTER CONTENTS

PROFITABILITY RATIOS

The underlying aim of a company.

There are two basic measures:

1. **Return on Capital Employed (ROCE).**
2. **Return on Equity.**

Return on capital employed – ROCE

A measure of the underlying performance of the business before finance.

It considers the overall return before financing. It is not affected by gearing.

$$\textbf{ROCE} = \frac{\textbf{Operating Profit}}{\textbf{Capital employed}} \times \textbf{100}$$

Operating profit

Also known as PBIT or profit before interest and tax.

Capital employed

The total funds invested in the business, it includes Equity and Long-term Debt.

Return on equity – ROE

A measure of return to the shareholders. It is calculated after taxation and before dividends have been paid out. It will be affected by gearing.

$$\textbf{ROE} = \frac{\textbf{Profit after tax}}{\textbf{Equity}} \times \textbf{100}$$

Key working

	$
PBIT	×
less Interest	(×)
PBT	×
Less Tax	(×)
PAT	×
Less Dividends	(×)
Retained Earnings	×

Example 1 Case

A company is considering a number of funding options for a new project. The new project may be funded by $20m of equity or debt. Below are the financial statements given the project has been funded in either manner.

Balance sheet extract

	Equity Finance	**Debt Finance**
	$m	$m
Creditors		
Debentures (10%)	0.0	20.0
Capital		
Share Capital (50p)	22.0	14.5
Share Premium	10.0	4.5
Reserves	10.0	3.0
	42.0	22.0

Profit and Loss Account extract

$m	
Turnover	200.0
Gross Profit	40.0
less expenses (excluding interest)	(30.0)
Operating Profit	10.0

Corporation Tax is charged at 30%

Required:

Calculate profitability ratios and compare the financial performance of the company under both equity and debt funding.

GEARING

Should we finance the business using debt or equity?

There are two basic considerations:

1. Cost.
2. Risk.

Cost

Any finance will incur servicing costs, debt will require interest payments and equity will require payment of dividends or at least capital growth. On the basis of cost of servicing we would always pick debt over equity. Debt should be less expensive for two reasons:

1. Tax

Debt is tax deductible because the debt holders are not owners of the business. Equity however will receive a return after tax because they receive an appropriation of profits. Debt is therefore tax efficient saving 30(ish)%.

2. Risk

The debt holder is in a less risky position than the shareholder. If there is lower risk then the debt holder should be willing to expect a lower return. The lower risk is due to two factors:

1. Fixed coupon – A legal obligation to pay interest.
2. Security – Charges or covenants against assets.

Risk – from the perspective of the company

Risk may be split into two elements:

1. Business risk.
2. Financial risk.

Business risk

Business risk is inherent to the business and relates to the environment in which the business operates.

1. Competition
2. Market
3. Legislation
4. Economic conditions.

Financial risk

Risk associated with debt financing. If the company is financed using equity, it carries no financial risk. This is because it has no need to pay shareholders a return (dividend) in the event of a poor trading year.

If the company finances itself using debt as well as equity then it must generate sufficient cash flow to pay interest payments as they fall due. The greater the level of debt, the greater the interest payments falling due and hence the higher the risk of default. This is financial risk.

GEARING TYPES

Gearing is a measure of risk.

There are two measures of gearing:

1. Operating gearing

Risk associated with the level of fixed costs within a business.

The higher the fixed cost, the more volatile the profit. The level of fixed cost is normally determined by the type of industry and cannot be changed. This is unlikely to arise in the F9 syllabus since it will be incorporated as part of the systematic risk of the company/ industry.

2. Financial gearing

Risk associated with debt financing.

The company can decide the level of financial risk it wishes to take on.

Impact

A company can/must accept some level of risk, and is willing to trade additional risk for additional gain. The effect of risk is cumulative: if a company already has high operating gearing it will have to be more conservative with its financial gearing.

FINANCIAL GEARING MEASURES

The mix of debt to equity within a firm's permanent capital.

There are two measures:

1. Capital Gearing – a balance sheet measure.
2. Interest Cover – a profit and loss account measure.

Capital gearing

The mix of debt to equity.

Ratio measure (equity gearing)

$$\textbf{Gearing} = \frac{\textbf{Debt}}{\textbf{Equity}} \times \textbf{100}$$

Proportions measure (total or capital gearing)

$$\textbf{Gearing} = \frac{\textbf{Debt}}{\textbf{Debt + Equity}} \times \textbf{100}$$

Debt

All permanent capital charging a fixed interest may be considered debt.

1. Debentures and loans,
2. bank overdraft (if significant),
3. preference share capital.

Equity

1. Ordinary share capital
2. share premium
3. reserves.

Example 2 Redknapp Ltd

Balance sheet for Redknapp Ltd

	$m	$m
Fixed assets (total)		20.0
Current assets (total)	12.0	
Current liabilities		
Trade creditors	4.0	
Bank overdraft	5.0	
	9.0	
		3.0
Long-term liabilities		
Debenture 10%		(8.0)
		15.0
Capital		
Ordinary share capital	8.0	
Ordinary share premium	4.0	
Preference share capital	1.0	
Reserves	2.0	
		15.0

Required:

Calculate the financial gearing of the business using both methods.

INTEREST COVER

An income statement measure that considers the ability of the business to cover the interest payments as they fall due.

$$\textbf{Interest cover} = \frac{\textbf{PBIT}}{\textbf{Interest}}$$

Example 3

Stan 'the man' Collymore Income statement extract

	$m
Operating Profit	20.0
Interest	(4.5)
Profit Before Tax	15.5
Tax @ 30%	(4.65)
Profit After Tax	10.85

Required:

(a) Calculate the interest cover.

(b) Is this level of cover safe?

Example 4 Arwin – exam standard

Arwin plans to raise $5m in order to expand its existing chain of retail outlets. It can raise the finance by issuing 10% loan notes redeemable in 2X15, or by a rights issue at $4.00 per share. The current financial statements of Arwin are as follows.

Income statement for the last year	$'000
Sales	50,000
Cost of sales	30,000
Gross profit	20,000
Administration costs	14,000
Profit before interest and tax	6,000
Interest	300
Profit before tax	5,700
Taxation at 30%	1,710
Profit after tax	3,990
Dividends	2,394
Retained earnings	1,596

Statement of Financial Position (Balance sheet) extract	$'000
Net non-current assets	20,100
Net current assets	4,960
12% loan notes 2X10	2,500
	22,560
Ordinary shares, par value 25c	2,500
Retained profit	20,060
	22,560

The expansion of business is expected to increase sales revenue by 12% in the first year. Variable cost of sales makes up 85% of cost of sales. Administration costs will increase by 5% due to new staff appointments. Arwin has a policy of paying out 60% of profit after tax as dividends and has no overdraft.

Required:

(a) For each financing proposal, prepare the forecast income statement after one additional year of operation. (5 marks)

(b) Evaluate and comment on the effects of each financing proposal on the following:

(i) Financial gearing;

(ii) Operational gearing;

(iii) Interest cover;

(iv) Earnings per share. (12 marks)

(c) Discuss the dangers to a company of a high level of gearing, including in your answer an explanation of the following terms:

(i) Business risk;

(ii) Financial risk. (8 marks)

(25 marks)

STOCK MARKET RATIOS

Earnings per share (EPS)

$$\text{EPS} = \frac{\text{PAT less Preference Dividend}}{\text{Number of ordinary shares in issue}}$$

Example 5

The Sammy Hyypia Company earned profits after tax of $14m and has a preference dividend of $2m. There are 6 million ordinary shares in circulation.

Required:

What is the EPS?

Price Earnings Ratio (P/E Ratio)

The P/E ratio is a measure of *future earnings growth*, it compares the market value to the current earnings.

$$\text{PE Ratio} = \frac{\text{Current Share Price}}{\text{EPS}} \qquad \frac{\text{Total Market Value (MV)}}{\text{Profit After Tax}}$$

Example 6

	Danny	Stephan
Share Price	200 pence	80 pence
EPS	10 pence	8 pence
Dividend per share	2 pence	8 pence
Number of shares	2 million	4 million

Required:

Which company is seen to have a better future by the market?

Dividend Cover

The relationship between the dividend paid and the funds available to pay the dividend ie the attributable profit

1. The industry type
2. Shareholder expectations
3. The investment opportunities
4. Tax
5. Dividend policy.

$$\textbf{Dividend cover} = \frac{\textbf{Earnings per share}}{\textbf{Dividend per share}} \quad \frac{\textbf{Profit After Tax}}{\textbf{Total Dividends}}$$

Example 6 contd

Required:

What is the dividend cover for each company?

Dividend Yield

The cash return from holding a share. It is theoretically irrelevant because it only considers part of the return available to the shareholder (the other part being the capital gain or increase in share price).

$$\textbf{Dividend yield} = \frac{\textbf{Dividend per share}}{\textbf{Current Share Price}} \quad \frac{\textbf{Total dividend}}{\textbf{Total market value}}$$

Example 6 contd

Required:

Calculate the dividend yield.

Total shareholder return (TSR)

A measure covering the two returns an investor will receive as a result of holding the share, ie the dividend and the capital gain or loss.

$$\text{TSR} = \frac{\text{Dividend per share + Capital gain or loss}}{\text{Share price at the beginning of the year}}$$

Capital gain = current share price - share price at the beginning of the year.

Example 7

	2006	2007	2008
Turnover	$7.2m	$8.0m	$7.9m
EPS	58.1c	60.2c	60.1c
DPS	24.3c	26.3c	27.6c
Closing share price	$7.25	$8.85	$7.34
Return on equity	11%	9%	

Required:

Compare and contrast the financial performance of the company with the expected return on equity.

Chapter 8

Raising equity finance

CHAPTER CONTENTS

RAISING EQUITY FINANCE

Unlisted companies

Equity finance for Small and medium sized enterprises (SMEs) and unquoted companies include:

1. Own funds
2. Retained earnings
3. Friends and family
4. Venture Capital
   - High risk/ high return.
   - Close relationship between VC and the company being offered finance.
   - Medium term (5–7 years).
   - Exit strategy.
5. Business Angels
6. Private placing.

Stock markets – considerations

The Stock Exchange suggests the following 7 considerations:

1. Prestige
2. Growth
3. Access
4. Visibility
5. Accountability
6. Responsibility
7. Regulation.

Methods of obtaining a listing

Fixed price offer for sale

Offered to the general public at a fixed price.

It has the potential to raise the highest possible price for the company by being offered to the widest possible market.

The problem is the cost associated with floatation which can be prohibitive.

Offer for sale by tender

Investors are able to bid for shares and the shares are issued only to those investors who have bid at the striking price or above.

Placing

Shares are placed with / sold to institutional investors, keeping the cost of the issue to a minimum.

Stock exchange introduction

Shares are introduced to the exchange without any new shares being issued.

EQUITY ISSUES BY QUOTED COMPANIES

A listed or quoted company is better able to raise equity finance.

Rights issues

A rights issue is the right of existing shareholders to subscribe to new share issues in proportion to their existing holdings. This is to protect the ownership rights of each investor.

Advantages

1. Low cost
2. Protect ownership rights
3. Rarely fail.

Theoretical ex-rights price (TERP)

The new share price after the issue is known as the theoretical ex-rights price and is calculated by finding the weighted average of the existing market price and the issue price, weighted by the number of shares ex-rights.

$$\text{Theoretical Ex-rights Price} = \frac{\text{MV of shares (cum rights)} + \text{Proceeds from rights issue}}{\text{Number of shares (ex rights)}}$$

Example 1 Marcus

Marcus plc, which has an issued capital of 4,000,000 shares, having a current market value of $2.80 each, makes a rights issue of one new share for every four existing shares at a price of $2.0.

Value of a right

The new shares are issued at a discount to the existing market value, this gives the rights some value.

Value of a right = Ex-rights price - Issue price

Example 1 contd

Required:

Calculate the theoretical ex-rights price.

Shareholders' options

The shareholder's options with a rights issue are to:

1. Take up (buy) the rights
2. Sell the rights
3. A bit of both
4. Do nothing.

Example 2

A shareholder had 10,000 shares in Marcus plc before the rights offer.

Required:

Calculate the effect on his net wealth of each of the following options:

(a) Take up the shares,

(b) Sell the rights,

(c) Do nothing.

Example 3 Tirwen

Tirwen is a medium-sized manufacturing company which is considering a 1 for 5 rights issue at a 15% discount to the current market price of $4.00 per share. Issue costs are expected to be $220,000 and these costs will be paid out of the funds raised. It is proposed that the rights issue funds raised will be used to redeem some of the existing loan stock at par. Financial information relating to Tirwen is as follows:

Current statement of financial position (balance sheet)

	$'000	$'000
Non-current assets		6,550
Current assets		
Inventory	2,000	
Receivables	1,500	
Cash	300	
		3,800
		10,350
Ordinary shares (par value 50c)		2,000
Reserves		1,500
12% loan notes 2X12		4,500
Current liabilities		
Trade payables	1,100	
Overdraft	1,250	
		2,350
		10,350

Other information:		
Price/earnings ratio of Tirwen:		15.24
Overdraft interest rate:		7%
Tax rate:		30%
Sector averages:	debt/equity ratio (book value):	100%
	interest cover:	6 times

Required:

(a) Ignoring issue costs and any use that may be made of the funds raised by the rights issue, calculate:

(i) the theoretical ex rights price per share;

(ii) the value of rights per existing share. (3 marks)

(b) What alternative actions are open to the owner of 1,000 shares in Tirwen as regards the rights issue? Determine the effect of each of these actions on the wealth of the investor. (6 marks)

(c) Calculate the current earnings per share and the revised earnings per share if the rights issue funds are used to redeem some of the existing loan notes. (6 marks)

(d) Evaluate whether the proposal to redeem some of the loan notes would increase the wealth of the shareholders of Tirwen. Assume that the price/earnings ratio of Tirwen remains constant. (3 marks)

(e) Discuss the reasons why a rights issue could be an attractive source of finance for Tirwen. Your discussion should include an evaluation of the effect of the rights issue on the debt/equity ratio and interest cover. (7 marks)

(25 marks)

Chapter 9

Efficient market hypothesis

CHAPTER CONTENTS

EFFICIENT MARKET HYPOTHESIS (EMH)

A market is efficient if

- The prices of securities traded in that market reflect all the relevant information accurately and rapidly, and are available to both buyers and sellers.
- No individual dominates the market.
- Transaction costs of buying and selling are not so high as to discourage trading significantly.
- Market efficiency from the perspective of the EMH relates to the efficiency of information, the better the information received by investors, the better and more informed the decisions they make will be.

Degree or forms of efficiency

For the purpose of testing, EMH is usually broken down into 3 forms as follows:

1. Weak form

Weak form hypothesis states that current share prices reflect all relevant information about the past price movements and their implications. If this is true, then it should be impossible to predict future share price movements from historic information or pattern.

Share prices only changes when new information about a company and its profits have become available. Since new information arrives unexpectedly, changes in share prices should occur in a random fashion, hence weak form can be referred to as random walk hypothesis.

2. Semi-strong form

Semi-strong form hypothesis state that current share prices reflects both

(i) all relevant information about past price movement and their implications; and

(ii) publicly available information about the company.

Any new publicly accessible information whether comments in the financial press, annual reports or brokers investment advisory services, should be accurately and immediately reflected in current share prices, so investment strategies based on such public information should not enable the investor to earn abnormal profit because these will have already been discounted by the market.

3. Strong form

The strong form hypothesis states that current share prices reflect all relevant information available from

- past price changes
- public knowledge; and
- insider knowledge available to specialists or experts such as investment managers.

Implications of EMH for financial managers

If capital markets are efficient, the main implications for financial managers are:

1. The timing of issues of debt or equity is not critical, as the prices quoted in the market are 'fair'. That is price will always reflect the true worth of the company, no over or under valuation at any point.
2. An entity cannot mislead the markets by adopting creative accounting techniques.
3. 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.
4. Large quantities of new shares can be sold without depressing the share price.
5. The market will decide what level of return it requires for the risk involved in making an investment in the company. It is pointless for the company to try to change the market's view by issuing different types of capital instrument.
6. Mergers and takeovers. If shares are correctly priced this means that the rationale behind mergers and takeovers may be questioned. If companies are acquired at their current market valuation then the purchasers will only gain if they can generate synergies (operating economies or rationalisation). In an efficient market these synergies would be known, and therefore already incorporated into the price demanded by the target company shareholders.

The more efficient the market is, the less the opportunity to make a speculative profit because it becomes impossible to consistently out-perform the market.

Evidence so far collected suggests that stock markets show efficiency that is at least weak form, but tending more towards a semi-strong form. In other words, current share prices reflect all or most publicly available information about companies and their securities.

Chapter 10

Valuation

CHAPTER CONTENTS

BUSINESS VALUATION

Approaches

The five main approaches are:

- Dividend valuation model.
- Net Asset Value
- Price Earnings Ratio
- Earnings Yield
- Discounted Cash Flow

VALUING SHARES

The dividend valuation model

The value of the company/share is the present value of the expected future dividends discounted at the cost of equity.

Either: $P_o = \frac{do(1+g)}{k_e - g}$ **FORMULA GIVEN**

Can either be used to calculate the total MV of a company or the value of a share.

Advantages

1. Considers the time value of money and has an acceptable theoretical basis.
2. Particularly useful when valuing a minority stake of a business.

Disadvantages

1. Difficulty estimating an appropriate growth rate.
2. The model is sensitive to key variables.
3. The growth rate is unlikely to be constant in practice.

Note

Total MV = Share price x Total number of shares.

Example 1 Parry

A company has the following information:

Share capital in issue is 2m ordinary shares (25¢)

Current dividend per share (ex div) - 4¢

Dividend five years ago – 2.5¢

Current equity beta 0.6

Market information:

Current market return 17%

Risk-free rate 6%

Required:

What is the market value of the company?

Example 2 Moran Ltd

A company has the following information:

Ordinary share capital (1m par value 50c)

Current dividend (ex div) - 16¢

Current EPS - 20¢

Current return earned on assets - 20%

Current equity beta 0.9

Current market return 11%

Risk-free rate 6%

Required:

Find the market capitalisation of the company.

Asset based valuations

Weaknesses

- Investors do not normally buy a company for the book value of its assets, but for the earnings / cash flows that the sum of its assets can produce in the future.
- It ignores intangible assets. It is very possible that intangible assets are more valuable than the balance sheet assets.

Uses for asset based valuations:

- asset stripping
- to identify a minimum price in a takeover
- if the assets are predominantly tangible assets.

Types of asset based measures

Book value

There is never a circumstance where book value is an appropriate valuation base. It may however be used as a stepping stone towards identifying another measure.

Net realisable value

Only used to establish a minimum value for an asset, it may be difficult to find an appropriate value over the short term. Used for a company when being broken up or asset stripped.

Replacement cost

May be used to be find the maximum value for an asset. Used for a company as a going concern.

Example 3 Fagan Ltd

Below is a balance sheet of Fagan Ltd,

	$
Non-current assets (carrying value)	625,000
Net current assets	160,000
	785,000
Represented by	
50c ordinary shares	300,000
Reserves	285,000
6% debentures Z1	200,000
	785,000

Notes:

- loan notes are redeemable at a premium of 5%
- The premises have a market value that is $50,000 higher than the book value
- all other assets are estimated to be realisable at their book value.

Required:

Value a 60% holding of ordinary shares on an assets basis.

Income / earnings based methods

Of particular use when valuing a majority shareholding:

1. As majority shareholders, the owners can influence the future earnings of the company.
2. The dividend policy of a company is less of an issue when control is held, the level of dividends can be manipulated to what you want.

Price Earnings Ratio

PE ratios are quoted for all listed companies and calculated as:

$$PE = \frac{\text{Price per share}}{\text{EPS}}$$

This can then be used to value shares in unquoted companies as:

Value of company = Total earnings × P/E ratio

Value per share = EPS × P/E ratio

using an adjusted P/E multiple from a similar quoted company (or industry average).

Example 4 Houllier Ltd

Houllier Ltd, an unlisted company:

- Ordinary share capital is 200,000 50¢ shares.
- Extract from income statement for the year ended 31 Dec 20X7:

	$	$
Profit before taxation	430,000	
Less: Corporation tax	110,000	
Profit after taxation		320,000
Less: Preference dividend	30,000	
Ordinary dividend	40,000	
		(250,000)
Retained profit for the year		70,000

- The PE ratio applicable to a similar type of business is 10.

Required:

Value 100,000 shares in Houllier Ltd on a PE basis.

Earnings yield

The earnings yield is the inverse of the PE ratio:

$$\text{Earnings yield} = \frac{\text{EPS}}{\text{Price per share}}$$

It can therefore be used to value the shares or market capitalisation of a company in exactly the same way as the PE ratio:

$$\text{Value of company} = \text{Total earnings} \times \frac{1}{\text{Required yield}}$$

$$\text{Value per share} = \text{EPS} \times \frac{1}{\text{Required yield}}$$

Example 5 Souness

Company A has earnings of $300,000. A similar listed company has a required yield of 12.5%.

Required:

Find the market capitalisation of each company.

Example 6 Kenny Dalglish

Company B has earnings of $420,500. A similar listed company has a PE ratio of 7.

Required:

Find the market capitalisation of each company.

PV of the free cash flows

A buyer of a business is obtaining a stream of future operating or 'free' cash flows.

The value of the business is:

PV of future cash flows

A discount rate reflecting the systematic risk of the flows should be used.

Method:

1. Identify relevant 'free' cash flows
   - operating cash flows
   - revenue from sale of assets
   - tax payable
   - tax relief
   - synergies from merger (if any)
2. Select a suitable time horizon
3. Identify a suitable discount rate

4. Calculate the present value over the time horizon.

Example 7 Paisley Ltd

The following information has been taken from the income statement and balance sheet of Paisley Ltd:

Revenue	$400m
Production expenses	$150m
Administrative expenses	$36m
Tax allowable depreciation	$28m
Capital investment	$60m
Corporate debt	$140m trading at 110% of par value

Corporation tax is 30%.

The WACC is 16.6%. Inflation is 6%.

These cash flows are expected to continue every year for the foreseeable future.

Required:

Calculate the value of equity.

Advantages

- The best method on a theoretical basis.
- May value a part of the company.

Disadvantages

- It relies on estimates of both cash flows and discount rates – may be unavailable.
- Difficulty in choosing a time horizon.
- Difficulty in valuing a company's worth beyond this period.
- Assumes that the discount rate and tax rates are constant through the period.

Example 8

Recent financial information relating to Open Co, a listed company, is as follows.

		$m
Profit after tax (earnings)		115
Dividends		69

Statement of financial position information:

	$m	$m
Non-current assets		815
Current assets		515
Total assets		1,330
Current liabilities		210
Equity		
Ordinary shares ($1 nominal)	120	
Reserves	705	
		825
Non-current liabilities		
6% Bank loan	105	
8% Bonds ($100 nominal)	190	
		295
		1,330

Forecasts are that the dividends of Open Co will grow in the future at a rate of 3% per year. The forecast growth rate of the earnings of the company is 4% per year.

Considering the risk associated with expected earnings growth, an earnings yield of 11% per year can be used for valuation purposes.

The cost of equity is 10% per year and the gross redemption yield on debt is 7%. The bonds are redeemable in 4 years at par.

The ex-dividend share price of the company is $8·50 per share, whilst the average PE ratio for the sector is 9.

Required:

Calculate the value of Open Co using the following methods:

(a) Current Market Capitalisation

(b) Net asset value method;

(c) Dividend growth model;

(d) PE ratio method

(e) Earnings yield method. (With and without growth)

(f) Market value of the Bonds

VALUATION OF DEBT

When valuing debt we assume that

Market price = The discounted cash flows of the debt

Note

The debt is normally valued gross of debt because we do not know the tax position of each investor.

Irredeemable debt

The company does not intend to repay the principal but to pay interest forever, the interest is paid in perpetuity.

The formula for valuing a debenture is therefore:

$$MV = \frac{I}{r}$$

where:

I = annual interest starting in one year's time

MV = market price of the debenture now (year 0)

r = debt holders' required return, expressed as a decimal.

If instead of r you are given the company's cost of debt the formula becomes:

$$MV = \frac{I(1 - T)}{Kd}$$

where:

Kd = company's cost of debt, expressed as a decimal.

Example 9 Abbie Lou

A company has issued irredeemable loan notes with a coupon rate of 9%. The required return of investors in this category of debt is 6%.

Required:

The current market value of the debt?

Redeemable debt

The market value is the present value of the future cash flows, these normally include:

1. Interest payments for the years in issue
2. Redemption value.

Example 10 Freddie

A company has 10% debt redeemable in 5 years. Redemption will be at par value. The investors require a return of 8%.

Required:

The market value of the debt?

Convertible debt

The value of a convertible is the higher of its value as debt and its converted value. This is known as the formula value.

Example 11 Elliot

Elliot plc has convertible loan notes with a coupon rate of 10%. Each $100 loan note may be converted into 25 ordinary shares at the maturity date which is in 4 years, or redeem at a 5% premium to the par value.

The current share price is $3.70 which is expected to grow by 4% per annum. Investors require a rate of return of 6% per annum.

Required:

Calculate the following:

(a) Market Value

(b) Floor value

(c) Conversion premium

Preference shares

Similar to irredeemable debt, the income stream is the fixed percentage dividend received in perpetuity.

The formula is therefore: $P_0 = \frac{D}{Kp}$

where:

D = the constant annual preference dividend

P_0 = ex-div market value of the share

Kp = cost of the preference share.

Example 12 Tosca

A firm has in issue $1 11% preference shares. The required return of preference shareholders is 12%.

Required:

What is the value of a preference share?

Chapter 11

Risk

CHAPTER CONTENTS

FOREIGN CURRENCY RISK

The risk that the exchange rate may move up or down in relation to other currencies. It will have a major impact on the profitability of any company that buys or sells to other countries.

THE EXCHANGE RATE

Spot rate

A prevailing rate at a point in time (say today)

e.g. $:£ 1.9500

This means that the dollar ($) is expressed in terms of one pound (£), i.e. we express the first currency in terms of one of the second.

Conversion rule (÷ and ×)	***÷ 1st currency to calculate the 2nd***
	× 2nd currency to calculate the 1st

Spot rate with spread

The bank expects a margin to transact funds. As a result the rate is often expressed in terms of a bid/offer spread. Remember the bank will always win!

e.g. $:£ 1.9150 – 1.9850 or $:£ 1.9500 +/- 0.0350

Flow rule (when looking at the 1st currency use Bart Simpson)	
***B**art*	***(buy 1st currency low)***
***S**impson*	***(sell 1st currency high)***

Example 1

Spot rate $:£ 1.9500 ± 0.0350

€:£ 1.2500 ± 0.0275

(a) A €300,000 receipt is transferred to our £ bank account.

(b) A £400,000 receipt is to be transferred into our $ bank account.

(c) A $250,000 payment is to be paid from our £ bank account.

(d) A £100,000 payment is to be paid from our € bank account.

Required:

What are the values of the transactions?

EXCHANGE RATE SYSTEMS

Exchange rates are a key measure for governments to attempt to control. They will have direct bearing on the economic performance of the country.

Fixed (or pegged) rate systems

Where a currency is fixed in relation to the dominant world currency ($) or alternatively against a basket of currencies (ERM).

The 'peg' may be changed from time to time to reflect the relative movement in underlying value.

This form of currency management is effective at giving a stable exchange platform for trade. It will however lead to a parallel or unofficial market for currency if out of step with perceived value and normally requires strict exchange control to operate.

Floating rate systems

Where the exchange rate is allowed to be determined without any government intervention.

It is determined by supply and demand. This is rare, currency value is normally considered too important a measure to be left solely to the market.

The market has a tendency to be volatile to the adverse effect of trade and wider government policy. This volatility can adversely affect the ability to trade between currencies.

Managed or 'dirty' float

Where the market is allowed to determine the exchange rate but with government intervention to reduce the adverse impacts of a freely floated rate.

The basic aim is to 'damp' the volatility by intervening or being prepared to intervene to maintain the value within a 'trading range'.

A government may further attempt to influence the ongoing value of the currency. If this is materially at odds with the markets' perception of the value however it is rarely successful in the long run. Examples of this failing include the pound falling out of the ERM or the collapse in the value of the Argentinian Peso.

The government may intervene by:

- Using reserves to buy or sell currency the government can artificially stimulate demand or supply and keep the currency within a trading range reducing volatility.
- Using interest rates, by increasing the interest rate within the economy the government makes the currency more attractive to investors in government debt and will attract speculative funds.

TYPES OF FOREIGN CURRENCY RISK

There are three risks associated with foreign currency:

1. Transaction risk.
2. Economic risk.
3. Translation risk.

Transaction risk

The risk associated with **short-term cash flow** transactions.

This may include:

- Commercial trade – this is normally reflected by the sale of goods in a foreign currency but with a delay in payment. The receipt will have an uncertain value in the home currency.
- Borrowing or lending in another currency – subsequent cash flows relating to interest payments would be uncertain in the home currency.

These transactions may be hedged relatively easily either using internal or external hedging tools.

Economic risk

Long-term cash flow effects associated with asset investment in a foreign country or alternatively loans taken out or made in a foreign currency and the subsequent capital repayments.

Economic risk is more difficult to hedge given the longer term nature of the risk (possibly over 10 or more years). A simple technique would be to adopt a portfolio approach to investments by currency to spread the risk.

Translation risk

Risk associated with the reporting of foreign currency assets and liabilities within financial statements.

There is no cash flow impact of this type of risk. However, the impact on the financial statements can be severe.

Translation risk may be hedged by **matching** the assets and liabilities within each country. Any increase or decrease in value would cancel out on consolidation.

WHAT MAKES EXCHANGE RATES FLUCTUATE?

Balance of payments

The inflows and outflows from trade reflect demand for and supply of the home currency. If there is a consistent deficit or surplus there will be a continuing excess supply or demand for the currency that would be reflected in weakness or strength in the currency.

For major traded currencies this effect is relatively small.

Capital movements between countries

Of far more importance for major currencies are the flows of speculative capital from one currency to another. This makes the level of relative interest rates of critical importance for these currencies. An increase in the interest rate of one currency will lead to a one-off increase of demand for that currency increasing its value.

It is difficult to predict future rates based on this measure.

Purchasing Power Parity Theory (PPPT)

Based on the law of one price in economic theory. This would suggest that the price of the same product is the same in all currencies.

To extend the principle further this would suggest that a relative change in prices (inflation) would have a direct effect on the exchange rate.

PPPT is an unbiased but poor predictor of future exchange rates.

Illustration

A product is currently being sold in the UK for £2,000 and in the US for $4,000. This would infer that the current exchange rate is $:£ 2.0000.

What would we expect the exchange rate to be in 1 year if the inflation rates are 4% and 7% respectively?

Year	UK	US
0	£2,000	$4,000
Inflation	× 1.04	× 1.07
1	£2,080	$4,280

The predicted exchange rate would be $4,280/£2,080 = $:£ 2.0577.

To calculate the impact of PPPT use the following formula:

$$\text{Current spot rate} \times \frac{1 + \text{inf } I_{1st}}{1 + \text{inf } I_{2nd}} = \text{Future expected spot rate in one year's time.}$$

Example 2

The current exchange rate is €:£ 1.233 Inflation rates for the two currency zones are as follows:

Eurozone 5%

UK 3%

Required:

What is the predicted exchange rate in one year?

Problems with PPPT

- Not all inflation relates to exported goods.
- There are market imperfections such as taxation and tariffs that reduce the impact of PPPT.
- Only a small proportion of trade relates to traded goods.

Interest Rate Parity Theory (IRPT)

The theory that there is a no sum gain relating to investing in government bonds in differing countries. Any benefit in additional interest is eliminated by an adverse movement in exchange rates.

IRPT is an **unbiased but poor** predictor of future exchange rates.

Illustration

It is possible to invest £1m in short-dated govt bonds in the UK at 6.08% or alternatively in US treasury bills at 9.14%. The current exchange rate is $:£2.0000

Year	UK		US
0	£1m	× 2 =	$2m
Interest	× 1.0608		× 1.0914
1	£1.0608m		$2.1828m

The predicted exchange rate would be $2.1828m/£1.0608m = $:£ 2.0577.

Does it work?

In practice the relationship between interest and exchange rates is not perfect and certainly not simultaneous. It is possible that the exchange rate does not move in line with interest rates for long periods (research the 'carry trade') only to correct over a short period of time.

$$\text{Current spot rate} \times \frac{1 + i_{1st}}{1 + i_{2nd}} = \text{forward rate in one year's time.}$$

Example 3

The current exchange rate is €:£ 1.245. Interest rates for the two currency zones are as follows:

Eurozone 4%

UK 5.5%

Required:

What is the predicted exchange rate in one year?

The International Fisher Effect

The assumption that all currencies must offer the same real interest rate. This links PPPT to IRPT. It is based upon the Fisher effect.

The relative real interest rates should be the same due to the principle of supply and demand, if a country offers a higher real interest rate investors will invest in that currency and push up the price of the currency bringing the real rate back to equilibrium.

The international Fisher effect has a strong theoretical basis but is a poor predictor of future exchange rates.

Remember the Fisher effect

$$(1 + m) = (1 + r)(1 + i)$$

Illustration

(using values from previous illustrations for PPPT and IRPT)

YR	PPPT	IRPT
0	2.0000	2.0000
	× 1.07/1.04	×1.0914/1.0608
1	2.0577	2.0577

	UK	US	
Real rate of return	= 1.0608/1.04 - 1	= 1.0914/1.07 –1	The reason for both PPP and IRP having the same prediction is because the international Fisher effect holds true
	= 2%	= 2%	

Example 4 Aurelio

The following interest and inflation rates are known for the pound and the euro

	Inflation rates	Interest rates
UK £	5.5%	7%
Eurozone €	4%	5%

Required:

What are the predicted exchange rates in one year using:

(a) PPPT?

(b) IRPT?

Does the IFE hold true?

HEDGING EXCHANGE RATE RISK

Hedging is the process of reducing or eliminating risk. It may be achieved by using internal or external measures.

Internal measures have the advantage of being essentially cost free but at the same time are unlikely to completely eliminate the risk.

External measures involve a bank or financial market. They will incur cost but may totally eliminate the risk.

INTERNAL HEDGING TECHNIQUES

Invoice in own currency

By invoicing in your own currency you do not suffer the risk of exchange rate movement.

The risk does not disappear, instead it passes to the other party. It is questionable whether the other party will be happy to accept this risk.

Leading payment

By paying early or encouraging a customer to pay early the risk relating to an individual transaction is reduced or eliminated. The earlier the cash flow, the lower the exposure to exchange rate movements.

Matching or netting

If a company makes a number of transactions in both directions it will be able to net off those transactions relating to the same dates. By doing so a company can materially reduce the overall exposure, but is unlikely to eliminate it.

In order to perform netting the company must have a foreign currency bank account in the appropriate country.

Do nothing

A compelling idea, the exchange rates will fluctuate up and own. It could be argued that since you win some and lose some then ignoring the risk would be the best option.

As a result you save on hedging costs, the downside being that the exposure to exchange rates is present in the short-term.

EXTERNAL HEDGING TECHNIQUES

Forward contract

Features

1. An agreement with the bank to exchange currency for a specific amount at a future date.
2. It is an obligation that must be completed once entered into.
3. The transaction may take place over a limited range of dates if option dated. It is an over the counter (OTC) product which means that it is tailored to the specific value and date required.
4. The forward rate offers a perfect hedge because it is for the exact amount required by the transaction on the appropriate date and the future rate is known with certainty.
5. The underlying theory behind the setting of the future rate is IRPT.

Illustration

The current spot rate is $:£2.1132 ± 0.0046. The company is expecting to receive $400,000 in three months. The forward is quoted at a discount of 0.32 – 0.36 in cents in three months.

Forward rule

The forward rate may be given as an adjustment to the prevailing spot rate, if so:

Add a discount, subtract a premium

	$	$
Spot rate	2.1086	2.1178
Add discount	0.0032	0.0036
Forward rate	2.1118	2.1214

Receipt in £ = $400,000/ 2.1214 = £188,555

Example 5 Skrtel

A US corporation is looking to hedge its foreign exchange. The current spot rate is $:€ 1.6578 ± 0.0032, whilst the one month forward rate is $1.5378 ± 0.0132. The company is expecting to pay €350,000 in one month.

Required:

What is the value of the payment in $s?

Advantages

- flexibility with regard to the amount to be covered, should lead to a perfect hedge in terms of amount and date
- relatively straightforward both to comprehend and to organise.

Disadvantages

- contractual commitment that must be completed on the due date, if the underlying transaction is in anyway doubtful this may be problem
- the rate is fixed with no opportunity to benefit from favourable movements in exchange rates

Money market hedge

Use of the short-term money markets to borrow or deposit funds. This gives the company the opportunity to exchange currency today at the prevailing spot rate.

Steps

1. Borrow – borrow funds in the currency in which you need the money.
2. Translate – exchange the funds today avoiding exposure to fluctuations in the rate.
3. Deposit – deposit the funds in the currency in which you eventually want the funds until such time as you will need them.

Example 6 Arbeloa

Arbeloa is a UK company trading extensively in the US. The current exchange rate is $:£ 1.9750±0.003.

1 Month Forward $1.9732 - $1.9797

3 month Forward $1.9754 - $1.9818

We wish to do the following transactions:

$ Receipt of $500,000 in 1 month.

$ Payment of $300,000 in 3 months.

The money markets provide the following interest rates for next year (pa)

	UK	US
Loan rate	6.0%	7.5%
Deposit rate	4.0%	5.0%

Forward rates

Required:

Calculate the £ receipt and payments using both money markets and forward markets.

Advantages

- There is some flexibility regarding the date at which the transaction takes place.
- May be available in currencies for which a forward rate is not available.

Disadvantages

- Complex.
- May be difficult to borrow/ deposit in some currencies at a risk-free rate.

Other currency hedging techniques

Currency Futures

The 'fixing' of the exchange rate today for a future trade in a similar manner to the forward contract. The Future is an exchange traded instrument that can be bought or sold on an exchange (eg LIFFE).

The future is a standardised financial instrument in terms of amount and date. This may lead to a hedge that is less than perfect because the amount of the trade may differ.

The aim is to buy or sell the future in such a way as to compliment the underlying trade. Therefore you will have:

1. A futures contract betting on the exchange rate rising or falling, and
2. An underlying transaction that may fall or rise in terms of the home currency.

The linking of the two cancels out the movement of the exchange rate and leads to the hedge.

Currency options

They may be exchange traded or OTC. Options have the benefit of being a one-sided bet. You can **protect the downside** risk of the currency moving against you but still take advantage of the upside potential.

The option writer therefore only has a downside risk (as we take the upside). The option writer needs compensating for this risk and is paid a **premium** over and above transaction costs.

Inshal Co Exam standard

Inshal Co is a UK-based company which has the following expected transactions.

One month:	Expected receipt of $40,000
One month:	Expected payment of $140,000
Three months:	Expected receipts of $300,000

The finance manager has collected the following information:

Spot rate ($ per £):	1.7820 ± 0.0002
One month forward rate ($ per £):	1.7829 ± 0.0003
Three months forward rate ($ per £):	1.7846 ± 0.0004

Money market rates for Inshal Co:

	Borrowing	*Deposit*
One year sterling interest rate:	4.9%	4.6
One year dollar interest rate:	5.4%	5.1

Assume that it is now 1 April.

Required:

(a) Discuss the differences between transaction risk, translation risk and economic risk. (6 marks)

(b) Explain how inflation rates can be used to forecast exchange rates. (6 marks)

(c) Calculate the expected sterling receipts in one month and in three months using the forward market. (3 marks)

(d) Calculate the expected sterling receipts in three months using a money-market hedge and recommend whether a forward market hedge or a money market hedge should be used. (5 marks)

(e) Discuss how sterling currency futures contracts could be used to hedge the three-month dollar receipt. (5 marks)

(25 marks)

INTEREST RATE RISK

The risk that interest rates will rise or fall in the future. Interest rates are normally less volatile that exchange rates, changing at most on a monthly basis. They may even be constant over long periods of time.

The exposure to interest rates however is more enduring for companies on the basis that any form of existing borrowing or investing will be affected by a change in interest rates.

A company has a basic choice between borrowing fixed rate or variable (floating) rate. Both present a risk, the variable rate represents a cash flow risk and the fixed rate an opportunity cost.

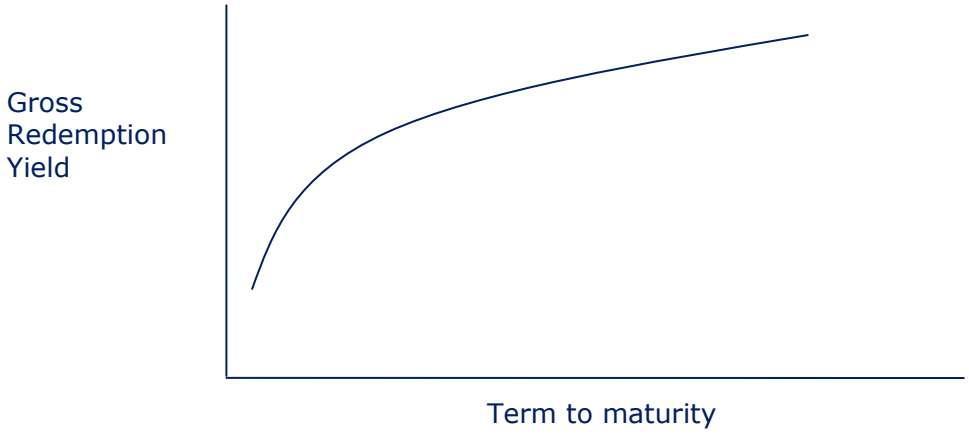
Reasons for fluctuations in interest rates

Interest rates or base rates are a key economic tool for government. They may be changed for the following reasons:

- To control inflation, higher interest rates will reduce demand for funds, aggregate demand and hence inflationary pressure.
- To protect the currency, contrary to IRPT an increase in the interest rates will have a one-off effect of attracting speculative funds and increasing the value o the economy.
- To 'kick-start' the economy, a reduction in interest rates can stimulate economic activity by encouraging borrowing.

The yield curve (term structure of interest rates)

The relationship between the gross redemption yield of a debt investment and its term to maturity. There are 3 elements:



1. Liquidity preference
2. Expectations
3. Market segmentation.

1. Liquidity preference

Investors prefer to be liquid over being illiquid. To encourage investment over the longer term the long-term debt must offer a higher return over short-term debt.

2. Market expectations

If interest rates are expected to fall over time long-term rates will be lower than short-term rates. This would lead to an inverted yield curve.

3. Market segmentation

Differing parts of the market (short-term vs long-term debt markets) may react to differing economic information meaning that the yield curve is not smooth but suffers discontinuities.

HEDGING INTEREST RATE RISK

We may hedge interest rate risk over the short or the long-term

Short term hedging	Long-term hedging
Forward rate agreements	Swaps
Interest rate guarantee	
Interest rate futures	
Interest rate options	

Short-term measures

Forward rate agreements (FRA)

The fixing of the interest rate today in relation to a future short-term loan. It is an obligation that must be taken once entered into. It is OTC and tailored to a specific loan in terms of:

1. Date
2. Amount, and
3. Term

and offers a 'perfect hedge'. The FRA is wholly separate to the underlying loan.

It will give certainty as regards the interest paid but there is a downside risk that interest rates may fall and we have already fixed at a higher rate.

Interest rate guarantee (IRG)

Similar to a FRA but an **option** rather than on obligation. In the event that interest rates move against the company (eg rise in the event of a loan) the option would be exercised. If the rates move in our favour then the option is allowed to lapse.

There is a **premium** to pay to compensate the IRG writer for accepting the downside risk.

Interest rate futures (STIR)

An exchange traded instrument that works in a similar manner to a FRA. By trading on the exchange the Future can 'fix' the rate today for a future loan.

Exchange traded interest rate options

Similar to an IRG but exchange traded, the option gives **protection against the downside** for the payment of a **premium**.

LONG-TERM HEDGING – SWAPS

A company will borrow either using a variable or a fixed rate. If it wishes to change its borrowing type it could redeem its present debt and re-issue in the appropriate form. There are risks and costs involved in doing so.

A swap allows the company to change the exposure (fixed to variable or vice versa) without having to redeem existing debt.

To prepare a swap we need the following steps

1. Identify a counter-party, either another company or bank willing to be the 'other side' of the transaction. If we want to swap fixed for variable they will want the opposite
2. Agree the terms of the swap to ensure that at the outset both parties are in a neutral position
3. On a regular basis (perhaps annually) transfer net amounts between the parties to reflect any movement in the prevailing exchange rates

Advantages of swaps

- Allows a change in interest rate exposure at relatively low cost and risk.
- May allow access to a debt type that is otherwise unavailable to the company.
- May reduce the overall cost of financing in certain circumstances.

Chapter 12

Working capital management

CHAPTER CONTENTS

THE TREASURY FUNCTION

A function devoted to all aspects of cash within a company.

This includes:

1. Investment
2. Raising finance
3. Banking and exchange
4. Cash and currency management
5. Risk
6. Insurance.

Role

'Treasury management is the corporate handling of all financial matters, the generation of external and internal funds for business. The management of currencies and cash flows, and complex strategies, policies and procedures of corporate finance.'

The role being summarised under 5 headings:

1. Corporate objectives
2. Liquidity management
3. Investment management
4. Funding management
5. Currency management.

Centralisation vs. decentralisation

In a large organisation there is the opportunity to have a single head office treasury department or to have individual treasury departments in each of the divisions. Modern practice would suggest the decentralised route where there is little or no head office intervention in the workings of an autonomous division. This runs contrary to treasury practice where large companies tend to have a centralised function.

Advantages of centralisation

1. Avoid duplication of skills of treasury across each division. A centralised team will enable the use of specialist employees in each of the roles of the department.
2. Borrowing can be made 'in bulk' taking advantage of better terms in the form of keener interest rates and less onerous conditions.
3. Pooled investments will similarly take advantage of higher rates of return than smaller amounts.
4. Pooling of cash resources will allow cash-rich parts of the company to fund other parts of the business in need of cash.
5. Closer management of the foreign currency risk of the business.

Advantages of decentralisation

1. Greater autonomy of action by individual treasury departments to reflect local requirements and problems.
2. Closer attention to the importance of cash by each division.

Profit centre vs. cost centre

Should the treasury department be run as a cost centre or a profit centre?

Cost centre – A function to which costs are accumulated.

Profit centre – A function to which both costs and revenues are accounted for.

Advantages of using a profit centre

1. The use of the treasury department is given 'a value' which limits the use of the service by the divisions.
2. The prices charged by the treasury department measure the relative efficiency of that internal service and may be compared to external provision.
3. The treasury department may undertake part of the hedging risk of a trade thereby saving the company as a whole money.
4. The department may gain other business if there is surplus capacity within the department.
5. Speculative positions may be taken that net substantial returns to the business.

Disadvantages of using a profit centre

1. Additional costs of monitoring. The treasury function is likely to be very different to the rest of the business and hence require specialist oversight if run as a profit making venture.
2. The treasury function is unlikely to be of sufficient size in most companies to make a profit function viable.
3. The company may be taking a substantial risk by speculation that it cannot readily quantify. In the event of a position going wrong the company may be dragged down as a result of a single transaction.

Short-term sources of finance

Factoring

The outsourcing of the credit control department to a third party.

The debts of the company are effectively sold to a factor. The factor takes on the responsibility to collect the debt for a fee. The factor offers three services:

1. Debt collection
2. Financing
3. Credit insurance.

The factor is often more successful at enforcing credit terms leading a lower level of debts outstanding. Factoring is therefore not only a source of short-term finance but also an external means of controlling or reducing the level of debtors.

Invoice discounting

A service also provided by a factoring company.

Selected invoices are used as security against which the company may borrow funds. This is a temporary source of finance repayable when the debt is cleared. The key advantage of invoice discounting is that it is a confidential service, the customer need not know about it.

Trade credit

The delay of payment to suppliers is effectively a source of finance.

By paying on credit terms the company is able to 'fund' its stock of the material at the expense of its suppliers.

Overdrafts

A source of short-term funding which is used to fund fluctuating working capital requirements.

Its great advantage is that you only pay for that part of the finance that you need.

The overdraft facility (total limit) is negotiated with the bank on a regular basis (maybe annually). For a company with a healthy trading record it is normal for the overdraft facility to be 'rolled over' from one year to the next although theoretically it is 'repayable on demand'.

Bank loans

Bank loans or term loans are loans over between one and three years which have become increasingly popular over the past ten to fifteen years 'as a bridge' between overdraft financing and more permanent funding.

Bills of exchange

A means of payment whereby by a 'promissory note' is exchanged for goods.
The bill of exchange is simply an agreement to pay a certain amount at a certain date in the future. No interest is payable on the note but is implicit in the terms of the bill.

Asset specific sources of finance

Some sources of finance are used to purchase individual assets using the asset as security against which the funds are borrowed.

Hire purchase

The purchase of an asset by means of a structured financial agreement.

Instead of having to pay the full amount immediately, the company is able to spread the payment over a period of typically between two and five years.

Finance lease

A type of asset financing that appears initially very similar to hire purchase. Again the asset is paid for over between two and five years (typically) and again there is a deposit (initial rental) and regular monthly payments or rentals.

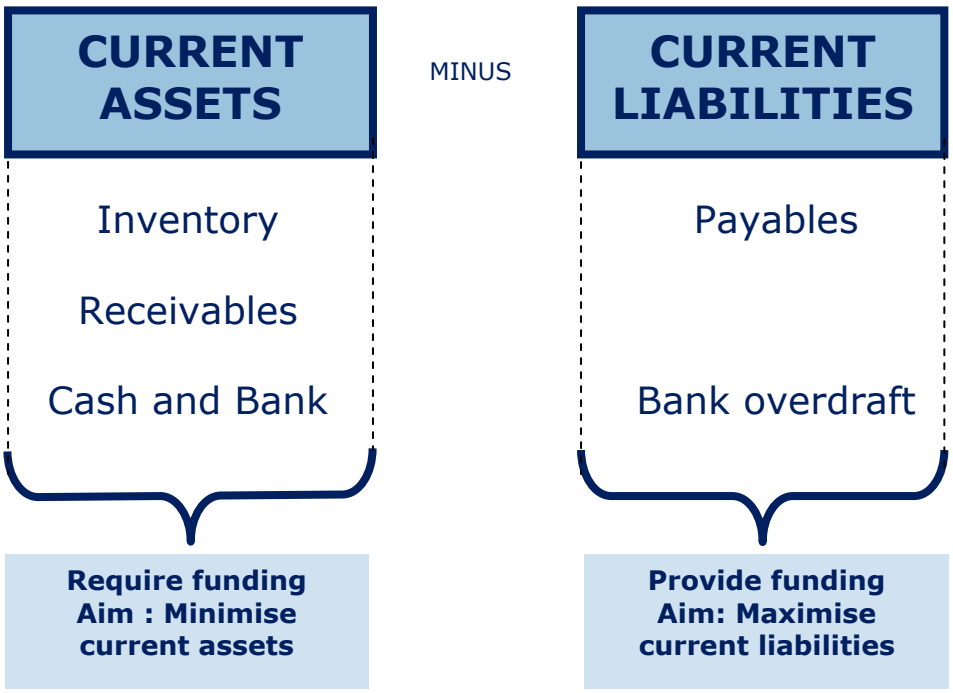
The key difference is that at the end of the lease agreement the title to the asset does not pass to the company (lessee) but is retained by the leasing company (lessor). This has important **potential tax advantages** covered later in the course.

Operating lease

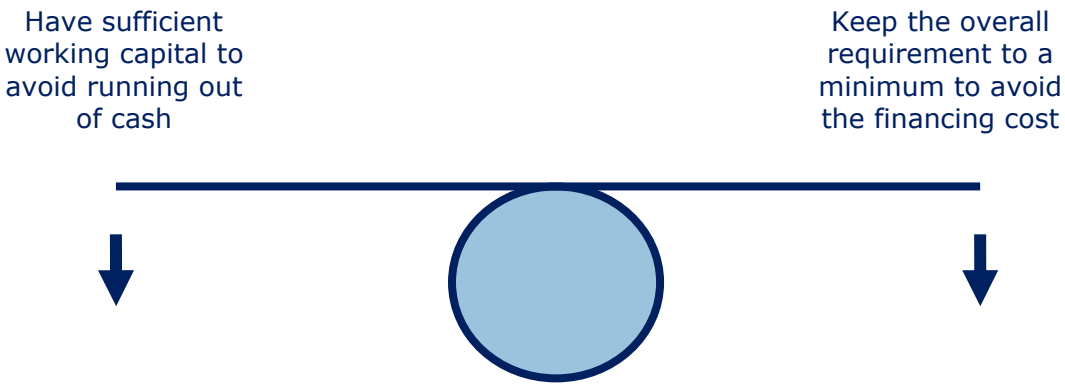
In this situation the company does not buy the asset (in part or in full) but instead rents the asset.

The operating lease is often used where the asset is only required for a short period of time such as Plant Hire or the company has no interest in acquiring the asset simply wishing to use it such as a company vehicle or photocopier.

WORKING CAPITAL MANAGEMENT – AN OVERVIEW



Working capital seesaw

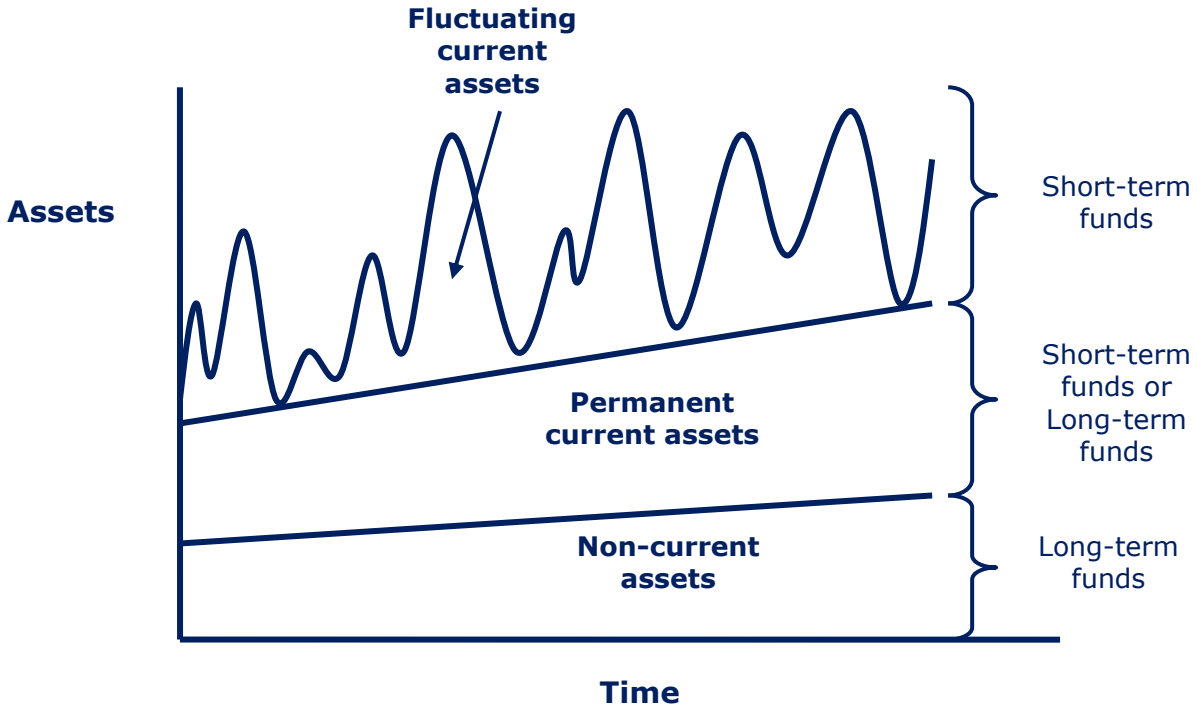


Level of working capital

1. The nature of the business,
2. Certainty in supplier deliveries,
3. The level of activity of the business,
4. The company's credit policy.

Funding the working capital requirement

	Short-term sources of finance	Long-term sources of finance
Examples	Bank overdraft Trade creditors	Equity Long-term debt
Advantages	1. Flexible – only borrow what is needed 2. Cheaper – liquidity preference 3. Easier to source	1. Secure – no need to constantly replenish 2. Lower financing risk 3. Matching funding to need



MEASURES OF WORKING CAPITAL MANAGEMENT

	Liquidity measures	Efficiency measure
Issue	Ensuring sufficient funding to avoid running out of cash	Measuring the speed of circulation of cash within the company
Measures	Current ratio Quick ratio	The operating cycle

Liquidity ratios

Current assets may be financed by current liabilities or by long-term funds. The "ideal" current ratio is 2:1. This would mean that half of the current assets are financed by current liabilities and therefore half by long-term funds. Similarly the ideal quick ratio is 1:1.

Current ratio

A simple measure of how much of the total current assets are financed by current liabilities. A safe measure is considered to be **2:1** or greater meaning that only a limited amount of the assets are funded by the current liabilities.

$$\textbf{Current Ratio} = \frac{\textbf{Current Assets}}{\textbf{Current Liabilities}}$$

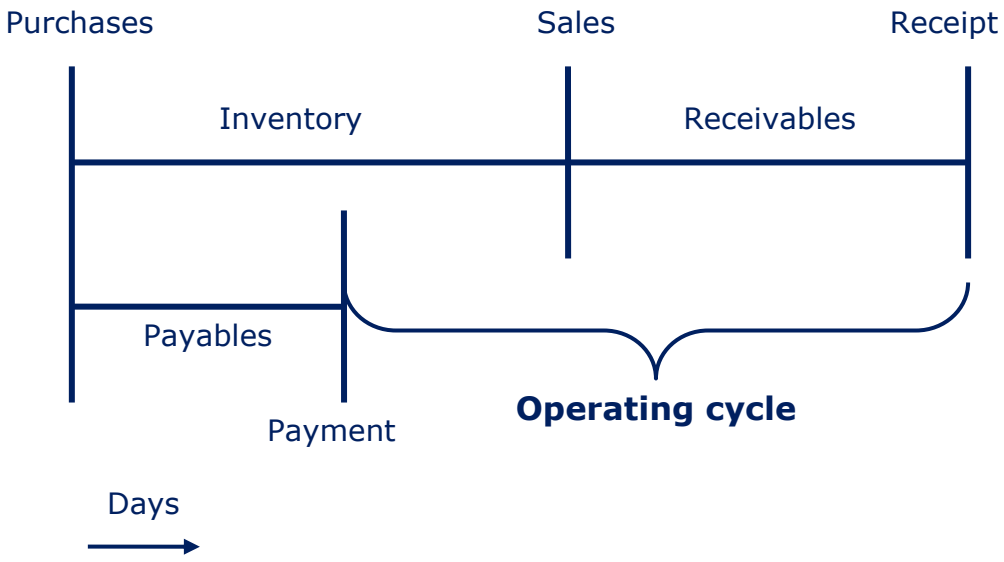
Quick ratio

A measure of how well current liabilities are covered by liquid assets. A safe measure is considered to be 1:1 meaning that we are able to meet our existing liabilities if they all fall due at once.

$$\textbf{Quick Ratio (or acid test)} = \frac{\textbf{Current Assets minus Stock}}{\textbf{Current Liabilities}}$$

Operating cycle

Also known as the cash cycle or trading cycle. The operating cycle is the length of time between the company's outlay on raw materials, wages and other expenditures and the inflow of cash from the sale of goods.



Example 1

Profit and loss account extract		**$**
Turnover		250,000
Gross profit		90,000
Balance Sheet extract	**$**	**$**
Current Assets		
Inventory	30,000	
Debtors	60,000	
		90,000
Current Liabilities		
Creditors		50,000

Required:

Prepare the operating cycle.

OVERTRADING

Overtrading is the term applied to a company which rapidly increase its turnover without having sufficient capital backing, hence the alternative term "under-capitalisation". Output increase are often obtained by more intensive utilisation of existing fixed assets, and growth tends to be financed by more intensive use of working capital.

Overtrading companies are often unable or unwilling to raise long-term capital and thus tend to rely more heavily on short-term sources such as overdraft and trade creditors. Debtors usually increase sharply as the company follows a more generous trade credit policy in order to win sales, while stock tend to increase as the company attempts to produce at a faster rate ahead of increase demand. Overtrading is thus characterised by rising borrowings and a declining liquidity position in terms of the quick ratio, if not always according to the current ratio.

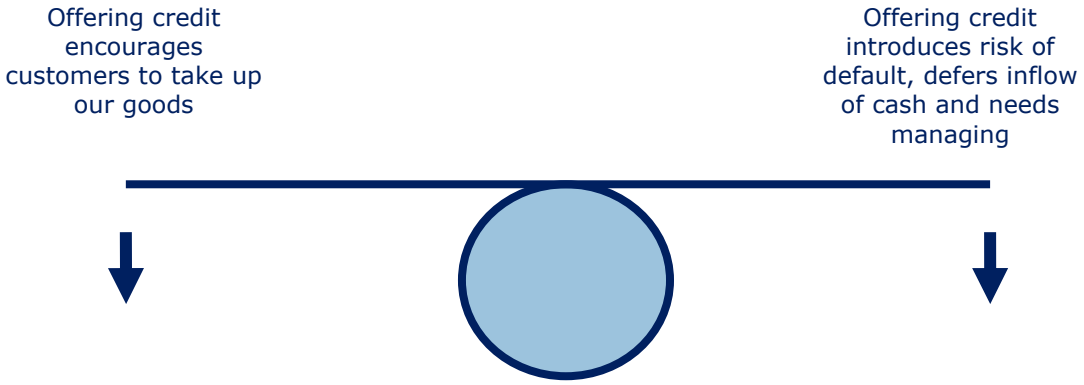
Symptoms of overtrading

1. Rapid increase in turnover
2. Fall in liquidity ratio or current liabilities exceed current assets
3. Sharp increase in the sales-to-fixed assets ratio
4. Increase in the trade payables period
5. Increase in short term borrowing and a decline in cash balance
6. Fall in profit margins.

Overtrading is risky because short-term finance may be withdrawn relatively quickly if creditors lose confidence in the business, or if there is general tightening of credit in the economy resulting to liquidity problems and even bankruptcy, even though the firm is profitable.

The fundamental solution to overtrading is to replace short-term finance with long-term finance such as term loan or equity funds.

MANAGING RECEIVABLES



Credit management

There are three aspects to credit management

1. Assessing credit status
2. Terms
3. Day to day management.

Assessing credit status

The creditworthiness of all new customers must be assessed before credit is offered, it is a privilege and not a right. Existing customers must also be re-assessed on a regular basis. The following may be used to assess credit status of a company

1. Bank References
2. Trade References
3. Published accounts
4. Credit rating agencies
5. Company's own Sales Record.

Terms

Given that we are willing to offer credit to a company, we must know consider the limits to the agreement.

This may include:

1. Credit limit value
2. Number of days credit
3. Discount on early payment
4. Interest on overdue account.

Day to day management

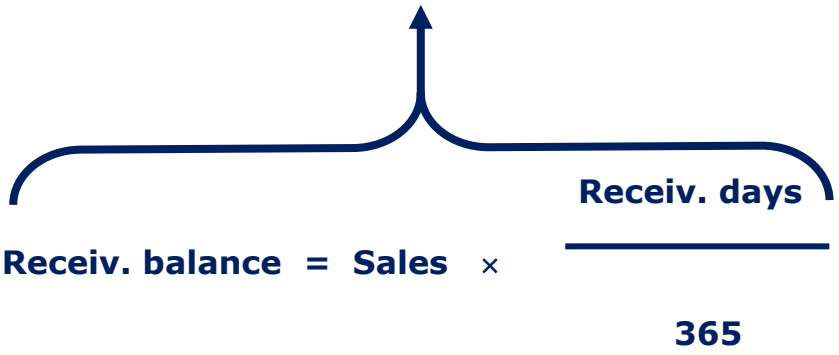
The credit policy is dependent on the credit controllers implementing a set of simple but rigorous procedures. If the system is not rigorous, those debtors who don't want to pay will find ways not to pay. A process may be like the following

Time line	Action
After 30 days	Send statement of account
+7 days	Reminder letter
+7 days	2nd reminder
+7 days	Legal action threat
+7 days	Take action to recover funds

COST OF FINANCING RECEIVABLES

The receivables balance needs to be financed. Any change to the receivables balance will lead to a change in the financing cost of the business.

Interest cost = Receivables balance × Interest rate



Example 2

Shankly Limited has sales of $40m for the previous year, receivables at the year end were $8m. The cost of financing debtors is covered by an overdraft at the interest rate of 14%.

Required:

(a) What are the receivables days for Shankly?

(b) Calculate the cost of financing receivables.

Discounts for early payment

Cash discounts are given to encourage early payment by customers. The cost of the discount is balanced against the savings the company receives from a lower balance and a shorter average collecting period.

Example 3

Shankly as above but a discount of 2% is offered for payment within 10 days.

Required:

Should the company introduce the discount given that 50% of the customers take up the discount?

Advantages/Disadvantages

Advantages

1. Early payment reducing the debtor balance and hence the interest charge.
2. May reduce the bad debts arising.

Disadvantages

1. Difficulty in setting the terms.
2. Greater uncertainty as to when cash receipts will be received.
3. May not reduce bad debt in practice.
4. Customers may pay over normal terms but still take the cash discount.

Factoring

There are three main types of factoring service available:

1. Debt Collection And Administration
2. Credit Insurance
3. Financing.

Example 4

Shankly again but a factor has offered a debt collection service which should shorten the debtor collection period on average to 50 days. It charges 1.6% of turnover but should reduce administration costs to the company by $175,000.

Required:

Should the company use the factoring facility?

Advantages/Disadvantages

Advantages

1. Saving in internal administration costs.
2. Reduction in the need for day to day management control.
3. Particularly useful for small and fast growing businesses where the credit control department may not be able to keep pace with volume growth.

Disadvantages

1. Should be more costly than an efficiently run internal credit control department.
2. Factoring has a bad reputation associated with failing companies, using a factor may suggest your company has money worries.
3. Customers may not wish to deal with a factor.
4. Once you start factoring it is difficult to revert easily to an internal credit control.
5. The company may give up the opportunity to decide to whom credit may be given.

Example 5 Ewden (exam standard)

Ewden plc 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 cashflow. Ewden's accounts for the past two years are summarised below.

Profit and loss account for the year ended 31 December

	20X2	*20X3*
	$000	$000
Sales	12,000	16,000
Cost of sales	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

Balance sheet as at 31 December

	20X2		*20X3*	
	$000	$000	$000	$000
Fixed assets (net)		9,000		12,000
Current assets				
Stock	1,400		2,200	
Debtors	1,600		2,600	
Cash	1,500		100	
		4,500		4,900
Current liabilities				
Overdraft	–		200	
Trade creditors	1,500		2,000	
Other creditors	500		200	
		(2,000)		(2,400)
10% loan stock		(2,000)		(2,000)
Net assets		9,500		12,500

Capital and reserves		
Ordinary shares (50p)	3,000	3,000
Profit and loss account	6,500	9,500
	9,500	12,500

In order to speed up collection from debtors, Ewden is considering two alternative policies. One option is to offer a 2 per cent discount to customers who settle within 10 days of dispatch of invoices rather than the normal 30 days offered. It is estimated that 50 per cent of customers would take advantage of this offer. Alternatively Ewden can utilise the services of a factor. The factor will operate on a service-only basis, administering and collecting payment from Ewden's customers. This is expected to generate administrative savings of $100,000 per annum and, it is hoped, will also shorten the debtor days to an average of 45. The factor will make a service charge of 1.5 per cent of Ewden's turnover. Ewden can borrow from its bankers at an interest rate of 18 per cent per annum.

Required:

(a) Identify the reasons for the sharp decline in Ewden's liquidity and assess the extent to which the company can be said to be exhibiting the problem of 'overtrading'.

Illustrate your answer by reference to key performance and liquidity ratios computed from Ewden's accounts. (13 marks)

(b) Determine the relative costs and benefits of the two methods of reducing debtors, and recommend an appropriate policy. (7 marks)

(20 marks)

Annualised cost of a cash discount

The balance of the difference in the amount of debt collected or paid and the time value of money.

Example 6

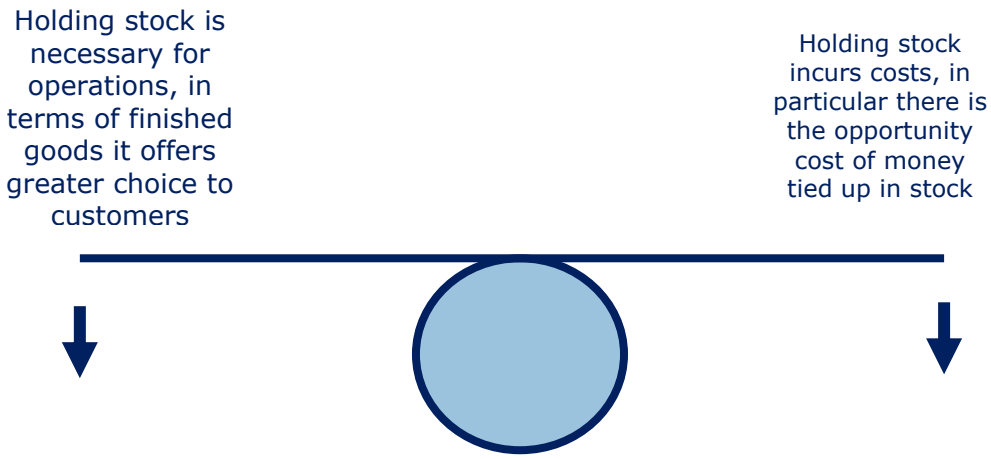
We offer a cash discount of 2% for payment over 10 days rather than the normal 60 days.

Required:

(a) What is the annualized cost of the cash discount?

(b) If the overdraft rate is 10% should we take offer the discount?

MANAGING INVENTORY



Material costs

Material costs are a major part of a company's costs and need to be carefully controlled. There are 4 types of cost associated with stock:

1. ordering costs,
2. holding costs,
3. stockout costs,
4. purchase cost.

Ordering costs

The clerical, administrative and accounting costs of placing an order. They are usually assumed to be independent of the size of the order.

Holding costs

Holding costs include items such as:

1. Opportunity cost of the investment in stock
2. Storage costs
3. Insurance costs
4. Deterioration.

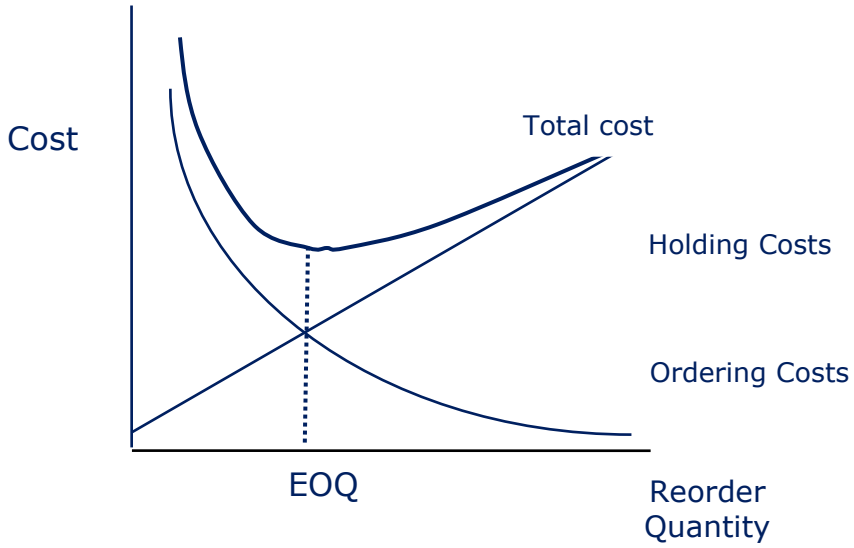
Stockout costs

1. Lost contribution through loss of sale;
2. Lost future contribution through loss of customer;
3. The cost of emergency orders of materials;
4. The cost of production stoppages.

Economic order quantity

When the reorder quantity is chosen so that the total cost of holding and ordering is minimized, it is known as the economic order quantity or EOQ.

As the size of the order increases, the average stock held increases and holding costs will also tend to increase. Similarly as the order size increases the number of orders needed decreases and so the ordering costs fall. The EOQ determines the optimum combination.



Example 7

A company requires 10,000 units of material X per month. The cost per order is $30 regardless of the size of the order. The holding costs are $20 per unit per annum. It is only possible to buy the stock in quantities of 400, 500, 600 or 700 units at one time.

Required:

What is the cheapest option?

Using the formula

$$Q = \sqrt{\frac{2Co.D}{Ch}}$$

Co = Cost per order

D = Annual demand

Ch = Cost of holding one unit for one year.

Example 7 contd

Required:

Calculate the economic order quantity using the formula given.

Bulk purchase discounts

Now there are two possible points of minima. The sum of the holding and ordering costs are minimised at the EOQ. There will however be savings in the purchase cost when the bulk discount volume is taken.

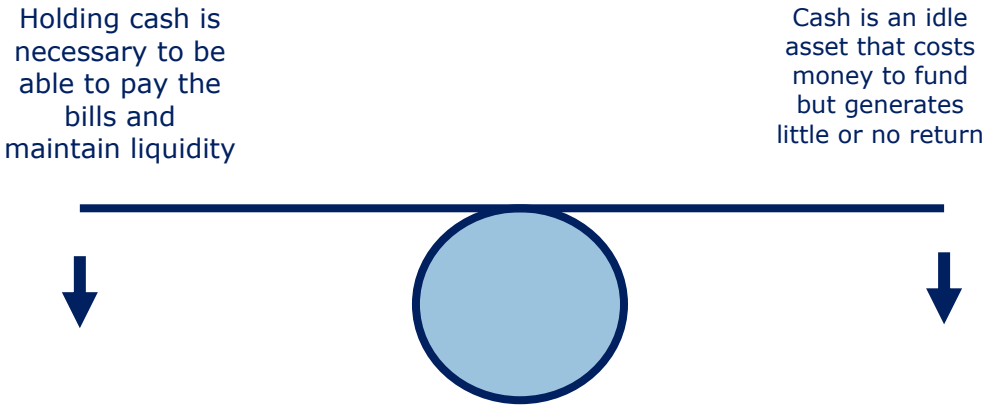
Example 8

Annual demand is 120,000 units. Ordering costs are $30 per order and holding costs are $20/unit/annum. The material can normally be purchased for $10/unit, but if 1,000 units are bought at one time they can be bought for $9,800. If 5,000 units are bought at one time, they can be bought for $47,500.

Required:

What reorder quantity would minimize the total cost?

CASH MANAGEMENT

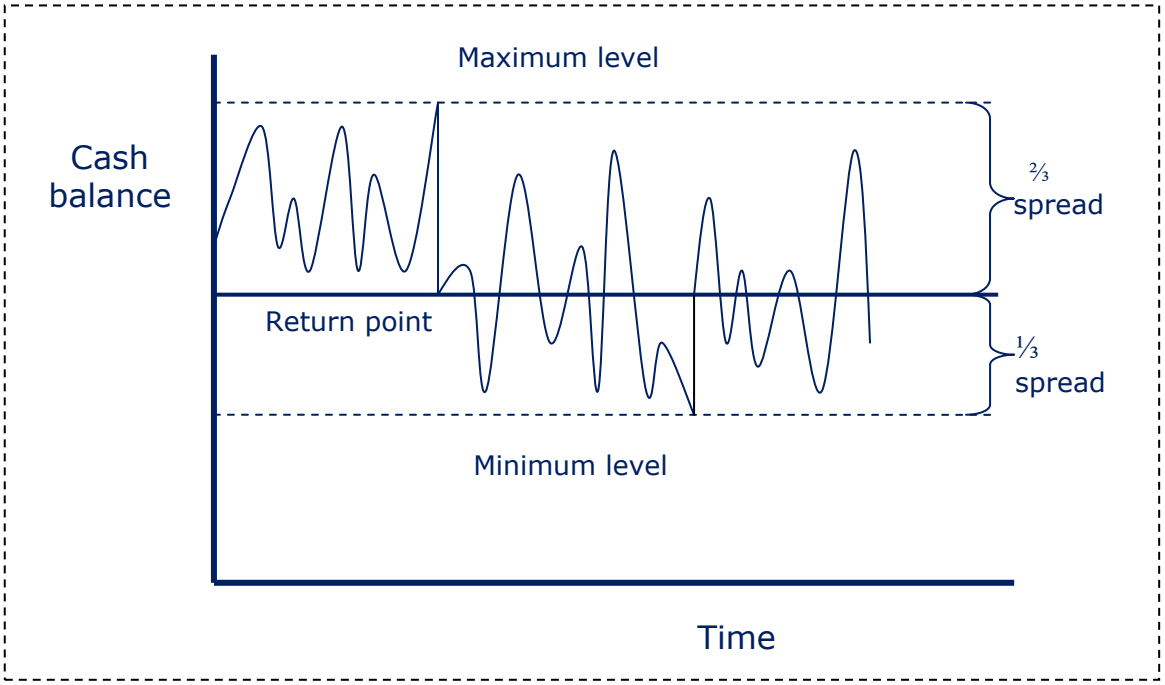


There are three areas associated with managing cash:

1. The Miller-Orr Model
2. The Baumol Model
3. The Cash Budget.

The Miller-Orr model

A model that considers the level of cash that should be held by a company in an environment of uncertainty. The decision rules are simplified to two control levels in order that the management of the cash balance can be delegated to a junior manager.



The model allows us to calculate the spread. Given that we have the spread all key control levels can be calculated.

Minimum level – given in the question

Maximum level = minimum level + spread

Return point = minimum level + ⅓ spread

Example 9

The minimum level of cash is $25,000. The variance of the cash flows is $250,000. The transaction cost for both investing and en-cashing funds is $50. The interest rate per day is 0.05%.

Required:

Calculate the:

(a) spread

(b) maximum level

(c) return point.

The Baumol model

The use of the EOQ model to manage cash.

$$Q = \sqrt{\frac{2Co.D}{Ch}}$$

Co = Transaction cost of investing/ en-cashing a security

D = Excess cash available to invest in short-term securities

Ch = Opportunity cost of holding cash

Example 10

A company generates $5,000 per month excess cash. The interest rate it can expect to earn on its investment is 6% per annum. The transaction costs associated with each separate investment of funds is constant at $50.

Required:

(a) What is the optimum amount of cash to be invested in each transaction?

(b) How many transactions will arise each year?

(c) What is the cost of making those transactions per annum?

Cash budget

A budget prepared on a monthly basis (at least) to ensure that the company has an understanding of its cash position going forward. There are 3 considerations:

1. **Inflow and outflows of cash**
2. **Ignore non cash flows**
3. **Pro forma led**

Example 11

Cash flow forecasts from the current date are as follows:

($000)	Month 1	Month 2	Month 3
Cash operating receipts	6,530	5,300	4,300
Cash operating payments	5,040	4,750	4,600
Interest payable on traded bonds		200	
Capital expenditure			1,000

The company currently has an overdraft balance of $2,000,000

The director has completed a review of accounts receivable management and has proposed staff training and operating procedure improvements, which he believes will reduce accounts receivable days by 18 days. This reduction would take four months to achieve from the current date, with an equal reduction in each month.

Overdraft interest is payable at a rate of 0.5% per month, with payments being made each month based on the opening balance at the start of that month. Credit sales for the year to the current date were $60,500,000 and cost of sales was $42,320,000. These levels of credit sales and cost of sales are expected to be maintained in the coming year. Assume that there are 365 working days in each year.

Required:

Calculate:

(a) the bank balance in three months' time if no action is taken; and

(b) the bank balance in three months' time if the director's proposal is implemented.

Example 12

Kool Co has annual sales revenue of $7 million and all sales are on 30 days' credit, although customers on average take fifteen days more than this to pay. Contribution represents 55% of sales and the company currently has no bad debts. Accounts receivable are financed by an overdraft at an annual interest rate of 8%.

Kool Co plans to offer an early settlement discount of 1.4% for payment within 20 days and to extend the maximum credit offered to 65 days.

The company expects that these changes will increase annual credit sales by 8%, while also leading to additional variable costs equal to 0.5% of turnover. The discount is expected to be taken by 35% of customers, with the remaining customers taking an average of 65 days to pay.

Required:

(a) **Evaluate whether the proposed changes in credit policy will increase the profitability of Kool Co.** (6 marks)

(b) Tiger Co, a subsidiary of Kool Co, has set a minimum cash account balance of $2,000. The average cost to the company of making deposits or selling investments is $50 per transaction and the standard deviation of its cash flows was $1,000 per day during the last year. The average interest rate on investments is 9.125%.

Determine the spread, the upper limit and the return point for the cash account of Tiger Co using the Miller-Orr model and explain the relevance of these values for the cash management of the company. (6 marks)

(c) **Identify and explain the key areas of accounts receivable management.** (6 marks)

(d) **Discuss the key factors to be considered when formulating a working capital funding policy.** (7 marks)

(25 marks)