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Lecture 1

CAPITAL INVESTMENT APPRAISAL

1 Introduction

Capital investment is a key element in financial management and a thorough understanding of the techniques of investment appraisal is very important. Textbooks compare *Non discounted cash flow methods* (namely payback and ARR) with the *discounted cash flow methods* (namely NPV and IRR), concluding that NPV is the best!

2. Non Discounted Cash Flows (DCF) methods

(a) Accounting rate of Return (ARR)

Accounting rate of return (also called the return on investment -ROI) is calculated as:

$$\frac{\text{Profit}}{\text{Capital}}$$

but whether profit is before or after interest charges and whether investment is the initial outlay or averaged over the life of the project is unclear, a weakness of definition of profit and capital!

However, this ratio is normally calculated using the company's published accounts, so one would expect ARR be calculated base on the accounting standards definition of profit and capital, and is normally:

$$\frac{\text{Profit}}{\text{Average (written down) Investment}}$$

OR, if we were to measure management's performance, the ratio would be:

$$\frac{\text{Profit before interest and tax}}{\text{average (total) capital employed}}$$

OR, measuring return to shareholders the ratio would be:

$$\frac{\text{Profit after interest and tax}}{\text{shareholders funds (equity)}}$$

In exam, pay attention to the definition of the ratio given in the question!!

Illustration

Beta company wished to evaluate an investment proposal using the ROCE techniques. The project requires an initial capital expenditure of $10,000 with $3,000 of working capital. The project will have four years life, at the end of which working capital will be fully recovered, the project has scrap value $2,000.

The project net of pre- tax cash flows are as follows:

Year	Net cash flow
1	$4000
2	6000
3	3500
4	1500

Depreciation is calculated base on straight line method.

Required

Calculate the ROCE using average profit divided by
(i) initial capital: and
(ii) average capital

Solution

Given the cash flow in the question, the first thing to do is to convert the cash flow into profit by adjusting non cash cost such as depreciation and provision to derive at profit.

$$\text{Depreciation p.a.} = \frac{\text{Cost - scrap value}}{\text{Project life}}$$

$$= \frac{\$10,000 - \$2,000}{4 \text{ years}} = \$2,000$$

Year	Net Cash flow	Net Profit
1	$4,000	$2,000
2	6,000	4,000
3	3,500	1,500
4	1,500	(500)

(i) ARR (based on initial capital) $= \frac{\text{Average profit}}{\text{Initial capital}}$

$$= \frac{\$1750}{\$10,000 + \$3,000} \times 100 = 13.5\%$$

(ii) ARR (based on average capital) = $\frac{\text{Average profit}}{\text{Average capital}}$

= $\frac{\$1750}{\$6,000^* + \$3,000} \times 100 = 19.4\%$

* Average capital for Fixed capital = (Opening capital (cost) + Closing capital (scrap value)) /2
= ($10,000 + $2,000) / 2 = $6,000

Weaknesses of ARR

- It ignores the cost of capital tied up in the project by not discounting the cash flows.
- The use of profit in decision making may include a lot of irrelevant cost such as depreciation and general fixed cost but ignore opportunity cost
- Profit is always subject to accounting manipulation

Though there may be many weaknesses associated with this method, it is still one of the most commonly used method due to its utilisation of the balance sheet and P/L account magnitudes familiar to managers, namely profit and capital employed. It is not surprising that some managers may be happiest 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. Afterall, most companies bonus payment is based on ROCE achieved.

(b) Payback Method

This method determine how long will a project "payback" its the initial investment. Payback concentrates on *cash flow* instead of on profit. In this aspect, payback is superior to accounting rate of return. This is suitable for evaluating projects with uncertain duration and/with high research and development cost, which need to recovered as soon as possible.

Illustration

Ajax plc is considering the purchase of a sausage machine. The machine would cost $12,000, has an expected life of five years with zero scrap value. In addition, an expenditure of $8,000 on working capital will be needed throughout the project life. The accountant have estimated the net after tax operating cash flow of the project as follows:

Year	Operating cash flow
1	$6,000
2	6,000
3	6,000
4	4,000
5	3,000

Ajax evaluates investment opportunities using three year max payback criteria.

Required

Evaluate whether the project is worthwhile using:

(i) Payback method
(ii) Discounted payback (use cost of capital 10%)

Solution

Initial cost:	$
Fixed capital	(12,000)
Working capital	(8,000)
	20,000

	(i) Payback (20,000)	DF 10% 1	(ii) Discounted payback (20,000)
Net cash flow			
Yr 1	6000	0.909	5454
	(14,000)		(14,546)
Yr 2	6000	0.826	4956
	(8000)		(9590)
Yr 3	6000	0.751	4506
	(2000)		(5084)
Yr 4	4000	0.683	2732
			(2352)
Yr 5		(11,000* x 0.621)	6831
Payback period :	3.5 years		4.3 years

* Cash flow $3,000 + working capital recovered $8,000

Weaknesses of payback

- All cash flows within the payback period are given equal weight (non-discounting)
- Cash flows outside the payback period are ignored
- Only concern with recovering of capital and not profitability.

Despite of these weaknesses, it is used extensively in practice!

Its simplicity probably explains its popularity:

- Decision-makers understand information presented to them
- Calculations are straightforward and likely to be error free

3 Discounted Cash Flows (DCF) methods

(a) Net Present Value (NPV) method

Net present value is just the present value of all cash flows, discounting using cost of capital. Cost of capital is simply the opportunity cost of using the company source of finance in the project, or simply the expected rate of return an investor required for him to invest his fund in the project. If the project NPV is positive, that means the project return is higher than the expected required return by investors and as such the project should be accepted. This positive NPV project is said to have increased the investors wealth in the company. On the other hand, project should be rejected if the NPV is negative.

However, decision maker will be interested not only in the final NPV payoff but also the size of the initial investment and the length in time of the projects. For example, if project A's NPV is the same as project's B NPV, but project A needs £10,000 capital and its life is 5 years, project B needs £100,000 capital and its life is 10 years, obviously a rational investor will prefer project A.

Benefits of NPV methods

* Its rule takes into account the time value of money of cost of capital in evaluating project.
* It has a direct impact on companies share prices. When a company accepts project with positive NPV, the share price of the company normally rises and vice versa for negative NPV project. Thus, NPV method helps to increase shareholders wealth.
* It uses relevant cash flows in it's project evaluation, thus not affected by accounting profit manipulation problem.
* It is perhaps the most sensible method of appraisal among all methods.

Weaknesses with NPV include:

* It assumes that firms pursue an objective of maximising the wealth of their shareholders. This is questionable given the wider range of stakeholders who might have conflicting interests to those of the shareholders.
* It is largely redundant if organisations are not wealth maximising. For example, public sector organisations may wish to invest in capital assets but will use non-profit objectives as part of their assessment.
* It is potentially a difficult method to apply in context of having to estimate what is the correct discount rate to use. This is particularly so when questions arise as to the incorporation of risk premium in the discount rate since an evaluation of the riskiness of the business, or of the potential project in particular, will have to be made and which may be difficult to discern. Alternative approaches to risk analysis, such as sensitivity and decision trees, are themselves, subject to fairly severe limitations.
* It can most easily cope with cash flows arising at period ends and is not a technique that is used easily when complicated, mid-period cash flows are present.

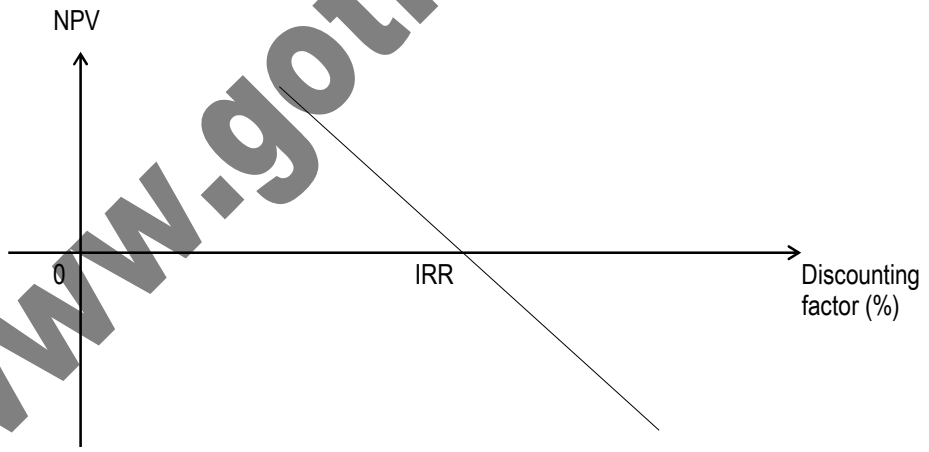
* NPV is not universally employed, especially in a small business environment. The available evidence suggests that businesses assess projects in a variety of ways (payback, IRR, accounting rate of return). The fact that such methods are used which are theoretically inferior to NPV calls into question the practical benefits of NPV and therefore hints at certain practical limitations.

The conclusion from NPV analysis is the present value of the surplus cash generated from a project. If reported profits are important to a business then it is possible that there may be a conflict between undertaking a positive NPV project and potentially adverse consequences on reported profits. This will particularly be the case for projects with long horizons, large initial investment and very delayed cash inflows. In such circumstances, businesses may prefer to use accounting measures of investment appraisal.

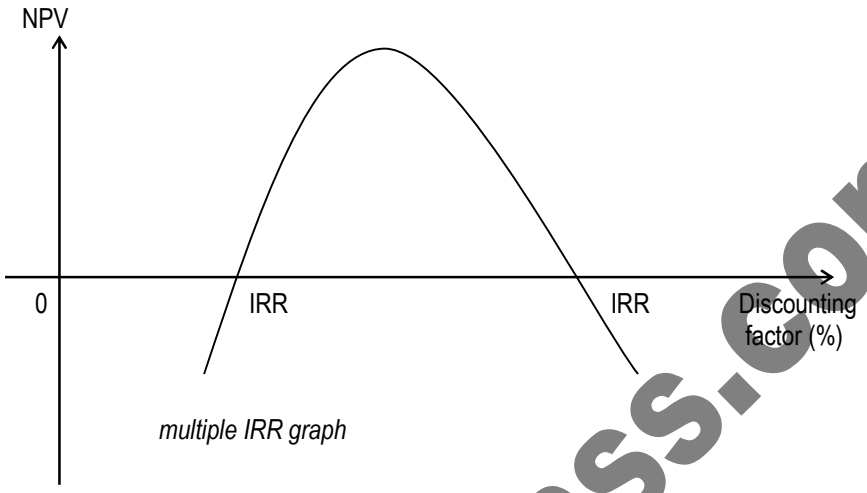
(b) Internal rate of return (IRR)

IRR is defined as the discount rate which results in *zero NPV* for a particular project. The decision rule now become--- accept the project if its IRR is greater than the cost of capital, reject the project if the IRR is less than the cost of capital. However, in more complex situations, NPV and IRR can lead to different conclusion and IRR normally receive bad press for a number of reasons:

- The computation of IRR is complex and involve trial and error!
- There may be *multiple IRR*. For normal type of projects where there is initial cash outflows follow by net cash inflows throughout the life of the projects, NPV of the project behave as what shown below, and thus only single IRR exist.



However, for unconventional cash flows (an initial cash outflows followed by inflows and subsequently another high cash outflows) multiple IRR may arise.....see graph below. In this situation, we will have a problem in deciding which IRR to follow.



multiple IRR graph

- In IRR calculations, any future cash inflows that occur during the project are assumed to be reinvested elsewhere in the market at the IRR. Obviously, different projects will have different IRR and thus such assumption is unrealistic! The NPV computation assumes reinvestment at the discount rate (or the company cost of capital).

- IRR is not suitable in the selection of mutually exclusive projects. IRR , given its definition as a discount rate when NPV equal to zero is simply a measure of break-even point . Selection of projects will have to be base on profitability (thus, NPV) and not just break even point! Besides, IRR can results in inconsistent decisions where multiple IRRs exist.

Yet, with all the criticism, IRR is more commonly used in practice than NPV. This implies that managers feel more comfortable with it. They prefer dealing with %, that is, they understand `project V has an IRR of 27%, which is in excess of the required return of 10% better than project v has a positive NPV of $22.25 when discounted at 10%.

Illustration

Parabiotic plc is involved in making a decision between a pair of mutually exclusive projects, X and Y. The cash flows of the two projects are as follows:

Year	Project X	Project Y
	$000	$000
0	(1,000)	(450)
1	400	300
2	600	150
3	187	106

Given the risk involved, it is judged that 6% would be an appropriate NPV discount rate and IRR hurdle rate.

Required

Advise the company on which project should they go for using:
(i) NPV; and
(ii) IRR

Solution

(i) NPV method

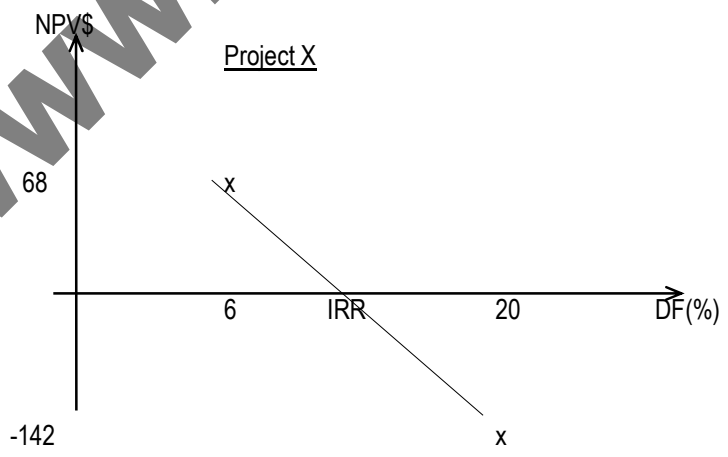
Yr	Cash flow		DF6%	Present value	
	Project X	Project Y		Project X	Project Y
0	$(1000)	$(450)	1	$(1000)	$(450)
1	400	300	0.943	377	283
2	600	150	0.890	534	134
3	187	106	0.840	157	89
			NPV	68	56

Using NPV decision for mutually exclusive projects, project X is preferred to project Y since it has larger positive NPV.

(ii) IRR method

Two approaches are may be used

Approach 1: Graphical approach: we need to determine (by trial & error) two different discounting factor which produces two different NPV, one positive & one negative.



By interpolation :
Project X IRR = 10.5%
Project Y IRR = 14.6% (same approach as for project X)

Approach 2: By linear interpolation:

Project X : $6\% + \frac{68}{68 - (-142)} \times (20\%-6\%) = 10.5\%$

Project Y : $6\% + \frac{56}{56 - (-35)} \times (20\%-6\%) = 14.6\%$

Using IRR approach, project Y should be selected (for mutually exclusive projects) as it has the higher IRR. **Thus, there is a conflict between NPV and IRR decision rule.....in all cases, for mutually exclusive projects , if conflict occurs between NPV and IRR, follow the NPV decision rule,** for reasons below.

Why is NPV the preferred method?

NPV is perhaps the most sound method to use in investment appraisal and selection as it allows the comparison be made between projects with different size and length of time, by comparing the profitability index (to be covered in later part of the topic) . Since the cash flows are discounted at the required rate of return for an investor , any positive NPV project will increase the wealth of the shareholders.....(the main objective of FM is to maximise shareholders wealth!); provided sufficient resources are available.

NPV – Relevant Cash Flows

Relevant cash flows are cash flows to be included in the NPV calculations. Three conditions are needed to find the relevant cash flows for a project.

(i) Cash flow - all relevant items must be cash flows; non cash flows like depreciation and provision are excluded. The cash flows should also be the cash flows payable *outside* the company for a group of companies. Internal transfer prices & costs are irrelevant for company's decision making.

(ii) Future - expected cash flows must also be incurred in some future period; past cash flows should be excluded.

(iii) Incremental - relevant cash flows must be that which change between alternative decision. As such all head office costs / general costs which is apportioned / allocated / absorbed by departments is irrelevant in departmental decision.

Note:
In computing the relevant cash flows for investment project, **ignore all financing costs** (interest charges, loan repayments, dividends) and all their tax effects (eg, tax relief on interest). This is because these are all implicitly taken into account through discounting process.

NPV – Handling Inflation

Capital budgeting involves estimation of cash flows over few years ahead. For such a long period of time, inflation cannot be ignored.

Two possible approaches:

1. Discount money cash flows with money cost of capital,....money cash flows mean the cash flow after incorporating inflation i.e. future cash flow at future price and money cost of capital is the cost of capital incorporating inflation rate...**OR**

2. Discount real cash flows with real cost of capital,.....real cash flows and real cost of capital refer to the cash flow and cost of capital excluding inflation , i.e. at today's price index (or current prices).

Note: whenever possible, use first approach

Illustration

Rhotachine plc wishes to evaluate a project. The company has taken great care to estimate how future rates of inflation will affect the prices charged for the projects output (and hence its revenue) and how inflation will affect the costs incurred in generating those revenue. The project's actual money cash flows have been estimated as:

Year	Cash flow
0	$ (1000)
1	800
2	600

The company believes that a 15.5% (money rate) return is available elsewhere on capital market for a similar risk project (i.e. market rate of return) and the inflation rate is 5% p.a. over the next two years.

Required

Calculate the NPV using:

(i) Money cash flow and money cost of capital; and
(ii) Real cash flow and real cost of capital

Solution

Since the question says `.....actual money cash flows have been estimated.....' implies the cash flow given in question is money cash flow. Sometimes question may use the phase`.....future cash flow.....' or`..... cash flow after adjusted for inflation.....' they all means money cash flow.

(i) Using money cash flow:

Yr	Money cash flow	Money DF 15.5%	Present value
0	$(1000)	1	$(1000)
1	800	0.8658	692.64
2	600	0.7496	449.76
		NPV	142.40

(ii) Using real cash flow:

Yr	Real cash flow	Real DF 10% %	Present value
0	$(1,000)	1	$(1,000)
1	761.92	0.9091	692.67
2	544.20	0.8264	449.73
		NPV	142.40

Workings

The real discount rate is found by using fisher formula:

$(1+i) = (1+r)(1+h)$ *where* i = *money rate*, r = *real rate*, h = *inflation rate*

The real discount rate = $(1+ i)/(1+ h) - 1$
$= (1+ 0.155)/ (1+ 0.05) - 1$
$= 0.1$ or 10%

The real cash flow is found by discounting the money cash flow with inflation rate 5%, on compounding basis.

Note that both methods should produced identical NPV

NPV – Handling tax

If tax is not specifically referred to in a question, despite its fundamental importance to most investment decisions, it should be ignored.

If tax is to be taken into account, but the question is silent on the details, assume:

1. tax is payable one year in arrear
2. fixed asset receive 25% WDA on reducing balance basis
3. there are sufficient profits (from other operations) to absorb all capital allowances.
4. the sale of asset will give rise to balancing allowances or balancing charge.

Illustration

A machine costs $1,000 and has a four-year life, at the end of which time it will be sold for $400 scrap. The corporation tax is 35%, payable 12 months in arrears and a system of 25% WDA, on reducing balance, is in operation.

Required

Compute the tax relief applicable to the new machine.

Assume the machine is bought:
(i) On the last day of previous accounting year
(ii) On the first day of the accounting year.

Solution

It is important to identify from the question when is the asset bought: .....first day of new accounting period (beginning of year 1) or last day of previous accounting period, as this will affect the timing of relief of CA from the taxation point of view.

(i) Assumes asset bought on the last day of previous accounting year:

	0	1	2	3	4	5
Cost	(1,000)				400	
WDA	250	188	141	105	(84)	
Balance	750	562	421	316	-	
Tax relief		88	66	49	37	(29)

(ii) Assumes asset bought on the first day of the accounting year:

	0	1	2	3	4	5
Cost	(1,000)				400	
WDA		250	188	141	21	
Balance		750	562	421	-	
Tax relief			88	66	49	7

Illustration

Stanchion plc is considering investing in a project which will require a capital expenditure outlay of $250,000. It will have four-year life, at the end of that time, the equipment will be sold off for $100,000.

In addition, $38,000 of working capital will be required from the start of the project, and this figure will have to be increased to $50,000 at the end of the first year. All the working capital will be recovered at the end of the project's life.

The project is expected to generate annual revenues of $200,000 and to incur annual cash operating costs of $80,000. The company believes that an after tax discount rate of 10% would be appropriate.

The project would be bought on the last day of the company's previous financial year and would be financed with a three year term loan of $250,000 at 3% over bank base rate. Bank base rate is currently 12%. The working capital would be financed out of Stanchion's own retained earnings.

Corporation tax is 35%, payable twelve months in arrears. 25% WDA on reducing balance basis are available on capital expenditure.

Required

Compute the NPV of the project.

Solution

			$'000			
Year	0	1	2	3	4	5
Revenues		200	200	200	200	
Costs		(80)	(80)	(80)	(80)	
Pre-tax operating CF		120	120	120	120	
Taxation:35%			(42)	(42)	(42)	(42)
Equipment	(250)				100	
Tax relief on WDA		22	16	12	9	(7)
Working Capital	(38)	(12)			50	
Net cash flow	(288)	130	94	90	237	(49)
DF 10%	1	0.909	0.826	0.751	0.683	0.621
Present value	(288)	118	78	68	162	(30)
NPV	$108,000					

Tax relief on WDA

	0	1	2	3	4	5
Cost	(250)				100	
WDA	63	47	35	26	(21)	
Balance	187	140	105	79	-	
Tax relief		22	16	12	9	(7)

Lecture 2

CAPITAL RATIONING

1 Introduction

Capital rationing refers to situation where the firm's finance is limited (scarce resource is capital) so that it cannot invest in all the positive NPV projects available.

Two reasons for capital rationing:

(i) Hard (External) Capital rationing:

- Inability to borrow
  - Bank unwilling to lend because of poor past performance or lack of asset backing
  - Interest rate too high
  - Government policies (eg. credit policy & Interest rate policy)
- Shareholders reluctant to subscribe new shares
- Any other reasons of fund shortage arise from outside the company

(ii) Soft (Internal) Capital rationing

- Lack of good advance planning results in sudden shortage of fund
- Cash limits imposed by management(head office)
- Any other reasons arise internally

Two types of capital rationing:

(i) Single period rationing
(ii) Multi-period rationing

2 Single Period Rationing

This refers to the capital is limited for one period only (eg. one year) . If the projects to be selected are divisible, the basic rule of contribution per limiting factor can be applied. This is done by using **profitability index (PI)**

$$PI = \frac{\text{project NPV (not include capital investment)}}{\text{PV of outlay in year of shortage}}$$

If the projects are non-divisible, we have no choice but just select the optimum project(s) by trial &error. (see practice question behind)

Note: If the projects are mutually exclusive, you can only select one of them (non-divisible)

Illustration

Bamboo Ltd has four projects available which are fully divisible, the fund available now is limited to $300. Select the best combination of projects.

project	Initial outlay	NPV	PI	Ranking
A	$100	$80	0.8	2
B	60	50	0.83	1
C	70	35	0.5	3
D	200	96	0.48	4

Allocation of projects:

Funds available		$300
Allocate to :	B	(60)
		240
	A	(100)
		140
	C	(70)
		70
	D	(70)

Disadvantages of Profitability Index (PI)

- Only applicable on divisible projects
- Selection method is too simple
- Limited use of projects with differing cash flow patterns
- Without consideration of project absolute size

3 Single Period Rationing with Non-divisible Projects

Projects are non-divisible then the method mentioned above is not applicable. Another way to deal with this situation is to use trial and error and test the NPV available from different combinations of projects.

Illustration

Nottingham Ltd has capital of $950,000 for investment. There are three projects, P, Q and R, for consideration. The company wants to invest in whole projects, but surplus funds can be invested. If cost of capital is 20%, which combination of projects give the highest NPV?:

Investment Project	Investment required $000	PV of inflows at 20% $000
P	400	565
Q	500	670
R	300	488

Possible investment combinations for pairs of P, Q and R are as follows:

Projects	Required investment $000	PV of inflows $000	NPV from projects $000
P and Q	900	1,235	335
P and R	700	1,053	353
Q and R	800	1,158	358

As combination of Q and R provides the highest NPV, it is suggested to invest $800,000 in these projects and the unused funds invest externally.

Lecture 3

FINANCING DECISION AND REPLACEMENT POLICY

1 Introduction

This lecture covers two main areas, ie financing, which will consider lease vs buy decision, followed by asset replacement policy or optimal replacement period.

2 Lease vs Buy

Leases are contractual agreements between a lessor (the owner) and a lessee (the user) governing the use of assets. The decision to be made here is either to lease an asset or to borrow money and buy the asset. Financial accounting distinguishes two types of leases, namely, **financial lease** and **operating lease** based on the interpretation of IFRS16. The key accounting phase is that a finance lease transfers substantially all rewards and risks of ownership to the lessee. Thus, the finance leases tend to be longer term to pass on to the lessee most of the asset's rewards (the asset is usually leased once) as well as transferring most of its risks such as maintenance, insurance and repair costs and even the burden of eventually selling the assets (that is the risk of selling).

Note: IFRS16 eliminates the classification of lease are either operating lease or financing lease. But lessors continue to classify them differently.

3 Types of leases

Finance leases are usually split into two parts:

(i) the **primary period,** during which time the lessor will require regular installments to be paid to provide a required return. During this time the lease is either non-cancelable, or there will be high penalties if the lessee cancels - the lessor does not want the asset back!!

(ii) the **secondary period,** once the primary period expires, some finance leases offer the right to buy the asset or to continue leasing it at a nominal or `**peppercorn rent'.**

Operating leases, on the other hand, tend to be short term, such as leasing a car or machine for a couple of weeks only. The leasor will lease the asset many times and needs many leases to earn a worthwhile return. In addition it is the lessor who will be responsible for the actual sale of the asset; alone with all other risks such as maintenance and insurance.

Neither lease transfers legal title to the lessee.

Summary differences between finance lease and operating lease:

Finance lease	Operating lease
One lease exists for the whole useful life of the asset	Several leases exist for the asset useful life
The lessor does not retain the risks or rewards of ownership.	The lessor normally carries out repairs & maintenance
Lease agreement cannot be cancelled	The lease can be cancelled at short notice
The substance of the transaction is the purchase of the asset by the lessee financed by a loan from the lessor	The substance of the transaction is the short-term rental of an asset.

4 An Evaluation

The decision to lease or buy can be made by calculating the NPV of each alternative and choosing the lower cost. The two implications must be considered are:

(a) Purchasing an asset provides the company with capital allowances (eg. 25% p.a. on reducing balance basis)

(b) Leasing an asset is a tax-allowable expenses (eg. saving 33% of the lease payment itself in tax).

SUMMARY OF THE MAIN DIFFERENCE BETWEEN ALTERNATIVE FINANCING METHODS:

Borrow to buy:	Lease	Hire Purchase
1. Own the asset, thus can claim CA	Cannot claim CA as no ownership	Can claim same CA *as if buy the asset by cash*
2. BA/BC arises on disposal	No BA/BC	BA/BC arises on disposal
3. Capital cost incurred (in Yr 0)	Lease payment involved, benefit from tax relief on lease payment	Deposit & Installment payment involved, tax relief *on interest element* of installment
4. Scrap value earned at time of disposal	No scrap value	Scrap value earned at time of disposal

5 Replacement Policy

This technique is used when deciding the best time to replace an asset. For example when is the best time to replace an old machine with a new one? After one year, after two years, after three years or when?

The first task is to establish what the policies are. For example if the maximum life of the machine is four years, there are four replacement policies : to replace every year, every two years, every three years or every four years.

There are two methods, which lead to the same decision:

1. Establish the lowest common multiple of years for the various policies. Compute the NPV for each policy over this number of years. For example, if the machine maximum life is 4 years, the lowest common multiple is 12 years in which time:
   - a machine replaced every year will be replaced 12 times
   - a machine replaced every two years will be replaced 6 times
   - a machine replaced every three years will be replaced 4 times
   - a machine replaced every four years will be replaced 3 times.

2. Examine the NPV of one complete cycle from purchase to sale, for each replacement policy. Divide by the appropriate annuity factor to get the equivalent annual amount. The second method is much easier and leads to the same decision. Thus, the second method is the method to be used in your exam. The first method is just for illustration only!

Both methods make the assumptions that:
1. Whichever replacement period chosen, it will be consistently used.
2. No new models of machine become available with different cost characteristics (i.e. there is no technical innovation, which is totally unrealistic).
3. There is no inflation or if there is, then cost of capital and costs are given in real terms. To handle inflation with money cash flows in this type of example is much more complex.

The relevant cash flows for this type of decision are:
- Original purchase price
- Running costs/Operating costs include maintenance costs which get more expensive each year as the machine gets older
- Resale value, which falls each year.

Illustration

The director of your company are considering the best length of time to keep a series A machine before replacing it. A new machine , which has a maximum life of 4 years, costs $45,800. Other relevant costs and trade in values are shown below:

End of year	1	2	3	4
Operating costs	(19,200)	(20,400)	(21,700)	(23,300)
Maintenance costs	(5,600)	(7,700)	(10,800)	(14,200)
	(24,800)	(28,100)	(32,500)	(37,500)
Resale value, if sold	29,200	20,000	9000	1600
	4,400	(8,100)	(23,500)	(35,900)
Cost of new machine If acquired	(45,800)	(45,800)	(45,800)	(45,800)
	(41,400)	(53,900)	(69,300)	(81,700)

The cost of capital is 10%

Solution:

Policy:					DF	Present value for replacing every			
Replace every	Year	2 years	3 years	4 years	10%	Year	2 years	3 years	4 years
Cashflows:									
End of year									
0	-45,800	-45,800	-45,800	-45,800	1.0000	-45,800	-45,800	-45,800	-45,800
1	-41,400	-24,800	-24,800	-24,800	0.9091	-37637	-22546	-22546	-22546
2	-41,400	-53,900	-28,100	-28,100	0.8264	-34213	-44543	-23222	-23222
3	-41,400	-24,800	-69,300	-32,500	0.7513	-31104	-18632	-52065	-24417
4	-41,400	-53,900	-24,800	-81,700	0.6830	-28276	-36814	-16938	-55801
5	-41,400	-24,800	-28,100	-24,800	0.6209	-25705	-15398	-17447	-15398
6	-41,400	-53,900	-69,300	-28,100	0.5645	-23370	-30427	-39120	-15862
7	-41,400	-24,800	-24,800	-32,500	0.5132	-21246	-12727	-12727	-16679
8	-41,400	-53,900	-28,100	-81,700	0.4665	-19313	-25144	-13109	-38113
9	-41,400	-24,800	-69,300	-24,800	0.4241	-17558	-10518	-29390	-10518
10	-41,400	-53,900	-24,800	-28,100	0.3855	-15960	-20778	-9560	-10833
11	-41,400	-24,800	-28,100	-32,500	0.3505	-14511	-8692	-9849	-11391
12	4400	-8100	-23,500	-35,900	0.3186	1401.84	-2581	-7487	-11438
					NPVs	-313,291	-294,600	-299,261	-302,018

Method 2: Use annual equivalent value (AEV) cashflows

Policy:					DF	Present value for replacing every			
Replace every	Year	2 years	3 years	4 years	10%	Year	2 years	3 years	4 years
Cashflows:									
End of year									
0	-45,800	-45,800	-45,800	-45,800	1.0000	-45,800	-45,800	-45,800	-45,800
1	4400	-24,800	-24,800	-24,800	0.9091	4000	-22,546	-22,546	-22,546
2		-8100	-28,100	-28,100	0.8264		-6694	-23,222	-23,222
3			-23,500	-32,500	0.7513			-17,656	-24,417
4				-35,900	0.683				-24,520
					NPVs	-41,800	-75,040	-109,224	-140,505
					Annuity factor	0.9091	1.7360	2.4870	3.1700
					AEV	-45,980	-43,226	-43,918	-44,323

DECISION: Select Replacement policy of 2 years (lowest NPV/AEV of costs)
AEV is also known as Equivalent Annual Cost (EAC).

Lecture 4

INVESTMENT APPRAISAL UNDER RISK

1 Introduction

As investment appraisal also involves estimation of future cash flows and future happening, element of risk may be incorporated in the decision analysis . There are many different ways in incorporating risk and uncertainty, the most common ways are:

(a) Sensitivity analysis;
(b) Expected value using probabilities;
(a) Decision tree analysis; and
(b) Simulation

2. Sensitivity Analysis

Sensitivity analysis looks at each input variable in turn to calculate how sensitive the NPV is to any change in that variable. The procedures involving the change to an input variable (or even two or more input variables) such as life of the project, capital cost, etc and to observe the effect on the output such as NPV, contribution , etc.

The starting point for a sensitivity analysis is the NPV using the most likely value or best estimate for each key variable. Taking the resulting `base case' NPV as a reference point, the aim is to identify those factors which have the greatest impact on the profitability of the project if their realised values deviate from expectations. This is done by finding the input values required to make NPV = 0. Note : One input is tested at each time.

Problems of sensitivity analysis include:

1. It deals with changes in isolation and tends to ignore interactions between variables
2. It may reveal a critical factors over which managers have no control, thus offering no guide to action.
3. It gives no indication of the likelihood of the variation under consideration. Variations in a factor which are potentially sensitive but have a minimal chance of occurrence provide little cause of concern.

Illustration

C & J Co is considering a project with the following cash flows

Year	Initial Investment	Variable costs	Cash inflows	Net cash
	$000	$000	$000	$000
0	7,000			
1		(2,000)	6,500	4,500
2		(2,000)	6,500	4,500

Cash flows arise from selling 650,000 units at $10 per unit. C & J Co has a cost of capital of 8%.

Required

Measure the sensitivity of the project to changes in initial investment and variable costs.

Solution:

The PVs of the cash flow are as follows.

Year	Discount factor 8%	PV of initial investment	PV of variable costs	PV of cash inflows	PV of net cash flow
		$000	$000	$000	$000
0	1.000	(7,000)			(7,000)
1	0.926		(1,852)	6,019	4,167
2	0.857		(1,714)	5,571	3,857
		(7,000)	(3,566)	11,590	1,024

(a) Initial investment

Sensitivity = (1,024 / 7,000) x 100% = 14.6%

(b) Variable c osts

Sensitivity = (1,024 / 3,566) x 100% = 28.7%

3 Expected NPV and Probabilities

Another way of dealing with the uncertainty of future cash flows is to assign probabilities of occurrence to them, and calculate the expected cash flows and expected NPV. Therefore, in your exam if probabilities are given, just simply calculate the expected cash flow for the variable where probabilities are assigned to, and proceed your answer as usual.

Problems of expected value include:

(a) An investment may be one-off, and expected NPV may never actually occur
(b) Assignment of probabilities to events is highly subjective.
(c) Expected values do not evaluate the range of possible NPV outcomes.
(d) Expected values do not take into account the measurement of risk, unless standard deviation is used.

4 Simulation model

Simulation models apply probability distributions to all of the variables that make up an NPV analysis. The computer is then used to generate random numbers which can be applied to these variables in order to produce a possible NPV..

Limitation of Simulation Model:

1. The need to assign probabilities to variables is difficult.
2. No decision rule is given. Although the expected NPV may be positive, the company may not wish to invest if there is a possibility of a negative NPV arising.
3. As with the capital rationing, the Simulation Model also uses a discount rate which prejudges how risky the project eventually turns out to be in the simulation (the risk-free rate is often used to avoid prejudging risk)
4. Finally, the model and the associated software can be complex and expensive to run.

Lecture 5

WACC/Capital Structures

1 Introduction

In all introductory courses on capital budgeting, we realized that NPV is theoretically superior decision-making rule. To use the NPV rule we need a discount rate in order to obtain present values. The discount rate used is actually the company's cost of capital. We shall first consider the justification for the use of the company's cost of capital in project evaluation and then to the derivation of each component in the make up of the cost of capital. We shall also discuss theories of capital structures on cost of capital.

2 Rationale for Using Cost of Capital

The assumed objective that underlies all conventional wisdom in finance is the need to maximize the wealth of shareholders, or the share price. The price of share depends on the supply and demand. Therefore, we need to stimulate the demand for the share. One way is through our investment decisions; by taking the projects that existing and potential investors want us to take.

Assuming perfect capital market, which implies that all investors are satisfied with the return that they are earning. If not, they would sell their securities, which would result in depressing the price. As the price falls the return rises. This will carry on happening until investors are satisfied with the return they are earning. This cost of capital will be the rate of return existing and potential investors want in order to persuade them to invest in the company's securities. We need now only to find out what the cost of capital is and then only take projects paying a higher return i.e. those projects with a positive NPV when discounted at that rate.

Assume that you are taking the projects that existing and potential investors want you to take. Investors will rush to buy the shares, and share price will rise and achieve the objective.

The entire rationale depends on a simple demand and supply analysis. The critical statement is the one, which says ' find out what this is '. We will now look at ways of calculating the returns that different categories of investors require.

3 Individual Cost of Capital

Capital provided by investors in the company may be classified into equity capital and debt capital. Equity capital consists of all ordinary shares, while debt capital consists of all capital, which commits the company in paying them a fixed amount each period, thus an obligation by the company. Examples of debt capital are debentures (fixed interest payment) and preferred shares (fixed dividend payment).

A The Cost of Equity (r_e)

This is the rate of return that investors require to persuade them to invest in company's ordinary shares. There are two ways of estimating it:

(i) The dividend valuation model

The basic form of the dividend valuation model is:

$$r_e = \frac{D_0(1+g)}{P_0} + g$$

Where,

r_e = cost of equity
D_0 = current dividend
P_0 = ex –dividend share price
g = the expected annual constant rate of dividend growth

Note: current dividend and share price are readily available and need only to estimate "g", with either of the following methods

1 Extrapolation of past growth
2 Retained earnings model: $g = b*r_e$
b = retention rate
r = return on new investment, may be estimated by using ROCE

(ii) The CAPM (refer also to Lecture 6)

$$E(r_e) = R_f + \beta_e(E(r_m) - R_f)$$

Where:

β_e = a suitable equity beta
R_f = risk free rate, usually using treasury bill rate
$E(r_m)$ = market return, use return by well diversified portfolio

Example: Extrapolating past dividend

Given the following past dividend of LPGA Ltd

2010	20c
2011	23c
2012	27c
2013	33c
2014	34c

Estimate the dividend growth rate for LPGA.

Solution:

Let the constant growth rate be g % p.a

$20c (1 + g)^4 = 34c$

solving g = **14.19%**

Example: Retained earnings model

LPGA's current EPS and DPS is 37c and 15c respectively. Return on new investment is approximately 20%.

Estimate the dividend growth rate for the company.

Solution:

b = (37 – 15) / 37 = 0.59

g = 0.59 x 0.2 = **11.8%**

Example: Cost of equity – dividend valuation model

A company is about to pay a dividend of 14c per share and has a current share price of 195c. the expected future growth in dividend is estimated at 12%.

What is the cost of equity?

Solution

D_0 = 14c, g = 12%, P_0 = share price ex-dividend = 195c – 14c = 181c

$$r_e = \frac{14c\ (1.12)}{181c} + 0.12$$

= **0.2066 (20.66%)**

Example: Cost of equity – CAPM

The equity beta of Marshall plc is 1.3, if T-bill is at 8% and market return is 18%. What is the cost of equity for Marshall?

$r_e = 8 + (18 – 8)\ 1.3 = 21\%$

B The Cost of Debt

The cost of debt is the discount rate that make the present value of the loan repayments (interest payment is net of tax) equal to the amount borrowed in the first place i.e. it gives a zero NPV. Two methods for calculating cost of debt $\{r_d(1 – T)\}$, these are:

(i) Interest Valuation Model

Irredeemble/undated debenture: $r_d(1 – T)$, = interest rate (1 – tax rate)

Redeemable/ dated debenture: $r_d(1 – T)$, = **An IRR (after tax) calculation**

(ii) CAPM: if debt beta is given (see next lecture)

Example: Irredeemable/undated debenture

A company issued an 8% irredeemable debentures. What is the cost of debt if debenture is currently price at 105, tax rate = 30%?

Solution
Interest rate = 8/105

$r_d(1-t)$ = 8/105 x (1-0.3) = **5.33%**

Example: Redeemable/dated debenture
Pension plc recently issued a 10 year 5% debenture at a price of 96, what is the cost of debt if tax rate is 30%?

Solution

Approximate $r_d(1 – T)$ by linear interpolation

2% + (17 / (17 – (-36)) x (10% - 2%))

= 4.6%

4 The Weighted Average Cost of Capital (WACC)

This is found by multiplying the costs of the various sources of finance used by the company by their proportion of the total market value of the company.

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

Where:
V_e = market value of equity = share price ex-div X number of shares
V_d = market value of debt = market value of debentures + loan amount

The idea is that this rate is used to calculate the NPV of the project. If the NPV is positive then the project will generate sufficient cash flows to pay to the providers of the capital used to finance it the return that they require and then a bit extra (the NPV). The extra accrues to the ordinary shareholders. This means that the project will pay a return in excess of that which the shareholders require. This will make the company popular, people will rush to buy and the share price will rise.

Limitation of WACC

The entire justification for the use of the current WACC depends on the revealed preference concept i.e. that in a perfect capital market investors are satisfied with the return they are earning.

Any investors willingness to accept a return depends on their perception of the risk they are taking. Change the risk and the required return will also change. We are no longer able to assume that investors are satisfied with the return they are earning and the whole argument for the use of the current WACC collapsed. Thus current WACC is limited to evaluating projects (NPV method) that do not change the risk of the company (business and financial risk) projects which are:

1. Same operating risk(or business risk) as existing projects
2. Financed in the same way as existing projects (gearing same)
3. Finance is not project specific (eg. No subsidy etc)

Example: WACC

The management of Custer plc are trying to decide on a cost of capital to apply to the evaluation of investment projects.

The company has an issued capital of 500,000 ordinary shares, with a current share price of 117c. it has also issued $200,000 of 10% debenture, redeemable in 2 years' time with current price of 105.30.

The ordinary dividend and debenture interest are due to be paid in the near future. The ordinary dividend will be $60,000 this year, and will be 5% more each year for the foreseeable future. What is the cost of capital for Custer plc? Assumed tax rate at 30%

Solution:

V_e = 105c x 500,000 = $525,000, V_d = 95.30% x $200,000 = $190,600

Note: market price of debenture ex-interest = 105.30 – 10 = 95.30 and share price ex-dividend 117c – 12c = 105c (current dividend per share = D_0 = $60,000 /500,000 = 12c)

$$r_e = \frac{D_0 (1+g)}{P_0} + g$$

$$= \frac{12(1.05)}{105} + 0.05 = 0.17 \text{ or } 17\%$$

$r_d(1-T)$: Approximately

$$2\% + \frac{14.4}{(14.4 - (-8.3))} \times (15\% - 2\%)$$

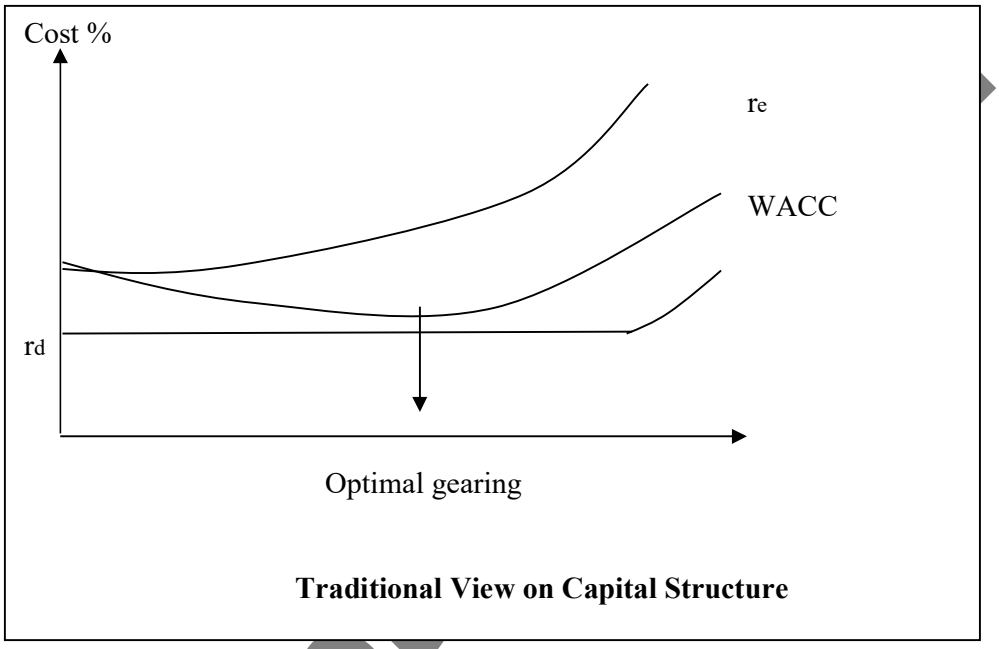
= 0.102 or 10.2%

Cost of capital = 17% x (525/715.6) + 10.2% x (190.6/715.6) = ~15%

5 Capital Structures and WACC

There are two main views concerning the possibilities of reducing the WACC by adjusting the gearing ratio. First the traditional view. The second, more radical view was proposed by Modigliani and Miller (M & M) and will be discussed next, follow by pecking order theory.

A Traditional View



Traditional View on Capital Structure

Traditionalists believe there is an optimal capital structure, or lowest WACC for a business. It assumed that the cost of debt is unaltered as gearing increases. This reflects debt capital's normally being secured on assets so that, as long as a company has some chargeable assets, it does not particularly matter if it has very little net worth: the debt holders have secured their portion of the ownership of the assets on liquidation. But there is probably a critical point, of a business beyond which an additional rate of return will be required to entice investors to take up further debt capital.

Equity holders, on the other hand, are not particularly concerned with low and moderate levels of debt. Thus, when a firm introduces debt into its capital structure – at a lower cost than for equity – WACC falls. At some stage, they realised that financial risk has increased as gearing approaches levels which worry them. They demand a higher rate of return, and these demands increase as gearing increases so that the overall WACC rises.

B Modigliani and Miller View (M & M) / Net Operating Income Approach

The traditional view is that there is an optimal level of debt because equity investors do not require an increased return pro rata with the increasing debt.

The M & M (No tax) supported view is that dividends are still threatened because interest charges diminish otherwise distributable earnings thereby making them riskier whatever the level of gearing. Whatever the source of finance used to buy assets we do not alter the asset risk or the operating income they generate. Understand this point, and you understand much of what M & M (No tax) had to say. The value of a business (and its WACC) is unaffected by its capital structure.

Implications of M & M (No tax)

i. Cost of debt remained unchanged as the level of gearing increase;
ii. The cost of equity rises provided that WACC keeps unchanged

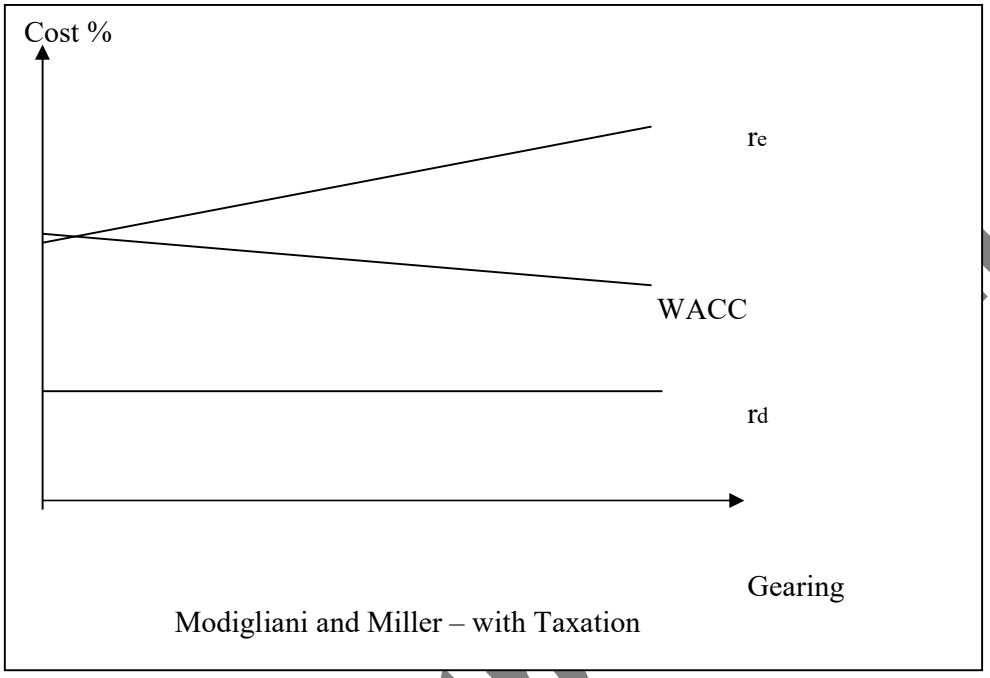
M & M concentrated on capital structure and treated all earnings as distributable otherwise there would have been an interaction between capital structure and dividend theories.

Limitations of M & M

M & M based their theories on the following assumptions:

1. Perfect capital market
2. Investors and corporation can freely borrow/lend at same rate
3. Shareholders are rational
4. No taxation
5. All cash flows are perpetuities and debt is permanent

Effects of Corporation Taxes



Modigliani and Miller – with Taxation

You need to be aware that corporation tax and personal tax affects the company cost of capital and an investor's attitude toward different financial products. The particular tax position of an investor has a profound influence on the relative attractiveness of debt versus equity.

We know that interest payments on debt are allowable for tax purposes. The obvious way that taxation affects the M & M (With tax) theory is that interest charges on debt being allowable for tax makes geared company's WACC less than an ungeared company's.

Effects of personal taxes

The gains from gearing are likely to be much smaller when personal taxes are taken into account. This was explained by Miller in 1997.

C Pecking Order Theory

It is an alternative of traditional theory. It states that firms will prefer retained earnings to any other source of finance, the order of preference is:

1. Retained earnings
2. Debt
3. Convertible debt
4. Preferred shares
5. Equity shares / Ordinary shares

Lecture 6

CAPITAL ASSET PRICING MODEL

1 Introduction

This lecture is one of the most important in the field of finance. It is concerned with market assessment of a fair rate of return from a company given its level of risk (systematic risk) in relation to the market as a whole. The CAPM allows financial managers and others to establish what the market requires as an adequate rate of return from their investment as shareholders.

Whenever an investment is made, for example in the shares of a company listed on a stock market, there is a risk that the actual return on the investment will be different from the expected return. Investors take the risk of an investment will be different from the expected return. Investors take the risk of an investment into account when deciding on the return they wish to receive for making the investment. The CAPM is a method of calculating the return required on an investment, based on an assessment of its risk.

2. Systematic And Unsystematic Risk

If an investor has a portfolio of investments in the shares of a number of different companies, it might be thought that the risk of the portfolio would be the average of the risks of the individual investments. In fact, it has been found that the risk of the portfolio is less than the average of the risks of the individual investments. By diversifying investments in a portfolio, therefore, an investor can reduce the overall level of risk faced.

There is a limit to this risk reduction effect, however, so that even a 'fully diversified' portfolio will not eliminate risk entirely. The risk which cannot be eliminated by portfolio diversification is called 'undiversified risk' or 'systematic risk', since it is the risk that is associated with the financial system. The risk which can be eliminated by portfolio diversification is called 'diversifiable risk', 'unsystematic risk', or 'specific risk', since it is the risk that is associated with individual companies and the shares they have issued. The sum of systematic risk and unsystematic risk is called total risk.

3. The Capital Asset Pricing Model (CAPM)

The CAPM assumes that investors hold fully diversified portfolios. This means that investors are assumed by the CAPM to want a return on an investment based on its systematic risk alone, rather than on its total risk. The measure of risk used in the CAPM, which is called 'beta', is therefore a measure of systematic risk.

The minimum level of return required by investors occurs when the actual return is the same as the expected return, so that there is no risk at all of the return on the investment being different from the expected return. This minimum level of return is called the 'risk-free rate of return'.

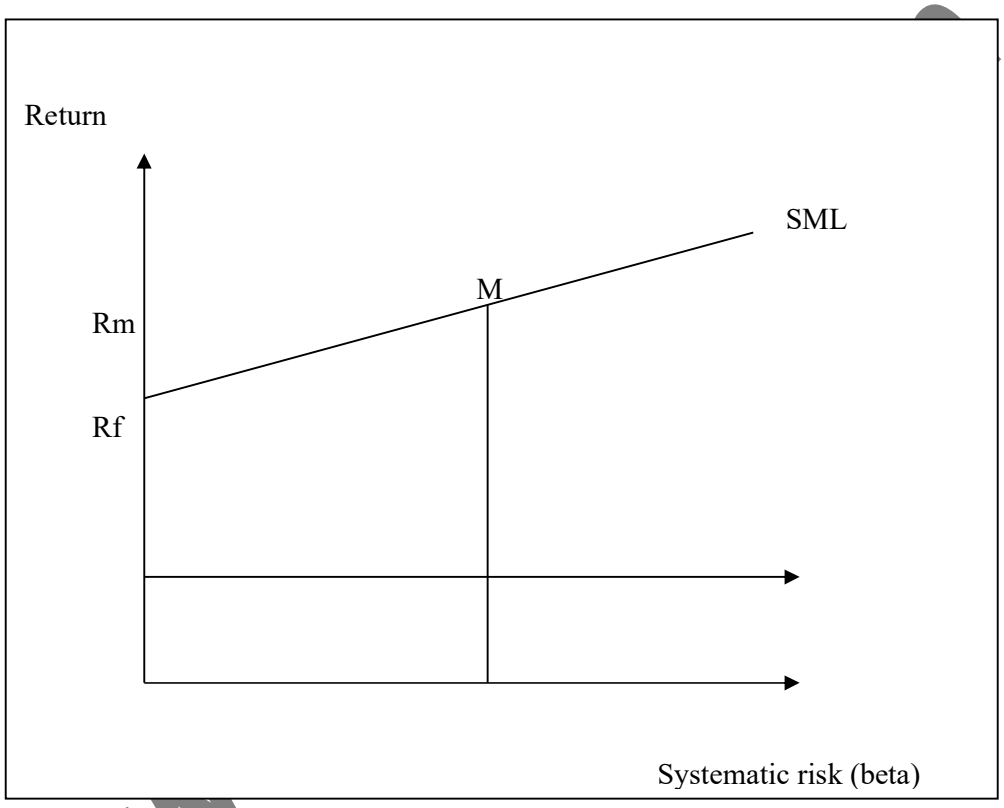
The formula –

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

$E(r_i)$ = return required on financial asset i
R_f = risk-free rate of return
β_i = beta value for financial asset i
$E(r_m)$ = average return on the capital market

This formula expresses the required return on a financial asset as the sum of the risk-free rate of return and a risk premium - $\beta_i(E(r_m) - R_f)$ – which compensates the investor for the systematic risk of the financial asset. If shares are being considered, $E(r_m)$ is the required return of equity investors, usually referred to as the 'cost of equity'.

The formula is that of a straight line, y = a + bx, with β_i as the independent variable, R_f as the intercept with the y axis, $(E(r_m) - R_f)$ as the slope of the line, and $E(r_i)$ as the values being plotted on the straight line. The line itself is called the security market line (SML).



In order to use the CAPM, investors need to have values for the variables contained in the model.

4. CAPM Assumptions

The CAPM is often criticized as being unrealistic because of the assumptions on which it is based, so it is important to be aware of these assumptions and the reasons why they are criticized. The assumptions are as follows:

i. Investors hold diversified portfolios: Investors will only require a return for the systematic risk of their portfolios;
ii. Single-period transaction horizon
iii. Investors can borrow and lend at the risk-free rate of return
iv. Perfect capital market: It means there are no taxes or transaction costs and all securities are valued correctly and that their returns will plot on to the SML.

5. The Risk-Free Rate of Return

In the real world, there is no such thing as a risk-free asset. Short-term government debt is a relatively safe investment, however, and in practice, it can be used as an acceptable substitute for the risk-free asset.

In order to have consistency of data, the yield on UK treasury bills is used as a substitute for the risk-free rate of return when applying the CAPM to shares that are traded on the UK capital market. Note that it is the yield on treasury bills which is used here, rather than the interest rate. The yield on treasury bills (sometimes called the yield to maturity) is the cost of debt of the treasury bills.

Because the CAPM is applied within a given financial system, the risk-free rate of return (the yield on short-term government debt) will change depending on which country's capital market is being considered. The risk-free rate of return is also not fixed, but will change with changing economic circumstances.

6. The Equity Risk Premium

Rather than finding the average return on the capital market, $E(r_m)$, research has concentrated on finding an appropriate value for $(E(r_m) – R_f)$, which is the difference between the average return on the capital market and the risk-free rate of return. This difference is called the equity risk premium, since it represents the extra return required for investing in equity (shares on the capital market as a whole) rather than investing in risk-free assets.

In the short term, share prices can fall as well as increase, so the average return on a capital market can be negative as well as positive. To smooth out short-term changes in the equity risk premium, a time-smoothed moving average analysis can be carried out over longer periods of time, often several decades. In the UK, when applying the CAPM to shares that are traded on the UK capital market, an equity risk premium of between 3.5% and 5% appears reasonable at the current time.

7. Beta

Beta is an indirect measure which compares the systematic risk associated with a company's shares with the systematic risk of the capital market as a whole. If the beta value of a company's shares is 1, the systematic risk associated with the shares is the same as the systematic risk of the capital market as a whole.

Beta can also be described as 'an index of responsiveness of the returns on a company's shares compared to the returns on the market as a whole'. For example, if a share has a beta value of 1, the return on the share will increase by 10% if the return on the capital market as a whole increases by 10%. If a share has a beta value of 0.5, the return on the share will increase by 5% if the return on the capital market increases by 10%, and so on.

Example: Calculating the cost of equity using CAPM

Although the concepts of the CAPM can appear complex, the application of the model is straightforward. Consider the following information:

Risk-free rate of return = 4%
Equity risk premium = 5%
Beta value of RD Co = 1.2

Cont'd
Example:

Solution:

Using the CAPM:
$E(r_i) = R_f + \beta_i(E(r_m) - R_f)$
$= 4 + (1.2 \times 5)$
$= 10\%$

The CAPM predicts that the cost of equity of RD Co is 10%. The same answer would have been found if the information had given the return on the market as 9%, rather than giving the equity risk premium as 5%.

8. Asset Betas, Equity Betas, And Debt Betas

If a company has no debt, it has no financial risk and its beta value reflects business risk alone. The beta value of company's business operations as a whole is called the 'asset beta'. As long as a company's business operations, and hence its business risk, do not change, its asset beta remains constant.

When a company takes on debt, its gearing increases and financial risk is added to its business risk. The ordinary shareholders of the company face an increasing level of risk as gearing increases and the return they require from the company increases to compensate for the increasing risk. This means that the beta of the company's shares, called the equity beta, increases as gearing increases.

However, if a company has no debt, its equity beta is the same as its asset beta. As a company gears up, the asset beta remains constant, even though the equity beta is increasing, because the asset beta is the weighted average of the equity beta and the beta of the company's debt.

Asset beta formula –

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

β_a = asset beta
β_e = equity beta
β_d = debt beta
V_e = market value of company's shares
V_d = market value of company's debt
$V_e + V_d(1 - T)$ = after tax market value of company
T = company profit tax rate

Note from the formula that if V_d is zero because a company has no debt, then $\beta_a = \beta_e$, as stated earlier.

Example: Calculating the asset beta of a company You have the following information relating to RD Co:

Equity beta of RD Co = 1.2; Debt beta of RD Co = 0.1
Market value of shares of RD Co = \$6m; Market value of debt of RD Co = \$1.5m
Company profits tax rate = 25% per year
After tax market value of the company = 6 + (1.5 x 0.75) = \$7.125m

Cont'd
Example: Calculating the asset beta of a company

Solution:

β_a = [(1.2 x 6)/7.125] + [(0.1 x 1.5 x 0.75)/7.125] = 1.024

9. Project-specific discount rates

When a business risk of an investment project differs from the business risk of the investing company, the return required on the investment project is different from the average return required on the investing company's existing business operations. This means that it is not appropriate to use the investing company's existing cost of capital as the discount rate for the investment project. Instead, the CAPM can be used to calculate a project-specific discount rate that reflects the business risk of the investment project.

10. Steps in calculating Project-specific discount rates

The steps in calculating a project-specific discount rate using the CAPM are:

i. Locate suitable proxy companies.
ii. Determine the equity betas of the proxy companies, their gearings and tax rates.
iii. Ungear the proxy equity betas to obtain asset betas.
iv. Calculate an average asset beta.
v. Regear the asset beta.
vi. Use the CAPM to calculate a project-specific cost of equity.

Example: Calculating the Project-specific Discount Rate

A company is planning to invest in a new project that is significantly different from its existing business operations. This company is financed 30% by debt and 70% by equity. It has located three companies with business operations similar to the proposed investment, and details of these companies are as follows –

Company A has an equity beta of 0.81 and is financed 25% by debt and 75% by equity.
Company B has an equity beta of 0.98 and is financed 40% by debt and 60% by equity.
Company C has an equity beta of 1.16 and is financed 50% by debt and 50% equity.

Assume that the risk-free rate of return is 4% per year, and that the equity risk premium is 6% per year. Assume also that all the companies pay tax at a rate of 30% per year. Calculate a project-specific discount rate for the proposed investment.

Solution:

Step 1 – Locating proxy companies
As all three companies are considered to be in similar business as the new project, we have to ungear all companies beta.

Cont'd

Example: Calculating the Project-specific Discount Rate

Step 2 – Ungearing the proxy equity betas

Ungearing the proxy equity betas:

Asset beta for Company A

= 0.81 x [75/(75 + 25(1-0.30))] = 0.657

Asset beta for Company B

= 0.98 x [60/(60 + 40(1-0.30))] = 0.668

Asset beta for Company C

= 1.16 x [50/(50 + 50(1-0.30))] = 0.682

Step 3 – Calculate an average asset beta

Averaging the asset betas:

(0.657 + 0.668 + 0.682)/3

= 2.007/3 = 0.669

Step 4 – Regearing the average asset beta

$0.669 = \beta_e \times 70/(70 + 30(1 - 0.30)$

$= \beta_e \times 0.769$

Hence $\beta_e = 0.669/0.769 = 0.870$

If the regearing equation were used:

$\beta_e = 0.669 \times ((1 + (1 - 0.30)30/70)$

= 0.870

Step 5 – Calculate the project-specific discount rate

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

= 4 + (0.870 x 6)

= 4 + 5.22 = 9.2%

11. CAPM and DVM

Both CAPM and the dividend valuation model may be used to estimate the cost of equity capital. When compared:

Advantages of CAPM

1. CAPM gives a cost of equity based on market estimates of returns and corresponding risk.
2. CAPM is concerned only with systematic risk, the only risk that is relevant in a well-diversified portfolio.
3. It provides a basis for establishing risk-adjusted discount rates for capital investment projects.

Disadvantages of CAPM:

1. CAPM is only concerned with the total return, and assumed that investors are indifferent between dividends or capital gains. This pose a problem when the tax system is weighted towards or against either form of returns. Under such circumstances investors will not be indifferent.
2. CAPM is a single period model which should be used with great caution if projects are multi-period.
3. Difficulty in obtaining data (risk free rate, market return, beta etc), especially for unlisted companies.
4. May not be appropriate for those investors who are not well-diversified, as they may be more concerned for total risk, including the unsystematic risk.

Advantages of Dividend Valuation Model (DVM)

1. Based on projected growth, may be more reliable than CAPM in using for future periods.
2. From practical experience, dividends are better indicator as a determinant of share prices.

Disadvantages of DVM:

1. Difficulties in forecasting future growth.
2. Constant future growth may not be realistic.

12 CAPM and Project Appraisal

The greatest potential use of CAPM in financial management of a company lies in the setting of minimum required return for new capital investment projects. This is so as new project will likely to have different risk level as the existing projects (making current cost of capital irrelevant).

Lecture 7

SOURCES OF FINANCE

1 Introduction

In earlier lectures, we have learned how to evaluate projects. When a project is acceptable and a company wants to take up the project, it would need capital or funds to finance the project. This lecture will introduce the various sources of finance available, ranging from internal to external source, equity and debt, short term and long term. Choosing the appropriate source is never and easy task as each source has it's own merits and demerits. In practice, a combination of few sources is normally used.

2 Internal or External finance

Factors to be considered in choosing internal or external finance:

1. Taxation: Using internal finance means cutting down on dividend payment so that profit earned is retained in the company as reserve. Shareholders will benefit from capital gain (as increased reserve increases net assets of company and may increase share price) instead of dividend payment. Capital gain is subject to lower tax than dividend income.
2. Transaction cost for shareholders: To extract the capital gain, shareholders need to dispose the shares which may involve transaction cost, eg, brokerage charges and commission.
3. Transaction cost for company: Raising external finance will give rise to transaction cost for the company, eg, issuing costs, cost of preparing prospectus, etc.
4. Market expectation: Generally the market take the view of cutting dividend payment as liquidity problem, this negative pressure will bring the share price down and may eliminate capital gain in (1) above.
5. Liquidity preference: Shareholders may demand cash rather than capital gain. They may sell off their shareholding if dividend is not pay out, resulting in control of company being diluted to other shareholders.

3 Debt or Equity finance

Factors to consider:

1. Equity finance (ordinary share) gives voting right to investor that debt finance don't.
2. Interest cost is generally cheaper than dividend payment required by shareholders. This is due to the risk impact of both. Debt holders normally receive fixed interest payment and have first priority in distribution of asset in the event of liquidation of company. As such, debt capital has lower risk and investors require a lower rate of return than equity capital.
3. Capital Gearing increases with debt capital, i.e. financial risk increases.
4. Taxation: interest payment is tax-deductible expenses from the company perspective but dividend is not. Thus, debt capital cost is cheaper than equity.
5. Important: Some argue that reserve / retained earnings (part of equity) is cost free…this is not true as reserve is part of shareholders capital and for shareholders to retain their money in the reserve, the company must compensate them with their required rate of return.

Factors to consider when raising debt capital:

1. Term structure of interest - short & medium term loan interest rate is normally lower than long term loan (see chapter 13 for more detail)
2. Transaction cost – short term & medium term loan need more frequent renewal, thus transaction cost will be higher.
3. Flexibility: short term loan (eg overdraft) is more flexible and can be adjusted according to the company requirement more easily compared to long term loan.
4. Uncertainty of obtaining future finance in short and medium term loan make them more risky than long term loan.
5. Future level of interest rate : If interest rate expect to fall in the future, short term loan would be preferred to long term loan and vise versa if interest rate is expected to rise in future.

4 Equity Capital

Equity interest in a company can be said to represent a share of the company's assets and a share of any profits earned on those assets after other claims have been met. The equity shareholders are the owners of the business who buy **ordinary shares** in the company. As ordinary shareholders, they can make decisions and their returns, dividend payment normally vary according to profit earned.

Another type of shares is **preference share.** The preference share holders cannot vote for the company and received fixed dividend payment. For example, 8% preference share with par value 50p means the preference shareholders will receive dividend of 8% x 50p = 4p per annum. Dividend is not compulsory can preference shareholders will not be paid if there is insufficient profit to pay dividend. The preference share holders does not have liquidation right enjoyed by payables.

Unquoted Companies

Traditionally unquoted companies obtained their funds from the owner proprietors. Ordinary shares in private companies should be regarded as virtually permanent investments. It is difficult to sell them due to the following administrative procedures:

1. Have to notify the company on the intention to sell
2. Sell to existing shareholder (who have the first right to the shares) or find a willing buyer who is acceptable to other shareholders
3. Have the shares valued by an accountant.

If the shareholder is a minority interest and not on the board of directors, he may suffer from having to rely on the company dividend (which is low) for investment return. The majority shareholders who are also directors, may use the company profits to pay themselves higher salaries or benefits.

Consequently, private companies find it difficult to raise new share capital from outside shareholders. Thus, if a company want to expand & need to raise large amount of capital, it will consider to be listed on the stock exchange and becomes quoted companies.

Quoted Companies

A quoted company is one where shares can be bought and sold on a stock exchange. To become a quoted company, a private company needs a good track record of growth and must first convert itself legally into a public company.

Advantages of quoted companies:

(1) The shares become much more attractive to minority shareholders because they can be sold easily on the stock exchange if the investor needs cash.
(2) Increased demand for the shares pushes their price up: often many times!
(3) It becomes much easier to raise new capital.
(4) The company can issue new shares which can be offered as `purchase consideration' to takeover another company.
(5) The market price of the shares provide a good indication of the value of the company. (provided the stock market is efficient)
(6) The company gains publicity
(7) Borrowing makes easier!

Disadvantages of quoted companies:

(1) Cost: the initial costs are high and there is an annual stock exchange fee.
(2) Disclosure requirements for published accounts are increased by stock exchange regulations.
(3) Companies performance become public information
(4) Dividend policy becomes more difficult because they have wider spread of shareholders with different personal objectives and differing tax positions.
(5) Equity shareholders become diluted, the original shareholders may lose their control power after the company is listed!
(6) There can be significant pressure to achieve short-term results. The stock market likes to see a continuous growth in earning per share. This may make it more difficult to sacrifice immediate profits for the sake of a more prosperous future.

Differences between private & public companies:

	Private company	*Public company*
1.	No minimum requirement for authorised	Minimum authorised capital is capital £50,000
2.	Name of company end with Ltd : Eg, Hope Ltd	Name of company end with plc: Eg, ABC plc
3.	Not stated in the M&A as public company	Stated in M&A as public company
4.	Shares mainly owned by family members	Shares owned by general public
5.	Transfer of shares to third party need approval from all existing shareholders	No such approval necessary

5 The Stock Exchange (London)

The basic function of stock exchange is to ensure a fair, orderly and efficient market for the transfer of securities. Two main objectives of stock exchange:

- all relevant information is made available to the public on a timely basis, so that all investors and potential investors can make informed and balanced investment decisions, and so that market prices can take account of the information as soon as possible.

- all investors deal on the same terms and get the same price.

Securities traded:

1. Company securities
   - shares
   - loan stock / debentures
   - convertibles, warrants, etc.
2. Public sector loan stock (central government, local government, and others)
3. Eurobonds (i.e. bonds issued in foreign currency) (eg: bond issues in UK but in US dollars)

2 tiers of stock market:

The Stock Exchange Official List (full listing) - covers the vast majority of securities

Conditions to obtain full listing:

- have published & filed audited accounts at least 3 years prior to the listing (varied in different listing status or in AIM)
- published accounts prepared in accordance to UK Accounting standards and IFRS.
- expected aggregate market value of all securities to be listed must be at least £700,000 for shares and £200,000 for debt securities.
- At least 25% of the class of securities to be listed must be in the hand of general public prior to the listing.

Alternative Investment Market (AIM)

AIM deals with smaller companies which need to raise some share capital from general public but unable to fulfill the requirement of full listing. No minimum amount of shares that need to be in hand of public. Sponsorship is also optional. Sponsors (normally banks or corporate brokers) are agents dealing with all administrative procedures of listing requirements, acting as intermediate party between the companies to be listed and the Stock Exchange. For a normal Official listing, a sponsor must be used.

The main aim of AIM is to satisfy the capital need for all companies outside the scope of Official listing. Therefore, the entry requirement is kept to as minimum as possible!

- Fees on the AIM are much cheaper.
- Other types of markets where trading of shares and stocks are possible:

(a) **Unlisted Securities Market** (USM) - has been abolished fully by end of 1996 and replaced by AIM

Advantages of companies traded on AIM:
- founders of companies could realise cash by selling their shares
- Medium size companies could obtain listing and thus equity finance by issuing shares to public
- Medium size company could takeover another company by offering shares
- The company could reward and encourage its employees through the share option scheme

Disadvantages of companies traded in AIM:
- An increase amount of financial disclosure was required
- Pressure from the new shareholders on dividend, etc.

(b) The **third market** - abolished in early 1990s and replaced by AIM
- more lenient rules for companies which cannot fulfill the requirements of USM

(c) **Over-The-Counter Market** (OTC)

It is possible for shares of any public company to be traded even though it is not listed in the Stock Exchange. If a seller can find a buyer, a deal can be arranged. OTC deals with these unlisted securities and operates independently from the Stock Exchange regulations. …in simple english, it is merely selling and buying between two parties without going through stock exchange.

Procedures for becoming a quoted company

A company can become a quoted company either by `Introduction' or by an initial public offer of shares.

(i) Stock exchange introduction

With an `introduction', no new shares are issued. The Stock Exchange gives permission for the company's shares to be bought and sold on the Stock Exchange market. If the company is already legally a public limited company and at least 25% of the shares are in public hands, the Stock Exchange permission is all that is required. If the company is private, it must become public and place 25% of its shares in the hands of the market makers (or broker) for sale to the public.

(ii) Shares issues by quoted companies

New shares can be issued by companies to obtain listing. There are many different ways available in issuing new shares:
(a) Right issues
(b) Placing
(c) Offer for sale
(d) Offer for sale by tender
(e) Offer for sale by prospectus / public issue

(a) Right Issues

Right issues refer to issue of new shares to existing shareholders. It is an offer to existing shareholders to subscribe for more shares, in proportion to their existing holding, usually at a relatively low price compare to the market price. This is to prevent the issue collapsing if the stock market falls between the date of announcement of the issue and the subscription date.

Example:

(i) Company's share price on date of announcement:	300 p
Right issue subscription price	250 p
Company's share price on date of subscription	270 p

The issue will be successful.

(ii) Company's share price on date of announcement:	300 p
Right issue subscription price	280 p
Company's share price on date of subscription	270 p

The issue will fail

Company legislation now requires an offer to be made to existing shareholders before it can be made to the public. A prospectus is required in right issue but less advertising is necessary than a public offer though more advertising than for a placing. Typical overall issue costs amount to about 5% of gross funds raised. These costs comprise underwriting fees, accountant fees, capital taxes, stock exchange fees, advertising, etc.

• If the shareholders take up their shares, their wealth will be unaffected by the issue price! The results of issuing these shares at an effective discount is to reduce the market price of all the shares in issue!

Advantages of Right Issue:

(1) Right issue automatically lowers a company gearing
(2) The finance is more or less guaranteed as right issues are normally fully subscribed
(3) It has a neutral impact on voting rights unless the existing shareholders sale their shares to others
(4) It might give an impression that the company is expanding.

Disadvantages of Right issue:

(1) Normally issue at a discount, which usually involves diluting historical eps.(but prospective eps could rise by the virtue investment of the new capital raised in profitable projects!)
(2) Underwriters fees and other issue costs can be expensive.
(3) A right issue usually forces shareholders to act, either by subscribing direct or by selling the rights.
(4) The market often skeptical about the right issue, tending to assume that the company is desperate for cash.

Should right issue be underwritten?

In theory, a right issue does not need to be underwritten: if the issue price is pitched low enough, all existing shareholders will either subscribe to new shares or sell their rights. In practice, however, the issue is often underwritten. For example, some shareholders may not subscribe to the issue or sell their rights either they forget or are disorganised).

Illustration

CLK currently has 2,000,000 ordinary shares in issue and valued at $1 each. The company has annual earnings $400,000. A one for three rights issue is proposed, at an issue price of $0.8. Find out the ex rights price. Ignore issue costs.

Solution

	$
Three shares have a current value (x $1) of	3.00
One new share will be issued for	0.80
Four shares would have a theoretical value of	3.80

Theoretical ex rights price = [1 / (3 + 1)] x [(3 x 1) + 0.80]
= $0.95

(b) Placing

A sponsoring merchant bank or sponsoring broker arranges for a few selected institutions to purchase all the new shares issued by the company. This still counts as a public issue, so a prospectus is required, but advertising, stock exchange fees and administration costs are kept to a minimum. Placing has the cheapest issue costs. Typical issue costs are 3% to 4 % of gross funds raised.

The advantage of placing: it is the simplest and cheapest method of issue. Usually used by pioneer shareholders to sell-off a company and recover huge capital gain. The main disadvantage of this method is the pioneer shareholders are likely to loose control power over the company when the shares are sold to large institutions.

(c) Offer for sales

In an offer for sale, the company sells new shares to a merchant bank (issuing house) which then offers them for sale to the public. This is the most expensive way of raising capital, but much larger sum can be raised than from right issues or placing.

Role of merchant bank in an offer for sale:
1. Recommending the price and timing of the share issue
2. Ensuring compliance with stock exchange and other regulations and arranging for professional involvement from accountants and lawyers
3. Payment of professional fees to accountant & lawyer, etc.
4. Offering the shares to the public (including advertising, circulating prospectus, etc)
5. Allotment of shares
6. Underwriting the issue

(d) Offer for sale by tender

This is useful if there is significant difficulty in determining an appropriate issue price. It is not very common, but occurs sometimes when public sector companies are privatised. Potential shareholders write in, stating the number of shares they are tendering for and at what price. The terms of offer are detailed in the prospectus (i.e. the manner in which shares will be allotted and the price chosen).

Possible methods of allotment:

1. Company rank the offers by price and issue shares at the tendered price until sufficient capital raised.
2. (more common) As above but all shares are issued at the same price: this is the highest price which will raise all the necessary capital

3. (eg privatisation issue) The issue price is the maximum price which will provide a minimum number of shareholders - the aim is to get more shareholders, which is a policy of government to encourage property-owning democracies. This technique does not usually achieve its objective, as the smaller shareholders often make an immediate gain by selling out to institutions!

(e) Prospectus Issue/ Public Issue

Similar to offer for sales except that the company organises all aspects of the issue itself; Only larger companies feel they have the resources to cope with this, it does not involve issuing house.

Bonus Issue (Capitalisation issue)

New shares issued `for free' to existing shareholders. It is a capitalisation issue as the accounting entry is debiting the capital reserve and crediting share capital. Companies may issue shares instead of , or , as well as cash as a dividend (this is called **scrip issue**).

The reason why a company may issue scrip dividend is that scrip dividend does not use up cash. The accounting treatment for a scrip issue is to convert equity reserves into share capital.

As there is no inflow of cash, the wealth of shareholders remain unchanged after bonus issue but share price will fall as the same wealth is spread over higher no of shares.

Stock Split

Occur when the company `splits' the old par value shares into smaller denominations in order to lower the share price into `a more normal trading range' .

Difference between bonus issue and stock splits

A bonus issue converts reserves into share capital, a stock split simply changes the number of shares and their par value. In bonus issue, the par value remains unchanged!

Students normally get confuse between bonus issue, scrip issue and stock split, the following table may help!!

	Bonus issue	Stock split	Scrip dividend
Funds raised	No	No	No
Changes in the nominal value of shares	No	Yes	No
Increase in no of shares in issue	Yes	Yes	Yes
Purpose	To award/retain existing shareholders	To reduce the share price if too high (make shares more attractive)	To avoid cash payment of dividend (used if the company is in liquidity problem)
A/C entries	Dr capital reserve Cr share capital	No double entry	Dr Revenue reserve Cr Share capital
Effect on share price	Fall	Fall	Fall
Effect on shareholders wealth	No	No	No

6 Debt Capital

Comprises of:
- Borrowing from banks and institutions
- Debentures / Loan stock / Bond
- Convertibles loan stock
- Warrants

Advantages of debt capital:

(1) Debt capital is cheaper than equity capital as it is less risky than equity capital due to:
- it has definite maturity
- priority in interest payments compare to dividend
- priority in capital distribution on liquidation
- fixed income irrespective of company earnings

As such the required rate of return by investors is lower than equity capital

(2) No dilution of control when debt is issued

Disadvantages of debt capital:

(1) Interest must be paid even if the company suffer from losses
(2) Debt capital increases a company's gearing
(3) With fixed maturity date, provision must be made for the repayment of debt.

(a) Debentures / Loan stock / Bonds

The three terms all refer to the same thing: fixed or floating rate loan (UK stock market generally fixed rate): quoted on stock market at market price , which depends on the market level of interest rates at that time .

• **Deep discount bond** : loan stock paying a very low fixed interest rate, hence issued at very low price below nominal value and redeemed at nominal value. Investors get return from capital gain (tax advantage).

• **Zero coupon bond :** the extreme case of a deep discount bond : no interest is paid at all, hence issued at very low price and redeemed at nominal value: investors get only capital gain.

Advantages of deep discount bond: low financing costs until redemption : useful in new project `start-up' situation

Disadvantages: if the project is unsuccessful, company may find difficulty in repaying the bonds

(b) Convertibles Loan stock

Loan stock which gives the option to convert into ordinary shares at a given conversion ratio on a specified future date or range of dates. If the option to convert is exercised, the company issues new shares.

Conversion premium = the difference between today's market price of loan stock and today's market price of equivalent shares

Advantages of convertibles to companies:
(1) Interest payable is lower than normal debenture
(2) A method of issuing `delayed equity' , increasing the capital base if the company is successful, but of allowing redemption of the funds if the company is not successful.

Advantages of convertibles to investors:
(1) Can get the opportunity of equity investment at a cheap price, if the company is successful.
(2) Can have the loan redeemed if the company is not successful.

Valuation of Convertibles

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

(c) Warrants

These are options issued by company, to subscribe to the company's shares at a given price on a given date or range of dates . The warrants will be exercised if the `exercise price' is less than the current market price per share. If the warrants are exercised, the company issues new shares.

Note! A warrant is merely an option, whereas a convertible debenture combines an option with a debenture, a warrant is not link with any underlying security.

If a company share price is £10 and the warrant exercise price is £8.75; the value of the warrant is £1.25. This value is called the formula value of the warrant. If the share price fell below £8.75, the warrant would be worthless.

7 International Markets

Loan capitals are also available in foreign currencies known as:

• Eurocurrency :International money market
UK companies borrow in a foreign currency from a UK bank (eg borrow US dollars in UK bank)
Most eurocurrency lending is in the form of negotiable certificates of deposit between banks of different countries.

• Eurobond: bonds dominated in a foreign currency different from that of the country of issue, and sold internationally
Long term bonds usually 10-15 years
Interest rate may be fixed or variable

8 Effects on Earnings per Share (EPS)

EPS is widely used measure of a company performance particularly over a number of years. It is a very useful component in the stock market yardstick - the P/E ratio. The computation of EPS is governed by accounting standard.

$$\text{EPS} = \frac{\text{Net profit after tax, minority interest, extraordinary items and preference dividends}}{\text{No of equity shares in issue and ranking for dividend}}$$

- Full disclosure of *fully diluted EPS* in addition to EPS where the fully diluted EPS is more than 5% away from the EPS. In FM, use is often made of potential shares issues at a future date: such as;

1. Convertibles loan stock
2. Convertible preference shares
3. Warrants

9 Effects on Financial Gearing

Gearing is a term used to measure the risk of a company. A company risk can be divided into two distinct categories, each measured by a type of gearing:

1. **Financial Risk** – the risk arises due to the capital structure of the company, i.e. the proportion of debt capital to equity capital. Financial risk is measured by **financial gearing**. Financial risk is concerned with the risk of not able to pay interest to debt holders which may result in the debt holders exercising their right to liquidate the company. Thus, a company with no debt capital will have no financial risk, and the financial risk increases as debt capital proportion to equity increases.

   Financial/ Capital gearing = $\frac{\text{Debt}}{\text{Equity}}$ or $\frac{\text{Debt}}{\text{Debt + Equity}}$

   Note: the valuation of debt & equity can either be based on book value or market value

   Debt calculation can either include overdraft or exclude overdraft (depending on the question)

   Financial risk calculated will normally be expressed in % form, eg 30% . Students need to be aware that this % is quite meaningless in telling whether the company's gearing level is dangerous or not. For it to be useful, this ratio need to be supported by interest coverage ratio, to judge if the company is able to pay the interest on the debt. As long as interest payment is not a problem, the financial gearing is not dangerous.

   Interest cover age ratio = PBIT / Interest

2. **Operating Risk** or Business Risk – the risk associated with the daily business operation which incorporate various types of business operating risk, eg exchange control risk, risk of not able to fulfill customer order on time, risk of sales demand fall resulting in contribution earned not able to cover fixed costs, etc. Operating risk is measured by **Operating gearing** .

   Operating Gearing = Fixed cost/variable cost or Fixed cost/ Total costs

Lecture 8

FINANCING OF SMALL AND MEDIUM ENTERPRISES / ISLAMIC FINANCE

1 Introduction

Small and medium enterprises (SME) can be defined as having the following characteristics:

(a) Firms are likely to be unquoted

(b) Ownership of the business is restricted to a few individuals, typical family group.

(c) They are not micro businesses that are normally regarded as those very small businesses that act as a medium for self employment of the owners.

2 Problems of Financing

SME always find themselves in a very difficult position to obtain source of funds from external sources. These may be due to the following reasons:

(a) Main handicap that SME's faces in accessing funds is the problem of uncertainty. SME have neither the business history nor larger track record that larger organisations possess. Larger organisations are subject by law to more public scrutiny, their accounts have to contain more details and be audited which the SMEs are not bound by such law. Because of the uncertainties, banks are rather reluctant to provide loan finance to SME.

(b) Often, banks will be unwilling to increase loan funding without an increase in security of assets. SME normally has limited assets to secure loans.

3 Sources of Finance

- Owner financing
- Overdraft financing
- Bank loans
- Trade credit
- Leasing
- Factoring
- Business angel financing
- Venture capital financing
- Government aids
- Listing and issue shares through AIM

4 Venture Capital Finance

Small companies normally find it very difficult to obtain finance from public investors or bankers. Often than not, the equity fund of the owner is the only source of finance available for many small business. These are due to the following reasons:

(a) The increasing expense and difficulty of obtaining a quotation on stock exchange.
(b) The UK tax system has encouraged individuals to save with large institutions. Better tax benefit is given for investment in large institutions than smaller ones.
(c) Investments in large companies are more easily marketable. An investment in small business will need to be long term.
(d) The general belief that smaller companies are more risky than larger ones.

Venture Capital Fund simply means equity capital available to small and growing business. Venture Capitalist or Venture Capital Institution is an institution (sometimes with Government Sponsoring) specialising in providing equity capital fund to small business for the motive of profit seeking, eg 3i Group, Apax Partners, CVC Capital Partners.

The Venture Capitalists will normally require certain criteria to be fulfilled before they invest in a company :

(a) There must be a foreseeable profitable product, project or service . In other words, the company must be seen by the Venture Capitalist of having very good prospect in future. The Venture Capitalist will normally request the company to submit a forecast say, five years plan for application of their funds.
(b) The funds provided by Venture Capitalists will be equity fund, i.e. the Venture Capitalist will want to have control power in the company, at least an associate company.
(c) The business invested must be easily realisable, most Venture Capitalists do not have the intention to invest in a company for more than five years. They will normally withdraw their investment after a certain period of time once they have made sufficient profit. This is normally done by listing the company invested to sell off their shares holding in the company, or sell back their shares to the founders of the company.
(d) The Venture Capital may sometime appoint a manager to run the company if they consider the company management team lack of management competence.

Types of investment by Venture Capitalist:

Generally speaking, venture capitalists will be interested in the following types of investment:

1. **Start-ups**
This type of investment covers businesses which are only at the concept stage through to those which are ready to start trading once the funds are made available. This type of investment is usually regarded as extremely high risk as no track record of performance is available.

2. **Growth capital**
In this case, a business may be at a very early stage and may require funds to move from the development stage to production or may be more established and require funds to develop further products or to expand its markets

3· **Management buy-outs or management buy-ins**
This is a very popular form of investment for venture capitalists. The two most important sources of management acquisitions are where a large business sells off part of its operations and where a family business experiences succession problems.

4. **Share purchases**
This type of investment may take the form of a buyout of part of the ownership of an existing business These last three types of investment are less risky than start ups as the businesses will have a track record and may have relatively well defined products and markets

5· **Recoveries**
In this case, the venture capitalist provides rescue capital to facilitate restructuring. The level of risk associated with this type of investment can vary greatly according to the particular circumstances.

Business angel financing

Business angels are wealthy individuals or groups of individual who invest directly in small businesses. The main problem with business angel financing is that it is informal in terms of a market and can be difficult to set up. However, sometimes informality can also be a strength. Surveys suggest that business angels are often more patient than providers of other sources of finance, they normally do not demand quick performance results as other sources of funds providers. However, the money available from individual business angels may be limited.

5 Government Aids

UK Government has introduced a number of assistance schemes to help businesses, and several of these are designed to encourage lenders and investors to make finance to SME. These include the following:

(a) Enterprise Finance Guarantee (EFG)
The Enterprise Finance Guarantee (EFG) is a UK government-guaranteed lending scheme intended to help smaller viable businesses who may be struggling to secure finance, by facilitating bank loans of between £1,000 and £1 million.
It is intended to enable banks to lend to viable small businesses who are unable to provide the security that the bank would otherwise require. The government announced the launch of the Enterprise Finance Guarantee Scheme (EFG) in November 2008 to provide targeted intervention for viable SMEs, close to the margins on risk, who could not access debt finance during times of tight credit conditions. EFG replaced the previous Small Firms Loan Guarantee scheme.

(c) European Regional Development Fund (ERDF)
ERDF is financed from the general budget of the European Union (EU). The funds are given directly to EU member governments. In the ERDF's first 15 years of operation, the UK received £3.6 billion from the fund. Approximately 80% of the funds available are allocated to the four poorest countries in the EU.

(d) Enterprise Investment Scheme (EIS)
EIS is intended to encourage investment in the ordinary shares of unquoted companies. When a qualifying individual subscribes for eligible shares in a qualifying company, the individual saves tax at 20% on the amount subscribed (including any share premium). A qualifying individual is one who is not connected with the company at any time in the period from two

years before the issue to five year after the issue. Capital gain generated by individual investors in the EIS are tax free provided the investment is held for 5 years.

(e) Venture Capital Trusts (VCT)

In 1993, the UK Government introduced a second measure (apart from EIS) to encourage equity investment in the form of a new kind of investment trust called VCT. This followed from the criticism from banks and small businesses groups that small companies were too dependent on short term finance. The investment trust must be approved by Inland Revenue, under rules which require it to invest a large proportion of assets in unquoated companies. Investors are exempted income tax on dividends and capital gain, provided the shares are held for 3 years.

6 Islamic Finance Introduction

Islamic finance is finance that is compliant with Sharia'a law. Islamic finance has gone through an exceptional growth period in recent years. The number of fully Sharia'a compliant banks continues to increase worldwide and Sharia'a compliant financial products are not only offered by Islamic banks but also by conventional banks using specific distribution channels. The term 'conventional' is used to dentify the financial institutions that have formed part of the financial infrastructure for a long time and are not specifically based on Islamic principles.

The object of an Islamic finance undertaking is not simply the pursuit of profit, but that the economic benefits of the enterprise should extend to goals such as social welfare and full employment. Making profits by lending alone and the charging of interest is forbidden under Sharia'a law. The business of trading goods and investment in Sharia'a acceptable enterprises form the core of Islamic finance.

7 Riba

Interest (riba) is the predetermined amount received by a provider of finance, over and above the principal amount of finance provided. Riba is absolutely forbidden in Islamic finance. Riba can be seen as unfair from the perspective of the borrower, the lender and the economy.

For the borrower, riba can turn a profit into a loss when profitability is low. For the lender, riba can provide an inadequate return when unanticipated inflation arises. In the economy, riba can lead to allocational inefficiency, directing economic resources to sub-optimal investments.

8 Islamic Financial Instruments

Islamic financial instruments require that an active role be played by the provider of funds, so that the risks and rewards of ownership are shared.

Mudaraba contract, for example, profits are shared between the partners in the proportions agreed in the contract, while losses are borne by the provider of finance.

Musharaka contract, profits are shared between the partners in the proportions agreed in the contract, while losses are shared between the partners according to their capital contributions.

Sukuk, certificates are issued which are linked to an underlying tangible asset and which also transfer the risk and rewards of ownership. The underlying asset is managed on behalf of the Sukuk holders.

Murabaha contract, payment by the buyer is made on a deferred or instalment basis. Returns are made by the supplier as a mark-up is paid by the buyer in exchange for the right to pay after the delivery date.

Ljara contract, which is equivalent to a lease agreement, returns are made through the payment of fixed or variable lease rental payments.

Lecture 9

WORKING CAPITAL MANAGEMENT - INVENTORY

1 Introduction

Working capital is defined as the difference between current assets and current liabilities. Working capital management is referred to the management of all aspects of both current assets and current liabilities, to minimise the risk of insolvency while maximising the return on assets.

The two fundamental questions to be answered in the area of working capital management are:

(a) How much should the firm invest in working capital?
(b) How should the investment in working capital being financed?

This lecture will also begin with an important item in the working capital - management of inventory

2 The importance of working capital management

Current assets normally represent more than half the total assets of a business firm. Because they represent such a large investment and due to their nature of being relatively volatile, current assets worth careful attention!

Working capital is particularly important for small business because although such firm can minimise their investment in fixed assets by renting or leasing, they cannot avoid investment in cash, receivables and inventories.

The relationship between sales growth and the need to finance current assets is close and direct. Thus, the level of working capital required must be closely monitored in the light of changes in level of sales.

3 Financing Current Asset

Some models have been created as how to finance current assets. It should be noted that all these models are theoretical and some variations in practice is unavoidable!!

(a) Traditional (Agricultural) Model

Originated in the agricultural industry, current assets will be financed by short term funds, which could be paid off when not required, whilst fixed assets would be financed by long term funds (debt or equity)

(b) Average Working Capital Financing model

The above model are rather simplistic and not suitable for manufacturing industries when buffer inventory are necessary. Cash too should never be allowed to fall below a particular level, and a certain level of trade credit is always extended. Thus, a proportion of current assets are fixed over time called **permanent current assets** and is financed by long term funds.

(c) Aggressive Working Capital Financing model

All fixed assets are financed by long term funds but part of the permanent current assets are financed with temporary short term credit. The increase of short term credit reduces cost of finance but due to the nature of short term funds volatility, the risk of shortage of funds during peak season increases.

(d) Conservative Working Capital Financing model:

In this case, the firm uses a small amount of short term credit to meet its peak seasonal requirements of working capital. Its also meet part of its seasonal needs and all permanent current assets and fixed assets by long term funds. This is a very conservative approach of financing with help to minimise the risk of shortage of capital but increases cost of finance/funds required.

4 Inventory Management

One main aspect of WCM is the management of inventory. This involve the following issues:

(i) What should be the minimum quantity of inventory to keep & what should be the maximum quantity?
(ii) How much to order (or to produce) in every ordering (production run)?
(iii) When to replenish inventory?

Inventory Levels

These inventory levels will answer the first question above. For the purpose of control, inventory is broken down into **3 control levels,** namely:

(a) The re-order level:
When inventory reaches this level, it signifies that ordering of inventory is necessary. The level is set in such a way that even usage is at maximum level and the lead-time / reorder period (the time gap between placing order & receiving inventory) is the longest, there will still be no stock-out situation.

Reorder level = Maximum Usage x Maximum Lead Time

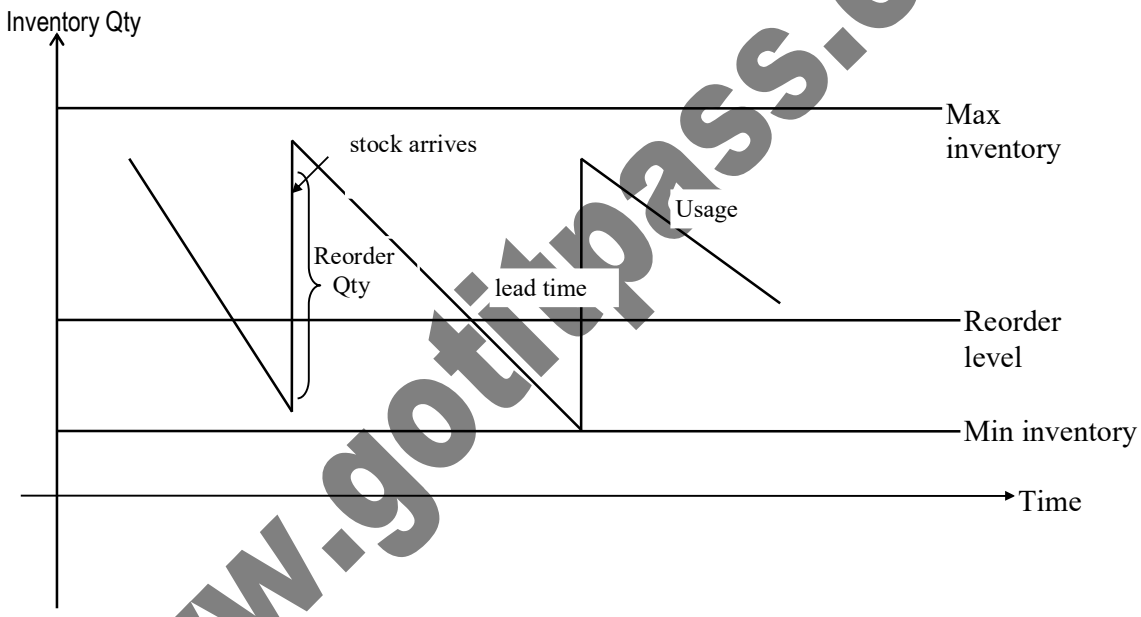
(b) The maximum inventory level:
This identifies the maximum quantity of inventory in order to avoid cost of over-stocking.

Maximum Inventory Level = Reorder Level + Reorder Quantity – (Minimum Usage x Minimum Lead Time)

(c) The minimum inventory level
This signifies the lowest quantity that inventory should be kept. This level warns the danger of stock-out about to happen! When inventory reaches this level, emergency action will have to be taken (eg. emergency buying) to avoid stock-out.

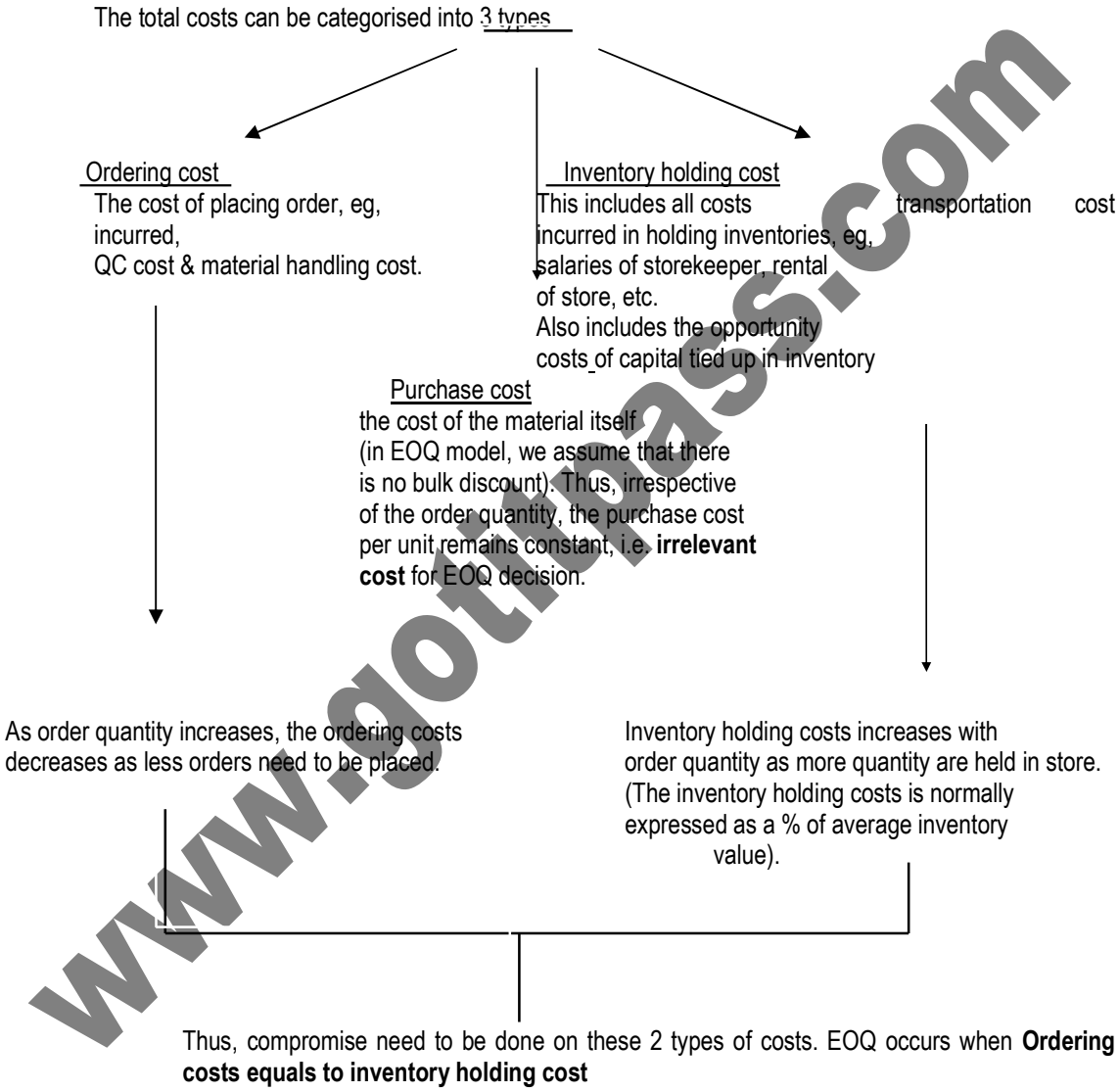
Minimum Inventory Level = Reorder Level – (Average Usage x Average Lead Time)

Inventory level Graph

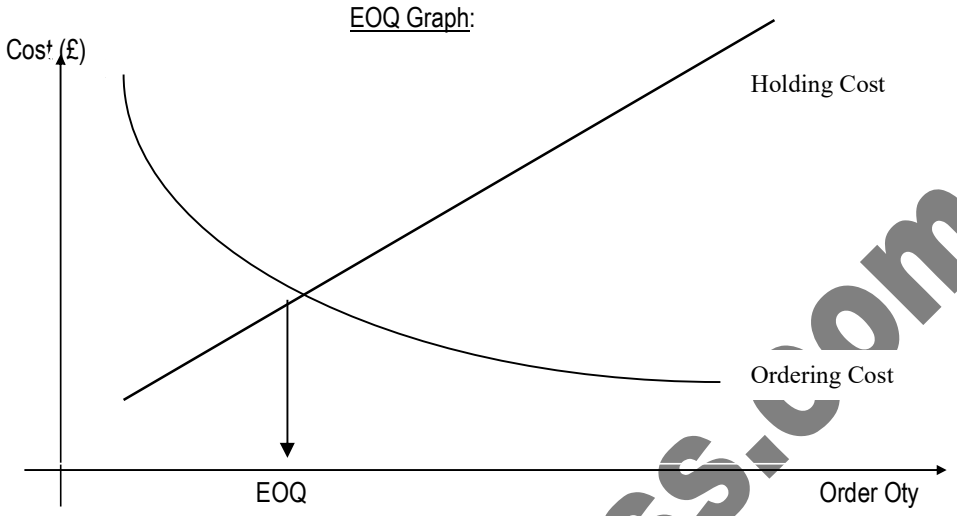


Economics Order Quantity (EOQ)

The EOQ is a model created to determine the order quantity to be placed on each purchase so as to minimise **total costs** with regards to inventories. Similar model can be created for determination of optimum production quantity, called the **economics batch quantity**.



Thus, compromise need to be done on these 2 types of costs. EOQ occurs when **Ordering costs equals to inventory holding cost**



The formula to calculate EOQ:

$EOQ = \sqrt{(2C_OD / C_h)}$ where D = demand p.a.
C_O = cost per order
C_h = holding cost per unit p.a.

Illustration

Happy co trades good AZ. The demand for AZ is 1,000 units a year. It costs $20 to place an order, and $1 to hold a unit for a year. Find the order size to minimize inventory costs, the number of orders placed each year, the length of the inventory cycle and the total costs of holding inventory for the year.

Solution

EOQ = $\sqrt{(2 \times 20 \times 1000 / 1)}$

= 200

It means that there will be:
1,000 / 200 = 5 orders placed each year

Inventory cycle is therefore:
52 weeks/ 5 = 10.4 weeks

Total costs of holding inventory for a year will be: (5 x $20) + (200 / 2 x 1) = $200

Assumptions underlying EOQ

(a) that there is a known, constant inventory holding cost
(b) that there is a known, constant ordering cost
(c) that rates of demand are known
(d) that there is a known , constant price per unit (no bulk discount for large order quantity)
(e) that replenishment is made instantaneously, i.e. lead time is NIL & reorder level is also NIL
(f) no inventory-out is allowed.

Now we shall look at how to modify the EOQ model given if the assumptions are not valid!

EOQ with discounts (assumption (d) not valid)

When discounts are receivable for large order quantity, the purchase cost of inventory will vary due to the discount enjoyed. As such the **purchase cost is now relevant** and must be considered in the ordering quantity decision.

Steps in determining EOQ with discount:

1. Compute the EOQ assuming no discount.
2. Recalculate the EOQ with discount adjustment if 1 above is incorrect.
3. Calculate the total costs of inventory (including purchase cost) using the EOQ in step 1 or 2.
4. Calculate the total costs of inventory at various discount rate (use the lowest order quantity when discount is enjoyed)
5. Select the option with lowest total costs.

Illustration

Happy Co has been offered a discount of bulk purchase. AZ price, without discount, is $2, and now a 2% discount is offered per order of 250 units. Does Happy Co. accept the discount to minimize total costs?

Solution

A Total cost of no discounts –

Purchase costs	=	$2 x 1,000
	=	$2,000
Total costs of holding inventory for a year	=	$200
Total costs	=	$2,200

B 2% discount is accepted –

Purchase costs	=	$1.96 x 1,000
	=	$1,960
Order costs	=	$20 x 1000 / 250
	=	$80
Holding costs	=	$1 x 250 / 2
	=	$125
Total costs	=	$2,165

Therefore, Happy Co will accept the discount to minimize total costs.

The Reorder level problem

The EOQ model developed so far is base on certainty in future variable (demand & lead time), called deterministic model. If uncertainty is placed on demand & lead time in the future (called probabilistic or stochastic model) then we need to keep a **buffer inventory** or safety inventory to avoid inventory-out due to the uncertainty factor. Reorder level will have to be set to cover the buffer inventory. REORDER LEVEL CANNOT BE NIL ANY MORE! (assumption (e) not valid)

The amount of buffer inventory to be kept will depend on
(i) inventory holding costs of the buffer inventory &
(ii) inventory-out cost.

Generally: **The costs of holding buffer inventory must be compensated by the stock-out cost**

Lecture 10

RECEIVABLES MANAGEMENT

1 Introduction

Receivables' management involves:

(i) assessing credit worthiness of customers and credit limit
(ii) ensuring debts are paid on time and actions on late payment
(iii) determining credit period to be granted
(iv) decision on cash discount to be granted
(v) financing of receivables

Aspects (i) to (iv) comes under the heading of **credit control** and is the job of credit controllers.

2 Assessing credit worthiness of customers

In most businesses, there is a traditional credit period for 30 days. Companies may choose to vary their own credit period from the industry average:

- A longer period - may increase sales, but might also increase bad debts and collection costs
- A shorter period - speeds up cash flow when funds are tight, but might also turn away potential customers

Thus, a proper way/ policy of assessing **credit worthiness** (ability to repay) of customers should be available to determine how much to give credit and how long!

Sources of investigation of credit worthiness:
Direct assessment: Salesmen's reports (or credit controller), customers published accounts, and Direct interview/questionnaires

Indirect assessment: Banker's reference, reference from other suppliers, trade reference, and official agent's report

3 Setting credit limit: (time and amount)

This depends on a couple of factors. The **5 Cs** model is normally used as base for decision.

Character - willingness to pay
This is an evaluation of the business standing of the firm and the general paying willingness by the customers (managers, directors, etc). This aspect is very difficult to evaluate as attitude of a person is subjective. An assessment is made on the managers, shareholders or directors to determine whether they are expected to meet their business commitments as they fall due.

Capacity - ability to pay
This is an evaluation of the potential cash flows of the debtor's business. It can be done at two levels. The first level involves a general evaluation of the financial well being of the company (from assessment of company published accounts and ratios analysis). At second level the company tries to establish the potential cash flows that the debtor will generate in the future.

Capital - level of financial risk
Firms will be reluctant to deal with company that have large proportion of borrowing (high gearing). Normally in the process of liquidation, the secured loan will have to be repaid first before any distribution make to trade payables. In such situation, the higher the gearing of a business, the higher is the risk (financial risk) of non-repayment.

Condition - level of business risk
This is an evaluation of the anticipated economic condition in the near future in order to establish whether any expected changes will have a negative impact on the potential customers. The business risk or operating risk relates to the nature of the business eg, computer industry has higher business risk compared to food industry.

Collateral - legal or contractual agreement
Very well established firms may request their new customers to pledge some of their assets in favour of the credit to be granted. However in today's marketing this practice is rare except the usage of **Romalpa clauses (reservation of title)** in international trade.

4 Collection of Debts

The following procedures are applied *in order* in the process of debt collection.

- Statement of accounts
- Polite letters
- Phone call
- Salesmen to collect debt
- Threaten legal letter (warning letter)
- Legal letter

5 Evaluating Cash Discount schemes

One possible move to encourage prompt payment is by offering **cash discount** for fast paying customers. Decision on how much cash discount to offer depends on cost and benefit analysis:

Benefits of cash discount:

(i) Higher contribution from extra sales
(ii) Savings from lower cost of financing receivables (as receivables level reduces)
(iii) Possible reduction in bad debt due to earlier payment

Costs of cash discount:

(i) Cost of discount
(ii) Additional Administration costs

6 Financing Of Receivables

Cash flow is important to all businesses- the sooner the receivables pay the better. Any assistance in improving this cash flow is often welcome. Various credit management strategies have been developed to assist this:

(i) Factoring

The factoring company can perform a number of services:

Service factoring

- Operates the clients sales ledger and collect debts in return for an annual fee (usually % of turnover)
- Pay cash to client at an agreed date after invoice (e.g. 30 days)
- This period is less than the client current average receivables collection period.
- The service can either be **non-recourse factoring** or **recourse factoring**

Service and finance factoring

As above plus the factor advances (almost immediately upon receipt of sales invoices from client) as cash a high % of client current receivables (e.g. 80%) and charges interest. Thus, the factor helps to finance the receivables.

Undisclosed factoring

Factor uses the client stationery and name on all collection procedures. The debtor is unaware of the factor's existence. This step is to avoid drop in sales as a result of customers know about the use of factoring services by his supplier - factoring services may mean the supplier is in financial difficulties!!

<u>Advantages of factoring:</u>
1. Debt collection in hands of expert
2. Allows client to concentrate on running the business
3. Client save admin. costs on credit management.
4. Debtor financing is released to factor

<u>Disadvantages of factoring:</u>
1. can be costly
2. Possible lost of customer! *see undisclosed factoring!*
3. Client may lose contact with receivables. It is the factor that deals with receivables.

(ii) Invoice discounting

Invoice discounting is simply advancing money to a client against its receivables, although the administration of sales ledger remains with client. It is purely a source of finance. Invoice discounting is normally **with recourse.**

(iii) Forfaiting

When companies sell abroad, overseas receivables can act as the security for finance under a process called forfaiting. The selling company draws up a **bill of exchange (acceptance credit)** on an oversea customers which is then guaranteed by an international bank. The bill will be sold to the bank at a discount. Forfaiting is **non-recourse.**

(iv) Credit Insurance

This is basically an insurance company insuring the company against the risk of bad debts. Normally being used by export companies to insure against overseas debt.

7 Managing Accounts Payable

The management of trade accounts payable involves:

- Obtain satisfactory credit from suppliers
- Extend credit during periods of cash shortage
- Maintain good relationship suppliers

Candidates are suggested to take care not to confuse accounts receivable and accounts payable!!!

Lecture 11

CASH MANAGEMENT

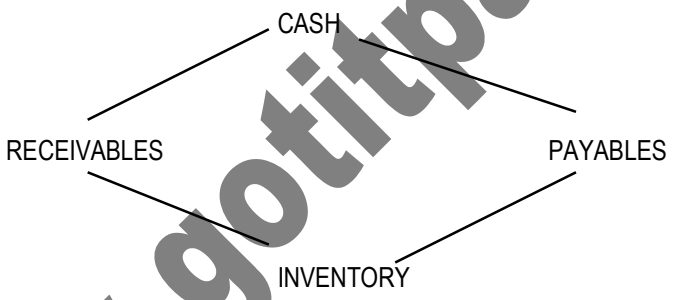
1 Introduction

Cash management involves:

(i) Forecast the cash requirement in the future budget period (cash budget)
(ii) Determine the working capital cycle (cash operating cycle) and
(iii) Calculating the amount of cash to be raised and buffer cash base on cash models

2 Working Capital Cycle

Working capital cycle is a cycle made up of current assets (inventory, receivables & cash) and current liabilities (payables and overdraft) . The components of current assets and current liabilities will keep changing form from one to another within a short period of time. For example, inventory change form to receivables when goods are sold, receivables become cash when customers pay, cash is converted to payables when the company pay it's suppliers and payables become inventory again when suppliers become inventory again when they supply goods. Below is an illustration of working capital cycle:



Illustration

The following data relate to Corn Ltd, a manufacturing company.

Turnover for the year	$1,500,000
Cost as a % of sales	%
Material	30
Labour	25
Variable overheads	10
Fixed overheads	15
Selling & distribution costs	5

On average:

- Receivables take 2.5 months before payment
- Materials are in inventory for three months
- WIP represents two months worth of half produced goods
- Finished goods represent one month's production
- Credit is taken as follow:

Materials	2 months
Labour	1 week
Variable overheads	1 month
Fixed overheads	1 month
Selling & distribution	0.5 month

WIP & finished goods are valued at material, labour and variable expense cost.

Required

Compute the working capital requirement of Corn Ltd assuming the labour force is paid for 50 weeks a year.

Solution

The annual costs incurred will be as follows:		$
Direct materials	30% of $1,500,000	450,000
Direct labour	25% of $1,500,000	375,000
Variable overheads	10% of $1,500,000	150,000
Fixed overheads	15% of $1,500,000	225,000
Selling & Distribution	5% of $1,500,000	75,000

Average value of current assets will be as follows:

	$	$
Raw materials 3/12 x 450,000		112,500
WIP: Mat (50% complete) 1/2 x 2/12 x 450,000	37,500	
Lab (50% complete) 1/2 x 2/12 x 375,000	31,250	
V O/H (50% complete) 1/2 x 2/12 x 150,000	12,500	
		81,250
FG : Mat 1/12 x 450,000	37,500	
Lab 1/12 x 375,000	31,250	
V O/H 1/12 x 150,000	12,500	
		81,250
Receivables 2.5/12 x 1,500,000		312,500
Less: Payables		
Mat 2/12 x 450,000	75,000	
Lab 1/50 x 375,000	7,500	
V O/H 1/12 x 150,000	12,500	
F O/H 1/12 x 225,000	18,750	
Selling & Distribution 0.5/12 x 75,000	3,125	
		(116,875)
Working capital requirement		470,625

3 Cash Operating Cycle

Cash operating cycle is the length of time between a business paying for its materials and the business customers paying for the goods made from the raw materials. It equals the receivables' collection period plus the length of time for which inventories are held, less the payables payment period.

(a) Calculating the cash operating cycle:

Receivables collection period

Average receivables / Credit sales x 365 days = days

Inventory holding period

Average inventories / Cost of sales x 365 days = days

Payables payment period

Average payables / Credit purchases x 365 days = (days)

Net cash operating cycle days

The operating cycle is normally longer for manufacturing concerns because of the length of time taken by production cycle. The inventory for a manufacturing concern consists of:

(a) Raw material
(b) Work-in-progress
(c) Finished goods

The operating cycle determine the amount of cash (or working capital) required to be input into the business. The longer the cycle the more working capital the company needs. Management need to watch that this cycle does not become so long.

Ways of reducing operating cycle include:

1. Reduce inventory holding,
2. Speed up debt collection, and / or
3. Delaying payment to payables.

(b) Reducing the Operating Cycle

Techniques include:

1. Reduce raw material inventory holding period
   - Introduce JIT inventory management system
   - Reducing the variety of parts and components and consequently the variety of inventory held.

2. Reducing production time
- Redesign factory layout to facilitate smoother production flow
- Avoid too long waiting time for WIP to enter the next production process

3. Reduce finished goods inventory holding period
   - Apply JIT philosophy : only produce to meet demand requirement…avoid over-stocking of finished goods
   - Regular review of inventory turnover of finished goods with a view to eliminate slow moving and obsolete inventories.

4. Reduce receivables collection period
   - Prompt settlement discount offered to customers
   - Factoring service used.
   - Efficient internal control to ensure proper procedures to collect debt on time

5. Delaying payment of payables
   - Utilise allowed credit period to its maximum
   - Negotiate with payables to delay payment or to arrange for an instalment scheme on payment which benefit the company.

These actions may have the benefit of reducing cash finance required and thus reduces interest cost but with have the negative effect of lower level of inventory & receivables and the danger of higher level of trade payables.

4 Treasury Model

There are two models have been developed for cash management:

(a) Baumol's model

* similar to the EOQ model , following the similar logic:

$$Q \text{ (the extra borrowing required)} = \sqrt{(2FC / i)}$$

where F = fixed transaction costs such as brokers fees
C = cash needed next period
i = cost of borrowing

Limitations of the baumol's model is similar to that of EOQ model:
1. Assumes a steady run down of cash (demand is constant)
2. Allows no buffer inventory of cash
3. There may be economies in bulk selling of securities, although exploiting these would increase the holding cost.

(b) Miller-Orr model

- help the finance manager to keep cash balances within defined limits by buying short-term investments whenever cash goes over the upper limit, and selling them when the cash balances fall below the lower limit.
- Companies must first define a minimum cash balance (buffer inventory)
- The model then defines the spread between the lower limit and the upper limit as:

$$\left(\frac{0.75 \times \text{transaction cost} \times \text{variances of daily cash flows}}{3 \times \text{daily interest}}\right)^{1/3}$$

- Finally a return point is incorporated in the model.

$$\text{Return point} = \text{lower limit} + \frac{(\text{upper limit} - \text{lower limit})}{3}$$

Note: you need not required to derive the model and calculate the levels, only general concept is examinable!

Every time cash balances hit the upper limit, send the balances back to the return point by buying short-term investments. Every time the cash balances falls to the lower limit, replenish it back to the return point by selling short-term investments.

Advantages and disadvantages of cash management models

Cash management models great advantage are that they make management aware of the many variables that affect cash management and the difficult trade off that must be made between liquidity and profitability when deciding how much cash to hold and in which type of deposit or security. The main disadvantage of such models are they ignore the fact that cashflows are to some extent controllable eg, managers can delay some payments and may be able to encourage receipts.

Applicability to public sector

With ever tighter budgets and closer public scrutiny it is vital that public sector bodies are making the best possible use of all their assets. Thus any steps that can reduce the cost of cash transactions is important. If cash management models can improve managerial decisions they must be used.

Illustration

The treasurer of a local government is reviewing her cash management procedures. She plans to introduce the use of cash management models and has asked you to investigate their applicability to the department. The following information is available:

- The dept has agreed with its bank that it will maintain a minimum daily cash balance of £15,000. Severe financial penalties will apply if this balance is not maintained.
- A forecast of daily cash movements for the next twelve months shows variance of daily cash flows of £9,000,000.
- The daily interest rate is at present 0.0236% and this is not expected to change for the foreseeable future.
- The transaction cost for each sale or purchase is £25.

Required

How such model, the Miller-Orr model would operate in practice, using information given above. Your answer should include calculations of the upper and lower limits for cash balances and the return point.

Note: Miller-Orr formula will be given in exam.

Solution

The Miller Orr model provides upper and lower cash limits, i.e. the level of cash balances at which securities should be purchased or sold.

We have to maintain a minimum cash balance of $15,000 with a variance of daily cash flow of $9m and interest rate of 0.0236% per day and transaction cost of $25. The upper limit is $15,000 plus the spread of $26,820 i.e. $41,820 and the return point is $15,000 + 1/3 of the spread of $26,820 i.e. $23,940.

Thus is cash balances reach the upper limit, we should buy securities or put money on deposit to reduce cash to return point and if balances fall to lower limit, sell securities or take money off deposit to replenish cash balances to return point.

5 Short- term Investment

Any temporary surplus funds may be invested in short-term securities to earn extra return:

- Bills of exchange /acceptance credit
- Government treasury bills
- Commercial paper (debt securities sold by companies directly to the market)
- Certificates of deposit (certificates of deposit issued by commercial banks)
- Local authority debt securities

What to do with cash surplus?

This is a very common some of marks allocated in exam question and easy to earn. So make sure you are able to propose some of these points:

1. Repay debt/repurchase share
2. Redeem debenture
3. Pay higher dividend
4. Takeover
5. Replace old fixed assets
6. Invest in short term securities (see 5 above)
7. Training of staff or bonus to encourage better staff support in organisation
8. Social responsibility : donations/anti-pollution project.

6 Payables and Other Short–term Finance

Short-term finance refers to `payables due within one year'

- trade payables
- expenses payables (accruals)
- bank overdraft
- commercial paper
- dividend payable (until dividends are paid the company is using the money earmarked for shareholders as short-term finance in the business.)
- bills of exchange/acceptance credit

Cost of trade credit

Trade credit is easily available and may be *free.* Thus, it is used by almost every business. Furthermore, trade credit is given by supplier without any pledging of assets/securities. However, sometimes the supplier may offer cash discount for prompt payment. In this case, the company will have to decide whether or not to accept the discount. This is done in exactly the same manner in evaluating cash discount for receivables, i.e. compare
(I) discounts received (benefit) with
(II) cost of finance required to repaid the payables (eg. overdraft).

Comparing short term funds to long term funds:

	Short term	Long term
Cost	Lower interest rate	Higher interest rate
Risk	higher as need to negotiate finance more frequent	lower as debt is more permanent in nature
Flexibility	Only take up debt as and when needed, not tied up by unnecessary capital. Interest rate changes.....may benefit if interest rate fall but suffer if interest rate increases	debt obtained for a fixed amount, must still pay interest even if the debt is not required for a temporary period. Fixed interest rate....benefit if market interest rate increases and vice versa
Matching	More suitable for financing current assets	More suitable for financing fixed assets

Bank Overdraft:

Short term funds provided by bank, allowing the current account holders to write cheque more than the balance available up to a certain limit. Interest is **only** charged on outstanding balance and not on the limit of credit facility set. The bank can demand payment of overdraft at any time.

Advantages:
1. Flexibility - can be used as required
2. Cheap - interest only 2-5%; interest charged on amount outstanding only

Disadvantages:
1. payable on demand.....but rarely imposed by bank in practice!
2. security is usually required by way of fixed or floating charges
3. interest cost vary with bank base rate
4. Guarantor may be required

Acceptance credit:

An arrangement with bank where the bank grants a company the facility to draw bills of exchange on the bank (up to an agreed limit) which the bank will accept. Accepted bills are sold in the discount market by the bank on behalf of the company at a relatively low discount. The company therefore obtain finance from the purchaser of the discounted bill.

The cost to the company is the amount of discount on the bill plus the fee payable to the bank for the acceptance credit.

Advantages:
1. The cost of finance is competitive to overdraft
2. The cost of bill of exchange is known when they are discounted and not affected by subsequent changes in interest rate.
3. Acceptance credit can be negotiated for longer period than overdraft.

Disadvantages:
1. only available to quite large company with good credit rating
2. Not as flexible as overdraft

7 Overtrading

Overtrading is also called under-capitalisation, a situation whereby the company activities expanded too rapidly without correspondence increase in capital backing.

Symptoms of Overtrading include:
1. Sales increase rapidly.
2. Receivables increase rapidly (debt collection period increase)
3. Inventory increase rapidly (produces/order at large quantity to cover increase sales demand)
4. Payables & short-term loan increases
5. Liquidity ratio drop rapidly

6. Cash balances drop rapidly (results in overdraft)
7. Sales to assets ratios increases (more intensive use of fixed assets to generate income)
8. Increase in gearing ratio
9. Fall in profit margin (possibly a move to increase sales volume)

Methods to overcome overtrading:

1. Increase equity capital
2. Increase margins (either from higher turnover or higher profit margin ratio), ie the increase in margin/ profit in the form of retained earnings will help to increase equity capital
3. Reduce Investment in fixed assets. (optimise the facilities of leasing, hire purchase or rent)
4. Improve control over working capital (this is the main problem of overtrading which must be overcome)
5. Cut-down on level of activity (the last option!)
6. Increase gearing (if still low) by obtaining long-term loan to help financing .
7. Franchising

Lecture 12

RISK MANAGEMENT: AN OVERVIEW

1 Introduction

Interest rates and exchange rates for the major currencies have fluctuated widely in recent years. This has not been always the case. From 1944 to 1971, member countries to the Bretton Woods agreement - which includes most of the major trading partners - pegged their currencies to a specified number of US dollars or a given amount of gold (set at $35 per ounce). Exchange rate fluctuations during those years rarely exceeded 2 percent.

This stability was threatened by massive US spending in the late 1960's to support the Vietnam War and fuel expansionary fiscal policies at home. By 1971, the number of dollars in circulation was greater than the total U.S. gold reserves, and President Nixon announced that the US dollars would no longer be convertible into gold. The action removed the basis for parity between currencies. Since 1973, European central banks have allowed their currencies to seek their own levels, and the resulting movement in exchange rates (and thus the interest rate, because of the close relationship between the two) have been dramatic. It is not unusual for a currency's value to vary as much as 20% within a year, and a swing of 25% has been recorded in a 3-month period. During the 1997 Asian currency crisis, certain currencies are swinging overnight at more than 50%.

Such volatility has added a new dimension of risk management to organizations, especially that of international business. Organizations will need to identify various types of interest rate/foreign exchange rate exposures, in order to manage the risk created by these volatility.

2 Exposures faced by Organization

Of the two exposures, interest rate exposure is by far more important in the economy, as all organizations will need to engage in either borrowing or lending one time or another (thus will subject to interest rate exposure), while foreign exchange exposure are mainly for international organizations.

We shall begin by describing interest rate exposure faced by organization. These exposures are mainly due to changes in market interest rates.

Organization that is paying fixed rate debt (e.g. loan) will suffer if interest rate decreases (tied up with higher rate earlier), or alternatively it will pay more on floating rate debt if interest rate increases (compare to fixed rate debt).

The level of interest rate risk faced by organizations can be measured by the use of **Gap analysis or netting**, which is based on the principle of grouping together assets and liabilities sensitive to interest rate changes according to their maturity.

Similarly, organization also faced exposures due to changes in foreign exchange rate, which may broadly be classified as follows:

1. **Transaction exposure**
   Changes in exchange rate movement adversely affecting the cash flows of an organization in home currency on 'transaction' already entered like import/export denominated in foreign currencies.

2. **Translation or accounting exposure**
   Changes in exchange rate movement adversely affecting the accounting profits (but not cash flows) of its foreign operations when 'translated' into home currency.

3. **Economic or operating exposure**
   Changes in the exchange rate adversely affecting the international competitiveness (and value of firm) of an organization. This is different from transaction risk only in that it is of long term in nature and the amount of exposure cannot be certain yet. Thus, transaction risk may be view as a short-term economic exposure. Every firm will be affected by this exposure.

3 Main Instruments for Managing Exposures

Having identified exposures of interest rate and foreign exchange rate, financial manager will now need to choose the appropriate methods to manage them, subject to achieving the organizations' objective/policy, and within its constraints.

These methods could be internally available or externally acquired, known as financial instruments (instruments available in the financial market).

Financial instruments available for managing both interest rate risk and foreign exchange rate risk are quite similar in nature and some of the main ones are described below.

Interest rate

1. **Forward rate agreements (FRAs)**
   Agreement, normally between a bank and an organization, on future interest rate for borrowing or lending.

2. **Interest rate futures**
   This is an agreement to buy or sell a standard quantity of particular type of bonds - which will be specified by the futures exchange.

3. **Interest rate options (exchange traded/OTC)**
   This contract gives the right to buy (call option) or sell (put option) interest rate futures, with no obligation to carry out the contract (thus has choice or option). OTC interest rate options give the rights to future interest rate.

4. Interest rate swaps

Agreement between two parties to exchange (swap) interest rate payment, meaningful only if fixed rate payment for floating rate payment.

Foreign currency

It is appropriately argued that only transaction and economic risk need to be managed by financial managers, since they will affect the cash flows (thus shareholders' value) of the company, but not the translation risk (if market is efficient, accounting figures should not affect the shareholders' value).

(a) Main methods for managing transaction exposure.

As discussed, transaction exposure involves transaction already entered, like import/export or borrowing/lending in foreign currency, which adversely affect the cash flow of organization from movement in exchange rate. The amount of exposure is known and thus may be managed by the use of financial instruments.

Internal methods

1. Invoicing in home currency

This is appropriate only if the home organization has higher bargaining power compare to its customers/suppliers.

2. Netting

Exposure will be reduced or eliminated by netting off receipts and payments in the same foreign currencies.

Bilateral netting nets off receipts and payments between two members of a group of companies in two countries. Multilateral netting is in principle no different except that it involves more than two companies within a group.

3. Leading and Lagging

Paying/receiving earlier(lead) or latter(lagging) to take advantage of favorable exchange rate movements. This may be only appropriate for foreign subsidiary/branches.

External methods (financial instruments)

1. Forward contracts

This is an agreement with bank to buy or sell foreign currency at a fixed exchange rate at some future date.

2. Money market
Simultaneously engaged in short term borrowing/lending of both home and foreign currencies to achieve similar result as in the forward foreign exchange contracts. This is possible as interest rate (money market) and foreign exchange rate are closely related by a theorem known as interest rate parity theorem (IRPT).

3. Currency futures
Same as forward contract, except that currency futures contract is highly standardized and is traded in the exchange.

4. Currency options
Option holder has the right to an exchange rate (exercise price) for buying (call option) or selling (put option) a standard amount of currency.

5. Currency swaps
This is an agreement between two parties to exchange currencies at the agreed rate of exchange (swap rate), exchange involved gross interest payment and notional principal.

(b) Main methods for managing economic risk.

Economic risk differs from transaction risk in that it is long term in nature and that the amount of foreign currency has yet to be committed unlike transaction already entered. Since there are still uncertainty in the amount of exposure, external financial instruments will not likely to be used, but that internal methods will usually be used in managing this exposure. These are:

1. Diversifying the suppliers (costs) and customers (sales) worldwide, thus canceling the effect of exchange rates movement.
2. Diversifying operations worldwide, again canceling the effect of exchange rate movement.

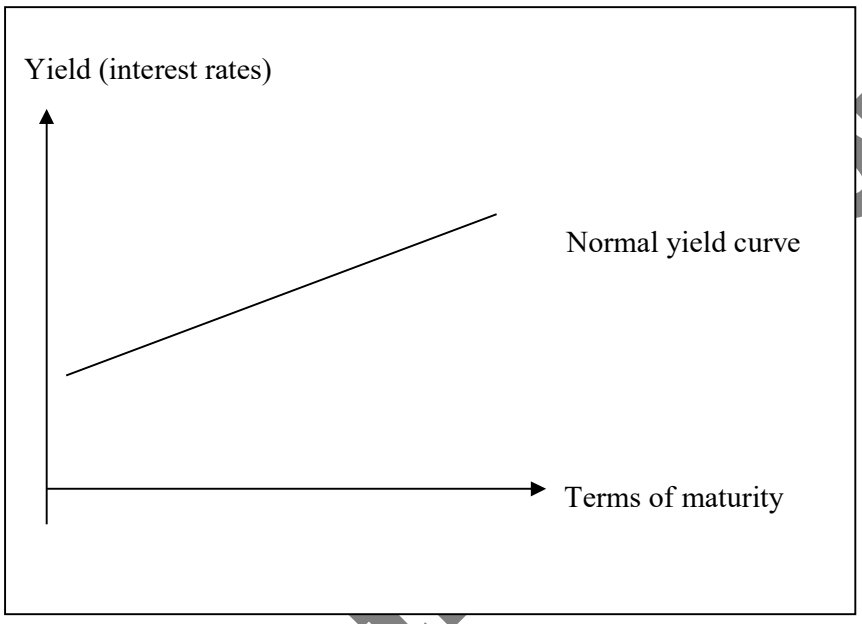
4 Factors to Consider for Managing Exposures

In deciding the appropriate methods to use in managing the both interest rate and foreign exchange risk. The main consideration should be of financial, that is which method will ensure adding the most value (receiving the most) or reducing the least value (paying the least) to an organization. Others include:

1. Risk attitude of company: Company policy
2. Risk exposure: Amount and/or duration of exposure, and volatility of rates
3. Internal methods available
4. Expertise in using the appropriate financial instruments

5 Terms Structure of Interest Rates

No discussion of interest rate is complete without mentioning of the terms structure of interest rates. Terms structure of interest rates refers to the relationship between the interest rates (redemption yield) and the terms to maturity. This relationship when plotted (y-axis = yield, x-axis = terms to maturity) is called the yield curve. A normal yield curve is usually upward sloping, i.e., the longer the terms to maturity, the higher is the yield. An inverted yield curve means the yield curve is downward sloping.



There are three main theories on the terms structure:

1. **Pure expectation theory**
   This theory based solely on investors' expectation on future interest rates. If investors expect that interest rates will rise (fall) in the future, yield curve will be upward (downward) sloping.

2. **Liquidity premium theory**
   This can be seen as an extension of the pure expectation theory, that investors must be compensated for tying up their money for a longer period of time, thus a higher rate of interest must be paid on longer maturity bonds.

3. **Market segmentation theory**
   This theory suggests that interest rates depended entirely on the demand and supply at a particular segment (terms to maturity) of the market.

If we ignore the market segmentation theory, and combine pure expectation and liquidity premium theory, assuming that the investors' expectation on future interest rate is equally divided on up and down (normally distributed), thus resulting in a flat yield curve. But, liquidity premium theory implies that investors will need to be compensated more for longer maturity, thus, resulting in upward sloping curve.

It is extremely important for financial manager to understand the significance of yield curve, as this will help the organization to achieve its financial objective:

1. If the yield curve is very steep, implying that future/long term rates will be very high and thus the financial manager might want to substitute debt capital with equity. Alternatively, if yield curve is less steep, the use of debt financing might be advisable.

2. The need to hedge interest rate risk

6 Theories of Exchange Rate Determination

To explain how exchange rates change, we need to examine their relationships with other key variables, notably inflation and interest rates. These are important for forecast future exchange rates.

A Inflation and exchange rates

Purchasing power parity theory (PPPT) maintains that the rate of exchange between countries' currencies depends on their relative domestic purchasing powers. It relates the determination of equilibrium foreign exchange rates to differences in inflation rates between nations. At a simple level the implication is that exchange rates move to compensate for changes in inflation. The basis of PPP is the 'law of one price': that internationally traded commodities must sell for the same price in every country. If, however, the law of one price does not hold, commodity arbitrageurs will profit by buying in one market and selling in another, so restoring equilibrium.

PPPT Formula:

$/£ Future exchange rate

$$= \frac{1 + \text{US inflation}}{1 + \text{UK inflation}} \times \text{Current exchange rate}$$

Example:

US inflation = 10% pa, UK inflation = 7% pa, current spot $/£ = 2.0000

PPPT implies that US $ will depreciate against UK £ as it has a higher inflation compare to UK.

One year $/£ exchange rate

$$= \frac{1 + 0.1}{1 + 0.07} \times 2.0000 = 2.0561 \text{ (US \$ depreciates)}$$

B Interest rates and forward rates

PPPT relates to traded goods but parallel principles applies to relationships between domestic and foreign prices in the securities markets. The interest rate parity theory (IRPT) implies that the rate of return on financial assets will be equal between nations. The IRPT theory maintains that differences in national interest rates for securities of similar risk and maturity should be reflected in the forward exchange rate discount or premium at which one currency is bought or sold forward against another.

IRPT Formula:

€ /£ Forward rate

$$= \frac{1 + \text{Euro interest}}{1 + \text{UK interest}} \times \text{Current exchange rate}$$

Example:

Euro interest = 3% pa, UK interest = 7% pa, current € /£ = 2.0000

IRPT implies that Euro will appreciate (forward premium) against UK £ as it has a lower interest rate compare to UK.

One year € /£ Forward rate

$$= \frac{1 + 0.03}{1 + 0.07} \times 2.0000 = 1.9252 \text{ (€ appreciates)}$$

Central to IRPT theory is the concept of interest arbitrage, namely short-term capital movements to optimize interest discrepancies in international money markets. Arbitrageurs ensure that, in the absence of market imperfections, funds are attracted to where they will be most profitable. Their borrowing in low-cost centers and investing in high-cost ones, helps eliminate these differentials as interest rates are raised in the low-cost centers and lowered in high-cost ones.

Interest rate parity is achieved when the positive interest differential equals the forward discount on the foreign currency (expressed annually). In effect high interest rates on a currency are offset by forward discounts and low interest rates by forward premiums. When this holds there is no advantage to borrowing or investing in specific markets or from covered interest arbitrage.

7 Foreign Exchange Markets

This is the market place for exchanging foreign currencies. It is the same as any ordinary market, that the price (exchange rate) is determined by the supply and demand of currencies. It differs from other traditional market in that it does not have a particular market place, but is link by both physical market place (e.g. money changer/bank), as well as non-physical market place like the use of telephone, fax, electronics transfer, and computers.

There are basically two types of foreign exchange market; these are the spot foreign exchange market (spot market) and the forward foreign exchange market (forward market).

Spot market involves the physical exchange/delivery of currencies on the spot (now, or up to two days), the associated rate is known as spot rate. Smaller amount can usually be achieved with the moneychangers, banks, or even hotels. A larger amount will usually need the involvement of the banks.

A forward market involves the physical exchange/delivery of currencies sometime in the future, with all the terms agreed today.

The spot and forward markets for foreign currencies depend very much on economics theory. The existence of a spot or forward market for a particular currency will depend on sufficient demand for that currency.

Lecture 13

HEDGING RISK

1 Introduction

In this lecture we shall concentrate on the evaluation of each hedging strategies. An understanding of the characteristics of these financial instruments is essential in carrying out the evaluation. We will first look at the different participants in the financial markets, followed by the characteristics and evaluation of each financial instrument.

2 Market Participants

1. **Hedgers**: trade in the financial markets to reduce or eliminate some pre-existing risk exposure.
2. **Speculators**: trade in the financial markets in pursuit of profits by accepting the market risk. This risk is usually passed on from the hedgers.
3. **Arbitrageurs**: trade in the financial markets in pursuit of riskless profits. This is only workable temporary, when there is inefficiency in the pricing.

Our concern here is only on using financial instruments to hedge (ie. hedgers)the foreign exchange risk that is either to reduce or to eliminate the foreign exchange risk.

3 Financial Instruments: Hedging transaction exposure (foreign exchange)

(a) Forward Contract

Forward contract is a private agreement on future exchange rate, usually between an organization and a bank, to buy/sell a particular currency.

Items need to be agreed are:
1. Currencies- need to specify the type and amount
2. Forward date - date for future exchange/delivery of currencies
3. Forward rate – agreed rate to be exchange

Forward contract is easily tailor-made to the need of the company in terms of the items described. It is also known as over-the-counter (OTC), to differentiate it from exchange traded contract in the futures and options discussed later.

There are basically two types of forward contract; these are the fixed forward foreign exchange contract (or forward contract) and option forward foreign exchange contract (or option forward). The two differ only in the delivery date.

Fixed forward will require the contract to be carry out on a particular (fixed) date, while option forward have the option/choice of carrying out the contract for a period of specified time in the future - like option 3 - 5 months, meaning the contract may be carry out in 3 to 5 months' time from today.

We may use the forward contract to hedge the foreign exchange risk. It is quite simple to carry out the hedge, start with this question, are we receiving or paying foreign currency? If we are to pay foreign currency, then we will need to buy foreign currency in order to make payment. Thus, we will need to buy foreign currency in the forward contract, and since the forward rate is fixed now for future delivery, we are ensure of the amount of home currency we will be paying regardless of the movement in the foreign exchange rate, and risk due to foreign exchange rate is eliminated.

Summary

1. Importer - payment of foreign currency:
   Buy foreign currency forward at agreed rate of exchange, thus will be able to know the exact amount to be paid in home currency.
2. Exporter – receipt of foreign currency:
   Sell foreign currency forward at agreed rate of exchange, thus will be able to know the exact amount to be received in home currency.

In both cases, using forward will no longer subject an organization to any foreign exchange risk, thus hedging (this case, foreign exchange risk is eliminated) is achieved.

Before proceeding to currency futures, we may look at how money market can be substituted for forward, as interest rate is closely associated to the foreign exchange rate.

Example: Forward hedge (Importer's case)

Andrews Ltd (UK) has entered into a contract on 1 May to buy a machine from a French company for € 7m payable in 3 months' time on 1 August.

Extract from the Financial Times on 1 May states:

€	
Spot	8.1102 – 8.1126
3 months	7.9827 – 8.0201

Required

Calculate payment (in UK pound) made by Andrews if entered into forward contract?

Solution

Buy machine: Importer case

Need to buy € 7m in order to made payment

Forward rate (buy euro) = € 7.9827

Payment (£) = € 7m / € 7.9827

= **£876,896**

(b) Money Market Hedge (or Synthetic Forward)

Money market refers to short-term (less than one year) borrowing/lending. Money market hedge refers to hedging of foreign exchange rate risk with the use of borrowing and lending of different currencies. The hedge created would be similar to the forwards, thus also known as synthetic forward. In fact, such hedges were historically used by traders long before the existence of forward contracts were make available and are still useful today, as an alternative to forward contracts or for currencies where forward contracts are not available.

Importer's case
Suppose a British company needs to pay $ in three months' time. It does not have enough money to pay now, but will have sufficient money in three months' time. The company may construct money market hedge follows:

Now:
1 Borrow appropriate amount in £ from UK bank.
2 Buy $: using the amount borrowed (£) at current spot rate.
3 Deposit the $ amount into US bank earning $ interest.

Later: (3 months)
1 Pays the creditors out of the US $ bank account
2 Repays the £ loan account

The effect is exactly the same as the forwards: pay in £ in three months.

Exporter's case: receipts of foreign currency ($)

Now:
1 Borrow appropriate amount in $ from US bank.
2 Sell $: using the amount borrowed ($) at current spot rate.
3 Deposit the £ amount into UK bank earning £ interest

Later:
1 Pays the US bank out of the US $ receipt from customer
2 Receives the £ from UK bank on deposit

Example: Money market hedge (Importer's case)

Example as in Andrews (forward hedge)

Suppose that on 1 May, interest rates are as follows

	Deposit	Borrow
Sterling	10.58%	10.88%
Euro	4.50%	6.68%

Calculate the payment made by Andrews if using money market hedge?

Now:	Later (3 months)
1. Borrow £ 0.8535m (10.88%)	Payment = £0.8535 (1 + 0.1088 X 3/12)
2. Buy € at 8.1102	= **£0.8767m**
3. Deposit € : x (4.5%) x (1 + 0.045 X 3/12) = € 7m x = € 6.9221m	

Example: Forward vs Money Market hedge (Exporter's case)

Mary Ltd (UK) has export goods to the USA, and will receive $4,000,000 in 5 months' time. The company's finance director wishes to hedge against the foreign exchange risk, and the two methods which the company usually considers are:

1. using forward contract
2. using money market

The following annual interest rates and exchange rates are currently available:

Interest rates

US 7.75% - 8.25%

UK 5.45% - 6.65%

Exchange rate

$/£

Spot 1.8525 – 1.8535

5 months 1.8589 – 1.8599

Required

Which is the cheaper method for Mary Ltd?

Solution:

1. Forward contract: Receives foreign currency ($4,000,000)

Sell foreign currency, forward 5 months, forward rate = 1.8599

Receipt (£) = $4,000,000 / $1.8599

= **£ 2,150,653**

2. Money Market:

Now	Later (5 months)
4. Borrow $: $3,867,069 (8.25%) x (1+ 0.0825 x 5/12) = $4,000,000	
5. Sell $: 1.8535	
6. Deposit £: (5.45%) £2,086,360	Receipt = £ 2,086,360 (1 + 0.0545 x 5/12) = **£2,133,738**

Forward contract is preferred.

(c) Currency Futures

This is similar to forward in that it is also an agreement to buy or sell a particular currency sometime in the future, except that it is highly standardized. It is traded in an organized exchange - in London, the exchange is known as LIFFE - London International Financial Futures and Options Exchange.

General characteristics of the futures include:

1. Organized Exchanges

Exchanges are nonprofit association of members. Exchange membership is called seats on the exchange. Only members have the right to trade futures on the exchange. Futures contracts are traded face to face, at exchange trading floor, in what is called an open outcry market.

2. Standardized Contract Terms

A major different between forwards and futures is that futures contracts have standardized contract terms. Futures contracts specify the following:

(i) Quality and quantity of goods (currency, bonds etc) that can be delivered
(ii) The delivery time, and the manner of delivery
(iii) The minimum price movement (tick size), a daily price limit, which sets the maximum price movement allowed in a single day

It would appear that these rules would restrict trading activity, but, in fact, they stimulate trading. Why? Standardization tells traders exactly what is being traded and the conditions of transaction. Uniformity promotes market liquidity.

3. The Clearinghouse

Each exchange has a clearinghouse. The clearinghouse guarantees that traders in the futures market will honor their obligations. The clearinghouse does this by splitting each trade once it is made and acting as the opposite side of each position. The clearinghouse acts as the buyer to every seller and seller to every buyer. By doing this, the clearinghouse allows either side of the trade to reverse positions later without having to contact the other side of the initial trade. This allows traders to enter the market knowing that they will be able to reverse their position any time that they want. Traders are also freed from having to worry about the other side of the trade defaulting, since the other side of their trade is now the clearinghouse.

4. Margin and Daily Settlement

To safeguard the clearinghouse, the exchange requires traders to post margin and settle their accounts on a daily basis. Before trading, the trader must deposit funds (called initial margin) with their broker (who, in return, will post margin with the clearinghouse).

The purpose of margin is to ensure that traders will perform their contractual obligation.

There are three types of margin.

(i) Initial margin: Initial margin must be posted before any trading takes place. Initial margin is fairly low and equals about one day's maximum price fluctuation. The margin requirement is low because at the end of every day there is a daily

settlement process called marking-the-account-to-market. In marking-to-market, any losses for the day are removed from the trader's account and any gains are added to the traders account.

(ii) Maintenance margin: If the margin balance in the trader's account falls below a certain level (called the maintenance margin), the trader will get a margin call and need to deposit more money ((iii) called the variation margin) into account to bring the account back to the initial margin level.

5. Closed the futures

Futures are normally settled by closing with offsetting position, i.e. if sell futures, and may be closed by buying back the futures and vice versa. This is because transaction date does not match delivery date for the futures.

6. Currency Futures

Futures contracts are traded in £, euro, yen, SF, A$ etc. These are traded on the International Monetary Market (via local futures exchanges like LIFFE, though currently not active). Futures prices are normally quoted in US $ per unit of the futures (e.g., US $ per £), and delivery of currency is standardized every 3 months (usually) period, namely March, June, September, and December.

What makes a hedge work is the fact that cash and futures prices for the same currency tend to moved up and down together, so the losses on one side are canceled out by gains on the other.

General steps: Currency futures hedge

NOW:
1 Decide whether to buy/sell currency futures
2 Determine which futures to trade
3 Decide on the number of contracts to buy/sell
4 Tick value = tick size X contract size

LATER:
1 Cash transaction (buy/sell or foreign currency on spot)
2 Futures transaction, need to close the futures position and decide how much gains/losses in the futures.
3 Determine the net receipts or payments in home currency.

Hedge efficiency

This is simply defined as profit divided by the loss in a futures hedge multiplying by 100%. This is use to measure how closely the futures hedge is able to cancel out the movement in the foreign exchange rates. In futures hedge, usually it is not perfectly hedge like in the forwards. Two reasons why this is so:

1. Futures only deal with whole contracts, thus the hedge will need to be rounded causing inaccuracies.

2. Spot rate and futures price may not moved perfectly when closed (known as basis risk)

Example: Futures hedge (Importer's case)

Dick pls is due to pay $2,780,000 to a US company in 2 months' time. It is now March 15. Dick pls wishes to hedge risk using currency futures.

Current spot rate is $1.6234/£
Futures contracts are currently available with the following rates:

June	$1.6289
September	$1.6302
December	$1.6324

Contract size: £25,000
Tick size: 0.01 cents

Required

Evaluate the hedge using futures if in 2 months:
The spot rate is $1.4657/£ and
Futures price is $1.4721 for June contract

Solution:

Now (March 15): Sell 68 June futures at $1.6289

Supporting calculation:

1. Sell £ futures (Pay $/Buy $ / Sell £)
2. Delivery date: June $1.6289
3. Number of contracts = {$2,780,000/$1.6289} / 25,000
   = 68.26 or 68 contracts
4. Tick value = $0.0001 X 25,000 = $2.5

Later (May 15)

Cash Transaction	Futures Transaction
Payment (£)	Sell : $1.6289 (March 15)
= $2,780,000/$1.4657	Buy: $1.4721 (May 15)
= £ 1,896,705	Profit: $0.1568/$0.0001
	= 1568 ticks
	Profit = $2.5 x 1568 x 68
	= $266,560 / $1.4657
	= £181,865

Net Payment = 1,896,705 – 181,865 = **£1,714,840**

7. Forwards and Futures

1. Forwards are private contracts and do not trade on an organized exchange. Futures contracts trade on organized exchanges.

2. Forwards are unique contracts satisfying the needs of the parties involved (for large organization). Futures contracts are highly standardized. A futures contract specifies the quantity, quality, delivery date, and delivery mechanism (good for small entity).

3. Forwards have default risk. The seller may not deliver, and the buyer may not accept delivery. With futures contracts, performance is guaranteed by the exchange's clearinghouse.

(d) Currency Options

A currency option is contract giving the right but not the obligation, to the holder, to buy (call) or to sell (put) a specific currency (the underlying asset) at an agreed price known as exercise/strike price. Thus the options holder has the choice of exercising at the exercise/strike price or of walking away from the contract.

To obtain the right, option holder will need to pay an amount of money known as option premium/price to the option writer (seller of option), who will have the obligation to do something (to buy or to sell currency) when requested by the holder.

Unlike forwards or futures, options may be able to take advantage if exchange rate moved in the company's favor, as they have the choice of not carrying out the contracts (not exercising the contracts).

4 Financial Instruments: Hedging interest risk

(a) Forward Rate Agreements (FRAs)

These are the interest rate equivalent of a forward contract. Companies are able to fix future interest rates on borrowing or lending for a specific period with a bank. The important difference between a FRA and a forward contract is that when a bank enters the FRA, it agrees the future interest rate but it does not agree to borrow or lend the money (thus, any difference will paid between them) which will arranged separately. FRAs are usually for at least £500,000 or the equivalent in other major currencies. This will create a perfect hedge as organization is fully protected from adverse movement of future interest rate.

(b) Interest Rate Futures

All of the basic principles relating to currency futures apply equally to interest rate futures. However there are two differences.

1 As with all futures, an interest rate futures is an agreement to buy or sell some commodity at a fixed price sometime in the future, the commodity is usually government loan stock (T-bills)
2 It is important to understand the relationship between market interest rates and price of gilts/treasury bills. Market interest rate is inversely related to the price of the gilts/treasury bills. The price of the futures can be found by taking 100 less the expected future interest rates.

Hedging interest rate risk with futures contracts
The procedure is the same as for foreign currency discussed earlier.

Borrower's case:
Concerned that future interest rate will increase, and price of T-bill will decrease. And cash price and futures price will likely to move together like foreign currency. To create an offsetting position, will need to sell the futures first.

NOW
1 Sell interest rate futures (Borrower)
2 Determine futures delivery date and futures price
3 Calculate the number of contracts
4 Tick value

LATER
1 Cash market transaction (Actual borrowing)
2 Futures gains/losses
3 Net interest payment

Depositor's case:

Same as borrowers case, except that need to initially buy futures. The procedure reverses for lenders, as they are concerned for interest rate falling, and T-bill price to rise, will buy futures first, and later if interest rates fall, will sell to make gains in order to offset the loss in deposit income.

Generally, as with foreign exchange hedges using futures, if interest rates moves against you, the futures will protect you. Any loss you suffer on the underlying cash position (actual borrowing or lending) is offset by the profits on the futures deal. However, should interest rates move for you, and they might, any gain on the underlying cash position is wiped out by the loss on the futures position. Thus, with a futures hedge, you cannot lose (too much) but you cannot win (too much) either.

(c) Interest Rate Options

There are basically two types of interest rate options, these are traded options and OTC options. Lets' consider traded options first.

1. Traded interest rate options

A traded interest rate option gives the right, but not the obligation, to the holder to buy (call option) or to sell (put option) an interest rate futures up to an agreed future date (delivery date) at a specified price (exercise price). Note that it is slightly different from the traded option in currency, where here it is actually an option on futures, unlike in currency, option on buying or selling a particular currency.

Interest rate option may be obtained with expiry dates up to one year. As with traded currency options anyone can buy a traded option but only members of the exchange can write traded options.

2. OTC options

These are longer term hedging techniques for interest rates. FRAs have a maximum life of two years, futures are up to two years and traded interest rate options are only up to one year. OTC options such as Caps, Floors, and collars can have a life of up to ten years, so can interest rate swaps. Short-term OTC options, i.e. Up to one year are called interest rate guarantees (IRG).

(a) Caps

These are an upper limit to the interest rate that will be paid on a loan. They are separate from the underlying loans (like FRAs). The bank charges a (option) premium and then makes the appropriate payments on relevant future dates. The advantage of a cap is that it limits the exposure of borrowers to upward rate movements while allowing them to benefit from interest rate reductions.

(b) Floors

These set a lower limit to the interest rate that lenders will receive. The same principle apply as for caps but this time they are used to limit the exposure of lenders to downward interest rate movements while allowing them to benefit from upward interest rate movement.

(c) Collars

These are a way of reducing the cost of a cap or a floor. The borrower buys (pays premium) a cap from the bank and then reduces the cost by selling a floor (receives premium). This way if interest rates rise, the borrower is protected, but if rates fall the bank is guaranteed of a minimum rate from the borrower. The borrower will not get the full benefit when the rate falls. The effect of a collar is to set the upper and lower limits on what a borrower will pay for a loan. Lenders may construct a collar by buying a floor (minimum rate) and recovering part or all of the cost by selling a cap thereby setting an upper and lower limit to the interest they will receive.

Lecture 14

BUSINESS VALUATION

1 Introduction

Assuming that a business has the necessary finance, and has decided the way in which it will grow, it has two ways of achieving its objective. It can either grow internally by developing new markets or products, or it can acquire another business that has already done so. The first alternative is called internal or organic growth, and the second is growth by acquisition.

2 Organic Growth

A. Management

Where a business wishes to grow organically, it has to ensure that all the necessary resources are available and all the functional areas of the business work together. For a business to grow organically, it needs to ensure that its goods and services are of the appropriate quality, that it can produce them in the correct quantities and that it can market them profitably. To do this it will need equipment and buildings, skilled people and the necessary finance. Often a business will find that a shortage of one of these resources limits the business's ability to grow, and that resource is known as the critical or key resource.

Even where a business has adequate resources it needs to coordinate their use. Businesses should ensure that the various functional areas do not adopt policies that conflict with each other. The various policies should all flow from the overall objectives. It is common practice to allow each department to play some part in setting its targets. Where businesses do this they have to ensure that these targets are all consistent with each other and the overall plan and that the combined effect is to increase shareholders' value.

B. Evaluation

A business should evaluate proposals for organic growth in the same way that it evaluates all investment proposals. However, the data used will often be very imprecise and may lack detail. An important part of any evaluation process is to ensure sufficient relevant information is available, and businesses will therefore adopt some form of decision support system. Decision support systems come in many forms, but their purpose is to gather data from outside the business to allow the managers to make better decisions about the future.

It is important to develop the decision support systems in the correct way. Unfortunately, many businesses do things the wrong way around: they develop an expertise or a source of information and apply the knowledge gained to whatever problem they have. The managers should instead decide what information they are likely to need and find a means of getting that information. The information need must determine the nature of the decision support system. the company must not design the

decision support system around the nature of the information currently available, otherwise it will not receive all the information it needs.

The quality of analysis is as important as the quality of the information. If the company has decided its objective is to increase the shareholders' value it needs to make decisions based on cash flows rather than profits. An analysis that ignores mediocre cash flow information in favor of reliable profit information will not lead to the best decision, no matter how good the profit information.

C. Monitoring

Once management has made the investment decision, it needs to monitor progress to ensure the business is achieving its targets. Businesses usually make investment decisions on a discounted cash flow basis yet they often monitoring performance using historical cash information and accounting data such as earnings growth. Although these figures are important information they are not consistent with the way in which the decision was originally made. The monitoring system must measure how well the business is achieving its objectives if it is to be of any use. Accordingly the monitoring system must use prospective cash flow information as well as accounting data.

The business may have set targets such as market share, sales levels or earnings per share. However, although these targets are prescribed for individual departments, for the business as a whole they are merely milestones along the path towards increasing shareholders' value – they are not targets in themselves. The monitoring process should generate corrective action based on the overall objective, not the specific targets.

The purpose of a monitoring system is to detect departures from the plan and to take appropriate action. In most cases the action will be designed to bring the business back on target. However, the monitoring process may detect that the plan was too optimistic or too pessimistic and so the targets might need to be revised. The process might also establish that the outside environment has changed to an unexpected extent and so the objectives might need to be completely revised.

3 Growth by Acquisitions

A. Why acquisition?

As discussed earlier, a company that decides to grow organically needs extra resources just to fuel the process of growth. If it grows by acquisition it will not need those resources. Similarly, to grow organically takes time. If the company has set itself targets to achieve within a particular time limit, it may need to acquire the necessary skills.

Companies wishing to growth vertical integration may find it easier to grow by acquisition rather than by organic growth. A company undertakes vertical integration when it manufactures its own raw materials rather than buying them in or sells to the final consumer rather than using intermediaries. In these circumstances growth by acquisition allows a company to acquire a ready-made business without the need to develop new markets or search for new customers.

Sometimes an acquisition is the only way to break into a market or maintain position in it. For example, the company may need access to a particular technology before it can pursue its strategy. If another business owns the technology, that business may not be willing to license its use. An acquisition may be the only way to acquire the technology or the skilled people. Alternatively, if a business is trying to enter a foreign market it may find it easier to do so by taking over a foreign business. Some countries insist that all businesses have at least some shareholders who are citizens of that country, and one way to expand into those countries is to acquire a majority shareholding in an existing company.

To summarize, growing by acquisition is probably desirable only if organic growth cannot achieve the targets that the company has set. This may be because this is the only way the business can get a particular critical resource, or because the time taken to grow organically would be unacceptable to the company's shareholders. In other circumstances the cost of buying the other business may outweigh the benefits obtained from owning it.

B. Experiences

We have already seen that one reason for growth by acquisitions is that it is quicker than organic growth. Where managers are judged according to short-term performance they will have a tendency to prefer growth by acquisition. Many commentators believe that growth by acquisition is more common in the Australian, UK and US economies (refer to as capital economies) than it is in other economies such as continental Europe and Japan. It is certainly true that highly contested takeover battles are more common in the three economies mentioned. To understand why may be the case one has to consider the pattern of company and share ownership in the various economies and the parts played by banks in financing companies.

In the capital economies the large businesses tend to be public quoted, and most of their share capital is actively traded. In countries such as Germany the companies tend to be privately owned and even where they are publicly quoted members of the founder's family often hold much of the share capital and usually sit on the board of directors. Some people think that the stock exchanges in the capital market economies take too short term a view and do not allow a company time to grow organically.

The position in the capital economies is further complicated by the nature of share ownership. The largest shareholders are not individual investors, but institutional investors such as pension funds, insurance companies, and investment trusts. These investors tend to be portfolio investors and thus concerned with the company's return relative to its beta factor rather than the company's future as such. This does not mean that these investors necessarily take a short-term view. However, these institutions compete for funds to manage and the main basis for competition is their past performance, which is often judged over periods as short as five years. The fund managers thus come under pressure to show short-term gains, which puts pressure on companies to produce short-term results.

The position in other economies is different. The greater proportion of shares held by managers means that they can take a longer-term view without the worry that other people could acquire the company and dismiss them. This removes one of the main attractions of growth by acquisition.

3 Financial Profile

The acquisition of a target will have a major effect on the financial profile of the new group. The likely impact of various forms of payment or debt will be a major consideration during the preparation of an offer, in both the short term and the long term, a series of considerations can be identified.

1. Market value during the takeover

The acquirer will always be interested to see what the market makes of a potential acquisition. A boost in the share price can be seen as support for claimed synergies, a fall as the reverse. However, where a share-for-share offer is being made, falls or increases in the share price will have a major effect on the financial success or failure of the deal. In the past there have been examples of companies engaging in a variety of illicit operations to maintain their own share price during an acquisition.

2. EPS and P/E ratio

Despite the attempts of the IASB to persuade the users of published accounts to look beyond EPS to a broader and more meaningful range of indicators, the analyst community continues to place great importance on EPS as a measure of sustainable earnings per share and current performance. Yet EPS is based on accounting figures that are prepared for reporting purposes and are not intended to be a measure of current value.

Remember that the P/E ratio is seen as an indicator of growth. A high P/E represents a perceived high potential and the likelihood of growth. After a takeover, EPS will go up or down depending on the target's P/E ratio. The market's perception of the takeover will already have been reflected by share price movements during takeover. The new P/E and EPS are calculated on the combined results of the group. In general, if the target has a higher P/E than the acquirer, the combined group will have a lower EPS than the acquirer had before the takeover.

Bearing in mind the importance of the EPS as an indicator of performance, companies might be expected to show a certain reluctance to acquire companies with higher P/Es. Again, such an approach shows the danger of using an accounting ratio to assess performance. The acquisition of a high-quality company able to generate long-term profits will restore the EPS over time through high growth. Equally, a company may wish to acquire a company with poor earnings but with a strong asset base, perhaps to asset strip or to put those assets to better use inside the new group.

4 Equity Valuations

Despite the importance of calculating the value of an acquisition target correctly, the evaluation process is an art, not a science. It offers little certainty. There are a number of valuation techniques. The main valuation techniques will first be discussed by looking at acquisitions and mergers in quoted companies.

1. Earnings method: P/E ratio

A valuation based on the price-earnings (P/E) ratio and earnings per share (EPS) used to be one of the most popular ways to value a company. The price-earnings ratio ascribed to the target represents the number of years' earnings the acquirer is prepared to pay for it. If the earnings per share are multiplied by the chosen P/E ratio, the result is the price the bidder will offer per share. Multiplying the price per share by the number of shares in issue gives the bidder's valuation of the whole company.

During the 1960s and 1970s a valuation based on EPS was considered to be the most important stock market indicator of performance, and P/E ratios played an important part in valuation. For several reasons the P/E approach has fallen from grace:

1. The P/E ratio is produced from accounting data and is not based on an economic assessment of the company's position.
2. It reflects a snapshot of profits which for many reasons will change from year to year.
3. It is difficult to build post-acquisition synergies into a P/E calculation, except by the most crude adjustment of the P/E ratio, perhaps by the use of a P/E based on the weighted average of the two companies.

2. The dividend valuation model

For an individual shareholder the value of a share can be argued to be the value of all future dividends into perpetuity. This is the maximum amount that a particular shareholder will be able to earn from the share. This method of valuation is open to question:

1. It assumes that dividend policy accurately reflects the future cash flow, capital growth or shrinkage of the company, but where a company is about to be taken over shareholders often anticipate a change of dividend policy.
2. It is reliant on potentially unreliable prediction of growth rates and rates of return.
3. It assumes that the shareholder is only interested in dividends; such a case might be made for a minority shareholder reliant on dividends for income but there are few other instances where a strong case can be made for this approach.

3. Asset valuation

Asset valuation is based on a simple formula, that the value of the tangible and intangible assets of the business, less the value of liabilities gives a net value which can then be used to set a price per share. This model is unsatisfactory:

1. It is difficult to put a value on the intangibles.
2. The valuation given to fixed assets can rarely reflect the value of the asset in the business generating profits, but will usually reflect current prices for those assets.
3. Many modern businesses are composed almost entirely of intangible assets, such as staff.
4. No account is taken of the capacity to generate profits, cash flow or dividends.

The asset valuation approach is usually only used for small companies where information allowing the use of more sophisticated valuation tools is seldom available.

The Berliner method tries to combine information on earnings and assets to achieve a valuation, thus overcoming some of the limitations of both the assets and earnings approaches. A simple average of the two values is taken. There is no theoretical justification, the approach is just a rule of thumb and is, again, more suited to smaller entities in the absence of a better approach.

The valuation of a target could also be carried out by examining the strength of its profits. A company is expected to earn a normal rate of return sufficient to match the use of the assets invested. Any profits earned in excess of this amount are 'super-profits' resulting from synergies and competitive advantages. A bidder pays the value of the company's assets to reflects normal assets and a number of years' super-profits. The multiple for the last figure would be the point for negotiation.

4. Net present value (NPV)

The present value of the cash flows that a target will bring to a group is the benefit that can be obtained from an acquisition. The beneficial cash flow can be calculated in two ways:

1. The operating cash flow generated by the target business standing alone
2. The operating cash flow of the target plus the gains resulting from combined entity after acquisition.

The simple stand-alone valuation is likely to provide a more conservative figure of the benefits of an acquisition. As synergy-related benefits are usually difficult to quantify, the stand-alone figure can provide a useful baseline. The normal practice is to calculate the incremental cash flows as the difference between current cash flows for the acquiring operation and cash flows after the takeover.

The estimates used in making the bid will be weighted to reflect the acquirer's wish to pay as little as possible. The first element of the evaluation of the target is relatively simple: the examination of historical information and the establishment of trends in the company's activity. The difficult part of the process is to project historical information into an uncertain future. Thus an acquirer can only employ estimated cash flows for a few years after acquisition before inputs become meaningless. For longer-term cash flows companies either use a perpetuity or plan for a set number of years.

Both stand-alone and synergy-related calculations will use a discount rate based on the systematic risk of the acquired business, not of the new group as a whole. On a takeover an acquirer is usually not just to add the value of the target's cash flow to his own, but to achieve further profits through the synergies between the two operations. Except where a company is merely looking to diversify into an entirely different business, the assessment of synergies will provide key indicators suggesting that a takeover will add value and that the company should proceed with a bid. Synergies also act to persuade companies to pay above a target's initial market price. If a bidder can estimate the value of the

synergies to be gained from a merger then he can add that value to the beneficial cash stream from the target business.

So far we have concentrated on quoted companies. The problems encountered in valuing unquoted companies requires a different approach. The acquirer will generally gather as much information about the company and its sector as possible. This will seldom give enough data to allow the use of present value or CAPM techniques, except in the case of largest private companies. The evaluation techniques generally used are:

1. Asset valuation, which may be most relevant to the owner of a private company as offers will be few and future earnings difficult to calculate.
2. The P/E ratio approach, with the P/E adjusted downwards for the lack of marketability. Berliner method could be used to combined assets and earnings method
3. The dividend approach. This is best used for the valuation of a minority holding as it is difficult to adjust it to impose a premium for control.
4. The super-profits approach

4 Debt Valuations

- Debt is always quoted in $100 nominal units, or blocks; always use $100 nominal values as the basis to your calculations.
- Debt can be quoted in % or as a value, eg 97% or $97. Both mean that $100 nominal value of debt is worth $97 market value.
- Interest on debt is stated as a percentage of nominal value. This is known as the coupon rate. It is not the same as the redemption yield on debt or the cost of debt.
- Always use ex-interest prices in any calculations.

1. Irredeemable Debt

For irredeemable bonds where the company will go on paying interest every year in perpetuity, without ever having to redeem the loan.

For example, if the cost of debt is 7% before tax and 5.6% after tax, and the rate of tax is 20%, the market value of irredeemable debt with a coupon rate of 6% will be:

P0 = 6/0.07 = 85.71, or
P0 = 6(1 – 0.20)/0.056 = 85.71

2. Redeemable Debt

The valuation of redeemable debt spends on future expected receipts. The market value is the discounted present value of future interest receivable, up to the year of redemption, plus the discounted present value of the redemption payment.

Example
A company has issued some 9% bonds, which are now redeemable at par in three years' time. Investors now require a redemption yield of 10%. What will the current market value of each $100 of bond be?

3 years annuity factor @ 10%: 2.487
3 years discount factor @ 10%: 0.751

Net Present Value of Redeemable Debt: 9 x 2.487 + 100 x 0.751 = $97.48

3. Convertible debt

When convertible bonds are traded on a stock market, its minimum market price will be the price of straight bonds with the same coupon rate of interest. If the market value falls to this minimum, it follows that the market attaches no value to the conversion rights.

The actual market price of convertible bonds will depend on:

- The price of straight debt
- The current conversion value
- The length of time before conversion may take place
- The market's expectation as to future equity returns and the associated risk

If the conversion value rises above the straight debt value then the price of convertible bonds will normally reflect this increase.

Example

What is the value of a 9% convertible bond if it can be converted in 5 years' time into 35 ordinary shares or redeemed at par on the same date? An investor's required return is 10% and the current market price of the underlying share is $2.50 which is expected to grow by 4% per annum.

Solution

Conversion value = $P0 (1 + g)nR = 2.50 \times 1.045 \times 35 = \$106.46$

Present value of $9 interest per annum for 5 years at 10% = $9 \times 3.791 = \$34.12$

Present value of the conversion value = $106.46 \times 0.621 = \$66.11$

Current market value of convertible bond = 34.12 + 66.11 = $100.23

Lecture 15

EFFICIENT MARKET HYPOTHESIS

1 Introduction

Consumer seeks to maximise utility for any amount of money spent. The shareholders (who are also consumers) invest money in shares of companies will demand **maximum return** on their shareholding. For them to invest in a company's shares, the company must offer return *at least as good as available elsewhere for the risks they are taking and also at least as good as spending the money now.* If not, they will take their money elsewhere.

Return of shares is calculated based on consideration of both dividends received from the shares and any change in value *over the period concern*. Take note that most theory under FM is based on **single-period model**, i.e. all valuation is based on a single specified period of return only and may not be valid for other periods.

Return = Dividend yield + Capital gain in % term

Return could be an expected return *(ex ante)* based on subjective probability, or it could be measured historically *(ex post)* based on past performance.

Illustration

A dividend of 10p per share was paid during period 1 on a share whose value was 100p at the start of the period and 150p at the end. Calculate the return on this share.

Solution

$$\text{Return} = \text{Dividend yield} + \text{Capital gain}$$

$$= \frac{10}{100} + \frac{150 - 100}{100}$$

$$= 60\%$$

Thus, return on investment depends on:
(i) future dividend payments - which depends on company performance on selected projects.
(ii) share price movements in the market - which is uncertain

2. Efficient Market Hypothesis

The aim of EMH is that it attempts to explain how the market reacts (thus, share price movement) to relevant information. In an efficient market the rational investor will seek to invest and trade financial securities until they have maximised their wealth at an acceptable level of risk. This can be achieved by company *accepting all projects with positive NPV when discounted at the company opportunity cost of capital.* Why is it so and how to calculate cost of capital is outside the syllabus of paper F9.

Assumptions of EMH

1. all information is freely available.
2. can buy & sell shares freely in the market without significant costs
3. can buy & sell without the influence of a dominant buyer or seller
4. not influence the market by investors actions; they are only one of many investors
   Simply, EMH operates under a perfect market!!!

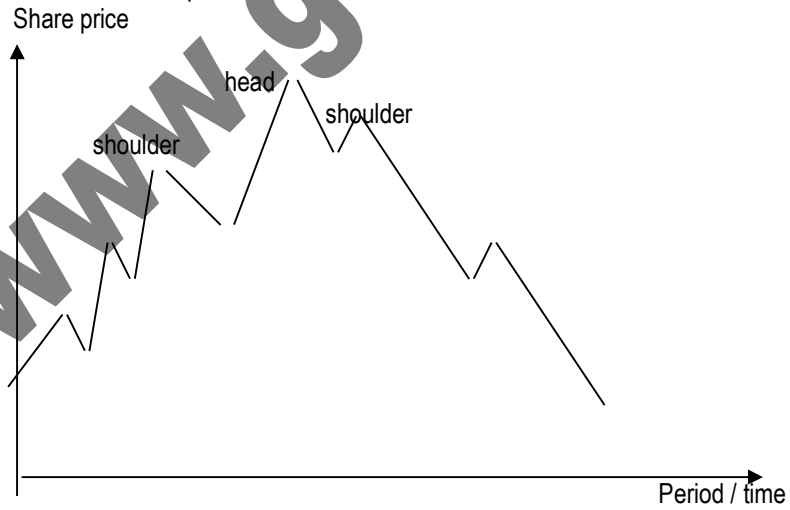
Before dealing with EMH in detail, it is good to look at some acceptable theory on the movement of share prices. Two main theories which attempt to explain why share price changes are:

(a) Technical Analysis

Based on the assumption that share prices follow a certain patterns which are repeatable. The chartists deny the EMH by arguing that share prices do not follow a random walk. This theory suggest that profit making is possible from buying & selling of shares by closely observing the patterns of shares prices movement.

However, essentially if it were possible for an investor to make abnormal returns of this type consistently, other investors and analysts would eliminate the opportunity by competition & ensuring that any past prices information would be reflected in current prices.

An example of a chart of chartism! *Head & Shoulders*



Reasoning behind the chart:

Investors observe a rise in the share price to a temporary peak known as the *left shoulder.* Profits are taken at this point and the price dips. However, investors reappraise the situation and assess that not all profits from the share have been made, so the share price rises further until it reaches a second peak at the *`head'*

The price falls again on profit taking with a subsequent minor rally for those who still believe there is profitable trading potential. After the 3rd peak at the *right shoulder*, there is significant profit taking and the price falls rapidly.

(b) Fundamental Analysis

Concern with valuing a business. Fundamental Analysis tries to derive at a value for the business shares by using some common models, such as the *dividend valuation model.* It says that all shares will have a basic value called *intrinsic value,* and that the market price of the shares will fluctuate up & down around this value but the long run will average at the intrinsic value. Thus, this theory argues that profit taking from selling & buying of shares is not possible in the long run. Share prices will move randomly around the intrinsic value. (*random walk)*

The pioneering work on the EMH was done by Maurice Kendall in 1950s. He statistically analysing share price movements in order to spot recurring patterns but to his surprise that no patterns could be identified. Share prices appeared to move at random. This was attributed to the fact that new information arrives at random! Thus, the study by Maurice deny technical analysis and support fundamental analysis!!

Both technical analysis and fundamental analysis can be highly complex and are the subject of the whole libraries of books. What they have in common is a simple assumption that there is publicly available information which has not yet been properly analysed by investors. You can use this information to `beat' other investors and to make consistent gains by buying and selling shares.

The EMH takes the opposite view. The general principle of the EMH is that publicly available information is very swiftly and logically analysed by many investors as soon as it becomes available . These investors quickly make buy or sell decision accordingly , as a result the new information will quickly cause the share price to rise or fall. Consequently, the market prices of stocks and shares very quickly and accurately reflect all relevant information which affects their value. *The conclusion is that you cannot guarantee to make consistent gains by analysing* ***publicly available information*** . Too many other investors will be competing against you for you to be first to the winning post every time.

BUT, ... Most investors don't believe the EMH, as such many investors still speculate the market.....and hope to make quick return!!!

3 Types of EMH

There is 3 basic types of EMH; analysed base on the following terms:

(a) Operational efficiency - the efficiency in which investors can buy & sell securities. There should be minimal transaction costs and the actions of individual buyers should not influence the market.

(b) Pricing efficiency - Prices of securities should reflects the available information. All prices reflect the fair value of the business projects.

(c) Allocational efficiency - If operational & pricing efficiency apply, available investors fund will be allocated to companies offering the best rates of return for a given level of risk.

Strong Form Efficiency

Here it is assumed that all information about companies is fairly reflected in the company's share price. This includes information available only to those with privileged access to information such as directors of the relevant organisation. Strong form efficiency is unlikely to exist.

Semi-strong form efficiency

Semi-strong form efficiency states that equity prices reflect all publicly available information, but not unpublished `inside' information.

Weak form efficiency

The current price reflects only information available in past share prices. Chartism and the study of past prices should not work in a weak form efficiency. No abnormal returns can be expected on trading of shares.

Generally most markets are semi-strong efficient.

4 Implication of EMH

If the EMH is true in the semi-strong form (which also implies that it is true in the weak form) implies that share prices will react when information becomes public. For example:

1. If details of a proposed new investment project are released to the public, share prices should rise by the amount of the project NPV when the details are announced (not when the project is started, or when it is finished).
2. New good information announced will rise share prices and new bad information will cause share prices to fall.
3. Announcement of financial results will cause share prices to move.
4. In a takeover situation, a firm cash offer is made for the shares of a company, the share price should immediately move to this cash price. If a share offer is made, the share prices of the two companies should be immediately connected by the share for share ratio. These changes should happen immediately after the announcement of the takeover and not after the takeover is completed.

5 Strong form EMH?

Most of today's world stock markets are in semi-strong form. Such form of EMH imposes the problem of insider dealing, someone with some inside confidential information can take advantage of the market through manipulation of information availability to the public. To avoid some acts, the market need to be in strong form EMH.

To achieve strong form EMH (which is still non-existence yet!) the following can help:

1. Advancement and investment in Information technology. IT helps increase the speed of information traveling, ensure information reaches every part of the world at the shortest possible time.
2. More detailed and advance accounting standards and company act describing the minimum and more detail disclosure requirement in published financial statements.
3. The implementation of corporate governance, such as all listed companies need to have internal audit department and non-executive directors sitting in the board.
4. Globalisation emphasis: minimise barrier of information traveling and trade between countries.

Lecture 16

FINANCIAL MANAGEMENT FUNCTION

1 Investor Ratios

Financial ratios are frequently used to analyse company performance, and the use and limitations of these should be familiar to you from paper F1. In paper F9, the range of ratios which you are required to understand and interpret is extended to encompass the measures which are commonly used by investors to appraise potential investment opportunities. The topic is not explicitly mentioned in the syllabus, but instead forms an implicit part of Sources of Finance: if a company is seeking to raise either debt or equity finance then it is vital that its directors understand the needs of potential investors, and how they will judge company performance.

(i) Returns on debentures

Anyone who holds such a debenture can calculate the rate of return they will receive (before tax) by applying the following formula:

Rate of return (%) = (Interest receivable (£) /price paid (£)) x 100

For example:

If an investor buys £1,000 nominal value of 10% Abbey National plc debentures, and pays a total price of £1,250, then they will receive interest amounting to £100 per year, by applying the formula shown above:

Rate of return = (100/ 1,250) x 100 = 8%

The market price of the debenture will change as interest rates vary, rising as interest rates fall and vice versa and so if the price per debenture rose to £136, giving a total value of £1,360 for the investment, the return becomes:
(100/1,360) x 100 = 7.35%

For any individual investor, the rate of return is, therefore, dictated by the price paid for the debenture, and provided that he/she sells it for the same price, that rate is fixed.

(ii) Returns on equity

The range of measures used to analyse the return to equity investors is much greater than that applied to debentures, perhaps because this class of investment carries a greater risk, and ordinary shareholders are the most significant group of investors.

Headline (Basic) Earnings Per Share

Traditionally, the most commonly quoted ratio has been earnings per share (EPS), but FRS 102, *The Financial Reporting Standard applicable in the UK and Republic of Ireland* sought to remove what was considered 'over-reliance' on the single EPS figure as a basis for judgement of company performance. The IASB argued that accounts need to be analysed in more detail, and that a single figure is open to manipulation. The Institute of Investment Management and Research (IIMR) is also arguing that analysts need a simple way of measuring trading performance, and as a result they formulated what is known as the 'headline earnings' figure , which has been adopted by the Financial Times as the basis for the calculation of the Price Earnings ratio. The headline figure is roughly equivalent to the 'old' earnings per share, and is calculated as :

'Headline earnings' per share

$$= \frac{\text{Profit after tax, minority interests and preference dividends}}{\text{Number of shares in issue and ranking for dividend}}$$

Suppose that Flames PLC has issued 200 million ordinary shares and reports after tax profits of £14 million. There are no minority interests but a preference dividend of £2 million is payable. The headline earnings figure is thus:

$$= \frac{£12 \text{ million}}{200 \text{ million}}$$

= £0.06 or 6 pence per share

Note that on its own the earnings per share figure is of limited use, because share prices can vary widely. If Company A has 10 pence earnings per share and Company B has 20 pence earnings per share this does not mean that B is twice as good as A. What matters to the investor is the return per £ invested, which is measured via the PE, or Price Earnings ratio.

The PE Ratio

The PE ratio for a company may be used as a basis for comparison with other companies, especially in the same business sector, and is best described as an indicator of expected earnings growth, so that the higher the PE ratio, the greater the expected growth.

The PE ratio is calculated as:

$$\frac{\text{Current share price}}{\text{Headline earnings per share}}$$

Using the example of Flames plc from above, if we assume that the ordinary shares are trading at a price of 96 pence, and the headline EPS is 6 pence per share, then

PE ratio = 96/6
= 16

The PE ratio is the market's estimate of future earnings potential, and so within any single sector of business, there may be quite wide variations in the PE ratios of different companies. **Table 1** below is evidence of this, as it shows the PE ratios for some of the largest UK food retailers at 5th October 1999.

Table 1: PE ratios for UK Food Retailers

Iceland	13.0
Safeway	9.3
W.Morrison	21.0
J.Sainsbury	14.2
Tesco	21.1
Somerfield	4.8

The figures suggest that the market has significantly more confidence in the ability of both Morrison and Tesco to continue increasing their earnings, but at the other extreme it clearly believes the outlook for Somerfield is rather bleak. It is useful to remember that the PE ratio which is used in the daily share price statistics published daily in the financial press relates earnings for the last financial year to the current share price. This means that investors are likely to find that as earnings increase for the current year, the PE ratio will appear to be less than that quoted in the newspaper.

Dividend cover

The relationship between dividends and earnings is measured by dividend cover, which is measured as:

$$\frac{\text{Net earnings per share}}{\text{Net dividends per share}}$$

Net earnings means earnings after tax has been paid. All dividends are paid net of tax.
Using the example given earlier, if net earnings per share are 6 pence, and the company pays a dividend of 2 pence per share (net) then the dividend cover is:

= 6/2
= 3 times

The division of earnings between re-investment and dividends is usually dependent upon the type of business activity, and the number of investment opportunities available. As a result the figure for dividend cover will vary widely between industries as well as between companies. **Table 2** below is based upon figures obtained from the London Share Service pages of the Financial Times and shows how wide the variation in cover can be.

Table 2: Dividend Cover for major UK companies at October 1999

Barclays Bank	1.85
Tesco	2.06
BT	1.78
Allied Domecq	1.20
British Aerospace	2.45

The table shows British Aerospace as having the highest level of dividend cover, and Allied Domecq the lowest. These figures are not surprising because the cost of developing new fighter planes is huge, and British Aerospace, therefore, needs to retain a large proportion of its earnings in order to maintain its research and development programme. In contrast, the wines and spirits business of Allied Domecq requires much less research expense, and the company has also been restructuring, which has released some cash for dividend payouts.

Dividend yield

Investors who are looking for income, may select and compare potential investments on the basis of the size of the dividend per share, and per £ invested, otherwise known as the dividend yield.

The dividend yield is calculated as:
Net dividend/ Current share price

For example, British Telecom shares offer a yield of 2.2% on a share priced at £9.20. This means that the net dividend per share will be equal to £9.20 x 0.022 or £0.2024, equal to just over 20 pence. **Table 2** above showed BT as having a dividend cover of 1.78, and so this means that headline EPS equals 1.78 x £0.2024 or 36 pence. In other words, nearly half of the earnings are being retained for re-investment into the business. In contrast, Rank, a large UK based leisure and entertainment company, offer a dividend yield of 7.6% on shares priced at £2.21. This means a net dividend per share of 16.796 pence. For investors, either individual or institutional, looking for income rather than capital gain, then Rank shares offer a much better yield than BT shares. On the other hand, if the investor is looking for long term capital gain, they are likely to prefer to buy BT shares.

2 Non Financial Objectives

Few people would argue with the idea that commercial businesses aim to make profits, and that decisions in these businesses are focused around how best to achieve this objective. The desire to be profitable need not, however, be all embracing, and in practice it can be seen that companies are likely to pursue a wide range of objectives, which are both financial and non-financial in nature. This handout seeks to explain how such diversity of objectives might arise, discuss examples of non-financial objectives, and consider the implications for company owners and society in general.

It is useful to remember that although a company is a separate entity in the legal sense, in reality it is made up of a collection of individuals and interest groups, all of whom have personal objectives to fulfil. Management will constantly be trying to balance the return to these groups e.g., shareholders or employees, and discussion on corporate objectives really comes down to a compromise which takes account of what the different groups are seeking. Consequently some objectives may be financial in nature, such as a rise in earnings per share, whilst others will be non-financial e.g., shorter working hours, or an increase in the level of waste recycling in a manufacturing process.

A useful starting point for analysing non-financial objectives, is to specify the variety of interest groups which may seek to influence company objectives, because they are affected by a company's operations. The list includes:

- **Equity investors**
  In other words the owners of the business, who will be looking for a financial return on their investment.
- **Payables**
  This group will want to ensure that the business maintains the liquidity level required to repay its debts on time.
- **Customers**
  Who will be concerned about product/service quality and price.
- **Employees**
  Improved working hours and conditions of work will be important to this group, and so they may have a mix of financial and non-financial concerns.
- **Managers**
  Whose personal objectives may to some extent conflict with those of the owners. For example, a manager may seek to increase staff levels, as a way of increasing his personal status, but this may be lead to reduced profits.
- **The community at large**
  Communities are affected by company activities in a number of ways such as the use of land in a local area, the potential for pollution from effluents, commercial sponsorship of community projects and the impact of business activity on local transport systems.

Faced with such a broad range of interest groups, managers are likely to find that they cannot simultaneously maximise profits and the wealth of their shareholders whilst also keeping all the other parties happy. In this situation, the only practical approach is to try and work to satisfy the various objectives rather than maximise any individual one. Adopting such a strategy means, for example, that the company might earn a satisfactory return for its shareholders, whilst at the same time paying reasonable wages to satisfy employees, and avoiding polluting the environment, hence being a "good citizen." As a result, profit is no longer the sole corporate objective, and the pursuit of non-financial objectives has begun to be increasingly important, as part of a portfolio of corporate objectives which spread right out into the community of which they are a part.

Non-financial objectives

The range of possible non-financial objectives which might be pursued is broad, and the list below is not comprehensive, but may be viewed as indicative of the aims of a typical business at the start of the twenty first century.
Non-financial objectives might include:

- Growth of sales;
- Diversification;
- Survival;
- Contented workforce;
- Leaders in technology development;
- Product/service quality;
- Environmental protection.

Clearly some of the objectives listed are specific to the interests of one particular group of people, and the extent to which they are pursued is dependent upon the bargaining power of that group. For example, employees may want to reduce working hours or raise the hourly rate of pay, but if management do not face a problem in recruiting staff to work under existing contract terms, it may be

very difficult to persuade management to pursue objectives which serve the interests of staff. In one sense, the "controlling influence" is always the equity investors. Pursuit of alternative goals, relating to employees, the environment or whatever, will incur costs and reduce profits. Equity investors will be conscious of this trade off, and if they think that they are losing too much as a consequence, investors will sell shares and the market value of the firm will fall. Managers need to remember that the interests of shareholders are paramount, but those interests will be tempered by the influences and objectives of other parties.

In a large number of instances, the willingness of management to pursue wider objectives is a matter of goodwill on their part, combined with strong bargaining power on the part of the outside parties. In other cases, non- financial objectives are "forced" upon companies via legislation. For example, the furniture company Ikea is very environmentally conscious. This reflects Ikea's Scandinavian origins, but at the same time it also reflects the fact that EU legislation, and the Kyoto Protocol are forcing companies to become more environmentally conscious. For example, Ikea banned the use of HFCs and CFCs in its products some years ago. The ban might indicate a strong environmental conscience on the part of the company, or it may simply indicate an anticipation of legislation that would ban such products anyway. Nonetheless, regardless of the reason behind the ban, its very existence indicates that Ikea is typical of the many companies which pursue non-financial as well as financial objectives.

Shareholder impact of non-financial objectives

The impact of the pursuit of non-financial objectives upon shareholder wealth is not clear cut. There are many writers who would argue that companies which pursue a wide range of objectives find that they create for themselves a very positive public image, and this serves to increase shareholder wealth. Others would argue that community type projects simply add to costs and thus erode profit, thereby reducing shareholder wealth. In reality, the truth probably lies somewhere between these two extremes. Carefully selected projects, particularly those which are community related, may well serve as a form of indirect advertising, and raise the corporate profile and associated shareholder wealth. Other projects may simply represent a gesture of goodwill, on which no return is either sought or earned. For example, suppose that a company decides to pursue an image of high product quality as a secondary objective. The aim is clearly non-financial in nature, but it will involve spending money on quality control and management projects which could add to costs and reduce profits.

Agency Problem

The agency relationship arising from the separation of ownership from management is sometimes characterised as the 'agency problem'.

Goal congruence is accordance between the objectives of agents acting within an organisation and the objectives of the organisation as a whole.

Goal congruence may be better achieved and the 'agency problem' better dealt with by offering organisational rewards (more pay and promotion) for the achievement of certain levels of performance. The conventional theory of reward structures is that if the organisation establishes procedures for formal measurement of performance, and rewards individuals for good performance, individuals will be more likely to direct their efforts towards achieving the organisation's goals.

3 Divisional Performance Measurement

Divisionalisation is a method of decentralisation whereby a company is divided into a few divisions and each division is in-charge by a department/division manager. The manager is given power to make

decision and rule the division to a certain degree of flexibility and independence define by the head office.

The degree of independence given to the manager depends on the type of divisional centre operated by the group:

Type of division	Manager responsible and has the power to decide on:	Basic performance measures applicable
Cost Centre	Cost	Cost variances
Profit Centre	Revenue and cost (i.e.profit)	Divisional profit
Investment centre	Profit and capital investment	ROCE/RI

The company will now need a set of performance measures to determine whether the divisional managers is running the division in a manner which benefit the group and thus reward the manager accordingly.

Divisional performance measures are used to compare :

- against targets
- against results of other divisions
- against last year results

Types of divisional performance measures

(i) Profit (from P/L A/C)

1. Comparison with other divisions is difficult:
   Need some comparative measure: e.g. profit margin (profit/sales) or profit compared with investment (ROCE).

2. Affected by accounting policies: (e.g. inventory, depreciation) need group standard accounting policies for internal as well as external reporting.

3. Needs to viewed long term as well as short term : long term plans may not be available.

4. Can be manipulated by short term actions; eg. detrimental cost cutting.

5. Definition of profit - before tax or after tax, before interest or after interest

6. Problem of controllability, some cost are beyond the control of divisional managers and should be segregated from the profit reported. The following format may be reported:

Sales		150
Cost of sales		(110)
Gross profit		40
Controllable expenses	(5)	
Profit controllable by manager	35	
Non controllable expenses	(10)	
Profit attributable to division		25

Example of non controllable expenses are depreciation on fixed asset acquired centrally, and allocated overheads.

How divisional profit may be manipulated?
If the bonus of a division depends on the profit earned, manager may wish to ``beat" the profit:

1. Creative Accounting:
   Change the accounting policies - eg : increase inventory value, decrease depreciation, capitalise expenditure.
2. Manipulate cut-off
   - Include next period sales in this period
   - Defer this period cost to next period
   - Induce customer to buy in this period by offering high discount, etc

3. Aggressive short term cost cutting: which may be detriment to longer term future,
   - chop discretionary costs such as training and advertising costs
   - cut employees benefits
   - use cheaper labour/material

(ii) Return On Capital Employed (ROCE)
Also called return on investment (ROI)

This is the most common method of evaluating divisional performance:

$$\textbf{Divisional ROI} = \frac{\textbf{Divisional profit}}{\textbf{Divisional net assets}}$$

$$\textbf{Asset turnover} = \frac{\textbf{Sales}}{\textbf{Net Assets}}$$

$$\textbf{Net profit margin} = \frac{\textbf{Divisional profit}}{\textbf{sales}}$$

Illustration

Division S has net assets of £500,000. Last year it earned profits of £90,000 from a turnover of £3,000,000. Compute the ROI , asset turnover and net profit margin.

Solution
ROI = 90/500 = 18%
Asset turnover = 3000/500 = 6 times
Net profit margin = 90/3000 = 3%

Check: ROI = asset turnover x net profit margin

Problems with ROI:

1. Problems of profit measurement, as above. For ROI we normally take divisional profit before interest and taxation as both interest cost and taxation are normally outside the control of divisional managers.
2. Definition problems of divisional net assets
   - distinguish between controllable and non contollable fixed assets
   - cash is often non controllable if it is centrally managed
   - problem of either use original cost or NBV or market value for calculation of ROI
3. Comparison between division is difficult if their accounting policies differ.
4. Target ROI often take no account of risk of activities in a division.

Important!
ROI can results in managers reluctant to replace old asset with new one or to increase capital investment for future benefits. This is because each time capital is being increased, (profit will not increase immediately at the same proportion) the ROI tends to fall.

(iii) Residual Income (RI)
The aim of residual income as a measure is to stop the last problem of ROI above, i.e. reluctant on capital expenditure. However it is still subject to all other problems of ROI such as definition of profit and net assets.

Divisional profit	X
Less : Imputed/Notional Interest (cost of capital x Net assets)	(X)
Residual Income	X

Cost of capital is normally the minimum required ROI

Illustration

Q division has a target return of 10% p.a. Its latest divisional profit was £480,000. on divisional capital employed of £3m. The division has opportunity to invest £400,000 in a new project which generates annual cash flows of £48,000 indefinitely.

Is the manager likely to accept the project if his divisional performance is based on (I) ROI & (II) RI?

Solution

	Existing situation	Additional investment	Revised situation
Net profit (£000)	480	48	528
Capital employed(£000)	3000	400	3400
ROI	16%	12%	15.53%
Net profit (£000)	480	48	528
Less: Notional interest (10% of capital employed)	300	40	340
RI	180	8	188

The manager will reject the project on ROI basis but may accept on RI basis.

Comment: In simple terms the project is acceptable to the company. It offers a rate of return of 12% (£48m/£400m) which is greater than the cost of capital. However, divisional ROI falls and this could lead to the divisional manager rejecting the proposal. This would be a dysfunctional decision. Residual

income increases if the proposal is adopted and this performance measure should lead to goal congruent decisions.

Divisional Performance Measurement in practice:

Below is a statistic collected by C.Drury on the most commonly used measures in practice for divisional performance measurement: Survey indicates that many companies do not depend on a single measure, instead a combination of a few measures is used as the base for performance appraisal.

ROI	55%
RI	20
Profit before interest	61
Target cash flow	43
Ability to stay with budget	57

ROI , RI and NPV compared:

ROI, RI and NPV can give conflicting advice when deciding whether to accept investment opportunities.

Relative merits of ROI and Residual income

Return on investment is a relative measure and hence suffers accordingly. For example, assume you could borrow unlimited amounts of money from the bank at a cost of 10% per annum. Would you rather borrow £100 and invest it at a 25% rate of return or borrow £1m and invest it at a rate of return of 15%?

Although the smaller investment has the higher percentage rate of return, it would only give you an absolute net return (residual income) of £15 per annum after borrowing costs. The bigger investment would give a net return of £50,000. Residual income, being an absolute measure, would lead you to select the project that maximises your wealth.

Residual income also ties in with net present value, theoretically the best way to make investment decisions. The present value of a project's residual income equals the project's net present value. In the long run, companies that maximise residual income will also maximise net present value and in turn shareholder wealth. Residual income does, however, experience problems in comparing managerial performance in divisions of different sizes. The manager of the larger division will generally show a higher residual income because of the size of the division rather than superior managerial performance.

Problems common to both ROI and Residual income

The following problems are common to both measures:

- Identifying controllable (traceable) profits and investment can be difficult.
- If used in a short-term way they can both overemphasise short-term performance at the expense of long-term performance. Investment projects with positive net present value can show poor ROI and residual income figures in early years leading to rejection of projects by managers (see Example 3).
- If assets are valued at net book value, ROI and residual income figures generally improve as assets get older. This can encourage managers to retain outdated plant and machinery (see Example 3).
- Both techniques attempt to measure divisional performance in a single figure. Given the complex nature of modern businesses, multi-faceted measures of performance are necessary.
- Both measures require an estimate of the cost of capital, a figure which can be difficult to calculate.

Illustration

PQR plc is considering opening a new division to manage a new investment project. Forecast cashflows of the new project are as follows:

Year	**0**	**1**	**2**	**3**	**4**	**5**
Forecast net cash flow £m	(5.0)	1.4	1.4	1.4	1.4	1.4

PQR's cost of capital is 10% pa. Straight line depreciation is used.

Required:: Calculate the project's net present value and its projected ROI and residual income over its five-year life.

NPV

Year	**0**	**1**	**2**	**3**	**4**	**5**
Forecast net cash flow £m	(5.0)	1.4	1.4	1.4	1.4	1.4
Present value factors at 10%	1.00	0.91	0.83	0.75	0.68	0.62
Present value	(5.0)	1.27	1.16	1.05	0.95	0.87

NPV = £0.30m

ROI

Year	**1**	**2**	**3**	**4**	**5**
1 Opening investment at net book value	5.0	4.0	3.0	2.0	1.0
2 Forecast net cash flow £m	1.4	1.4	1.4	1.4	1.4
3 Straight line depreciation	(1.0)	(1.0)	(1.0)	(1.0)	(1.0)
4 Profit	0.4	0.4	0.4	0.4	0.4
ROI (4 ÷ 1 x 100)	8%	10%	13%	20%	40%

Residual income

Year	**1**	**2**	**3**	**4**	**5**
Profit (as above)	0.4	0.4	0.4	0.4	0.4
Imputed capital charge (opening investment x 10%)	0.5	0.4	0.3	0.2	0.1
Residual income	(0.1)	0.0	0.1	0.2	0.3

Comment: this example demonstrates two points. Firstly, it illustrates the potential conflict between NPV and the two divisional performance measures. This project has a positive NPV and should increase shareholder wealth. However, the poor ROI and residual income figures in the first year could lead managers to reject the project. Secondly, it shows the tendency for both ROI and residual income to improve over time. Despite constant annual cashflows, both measures improve over time as the net book value of assets falls. This could encourage managers to retain outdated assets.

Non-Financial Performance indicators

In recent years, the trend in performance measurement has been towards a broader view of performance, covering both financial and non-financial indicators. The most well-known of these approaches is the balanced scorecard proposed by Kaplan and Norton. This approach attempts to overcome the following weaknesses of traditional performance measures:

- Single factor measures such as ROI and residual income are unlikely to give a full picture of divisional performance.
- Single factor measures are capable of distortion by unresponsible managers (eg by rejecting the proposal in Example 2).
- They can often lead to confusion between measures and objectives. If ROI is used as a performance measure to promote the maximisation of shareholder wealth some managers will see ROI (not shareholder wealth) as the objective and dysfunctional consequences may follow.
- They are of little use as a guide to action. If ROI or residual income fall they simply tell you that performance has worsened, they do not indicate why.

The balanced scorecard approach involves measuring performance under four different perspectives, as follows:

Perspective	**Question**
Financial success	How do we look to shareholders?
Customer satisfaction	How do customers see us?
Process efficiency	What must we excel at?
Growth	Can we continue to improve and create value?

The term 'balanced' is used because managerial performance is assessed under all four headings. Each organisation has to decide which performance measures to use under each heading. Areas to measure should relate to an organisation's critical success factors. Critical success factors (CSFs) are performance requirements which are fundamental to an organisation's success (for example innovation in a consumer electronics company) and can usually be identified from an organisation's mission statement, objectives and strategy. Key performance indicators (KPIs) are measurements of achievement of the chosen critical success factors. Key performance indicators should be:

- specific (ie measure profitability rather than 'financial performance', a term which could mean different things to different people)
- measurable (ie be capable of having a measure placed upon it, for example, number of customer complaints rather than the 'level of customer satisfaction')
- relevant, in that they measure achievement of a critical success factor.

Illustration

Perspective	Critical Success Factor	Key Performance Indicators
Financial success	Shareholder wealth	Dividend yield % increase in share price
	Cashflow	Actual v budget Debtor days
Customer satisfaction	Exam success	College pass rate v national average Premier college status Tutor grading by students
	Flexibility	Average number of course variants per subject (eg full-time, day release, evening)
Process efficiency	Resource utilisation	% room occupancy Average class size Average tutor teaching load (days)
Growth	Innovation products Information technology	% of sales from < 1 year old Number of online enrolments

The balanced scorecard approach to performance measurement offers several advantages:

- it measures performance in a variety of ways, rather than relying on one figure
- managers are unlikely to be able to distort the performance measure - bad performance is difficult to hide if multiple performance measures are used
- it takes a long-term perspective of business performance
- success in the four key areas should lead to the long-term success of the organisation
- it is flexible - what is measured can be changed over time to reflect changing priorities
- 'what gets measured gets done' - if managers know they are being appraised on various aspects of performance they will pay attention to these areas, rather than simply paying 'lip service' to them.

The main difficulty with the balanced scorecard approach is setting standards for each of the KPIs. This can prove difficult where the organisation has no previous experience of performance measurement. Benchmarking with other organisations is a possible solution to this problem.
Allowing for tradeoffs between KPIs can also be problematic. How should the organisation judge the manager who has improved in every area apart from, say, financial performance? One solution to this problem is to require managers to improve in all areas, and not allow tradeoffs between the different measures.

4 Not for profit organisations

This category of organisation includes public sector bodies such as the National Health Service or local councils, charitable bodies e.g., Oxfam, and other organisations whose purpose is to serve the broader community interests, rather than the pursuit of profit. In broad terms, such organisations seek to serve the interests of society as a whole, and so they give non-financial objectives priority of place.

It is reasonable to argue that they best serve society's interests when the gap between the benefits they provide, and the cost of that provision is greatest. This is commonly termed **value for money**, and it is not dissimilar to the concept of profit maximisation, but for the fact that public welfare is being maximised rather than profit.

In practice it is incredibly difficult to quantify, for example, the benefits from an operation such as the UK's National Health Service. How does one put a value on a life which has been prolonged by "x" number of years, or on the easing of pain which is brought about by the replacement of an arthritic joint? The benefits extend beyond factors which can be measured in purely financial terms. Nonetheless, financial criteria can be used to appraise the extent to which such organisations offer value for money, and hence make good use of the funds provided to them.
Value for money may be described as " getting the best possible combination of services from the least resources." This means maximising the benefits for the lowest possible cost, and is usually accepted as requiring the application of economy, effectiveness and efficiency. Economy measures the inputs that are required to achieve a certain level of outputs. Effectiveness measures the extent to which a service achieves its declared objectives/goals. Efficiency combines the other two measures to show the ratio of inputs : outputs. When an operation is efficient it will produce the maximum number of goods/services relative to the inputs required for their production. The three "Es" are the fundamental prerequisite of achieving Value For Money.

The major difficulty for public sector bodies lies in precisely how to measure the achievement of the non-financial objectives. Value for money as a concept assumes that there is a yardstick against which to measure success i.e., achievement of objectives. In reality, the indicators of success are open to debate. For example, in the Health Service is success measured in terms of fewer patient deaths per hospital admission, shorter waiting lists for operations, average speed of patient recovery? etc., etc. As long as objectives are difficult to specify, so too will it remain difficult to specify where there is value for money. Comparative performance measures are useful, but care must be taken not to read too much into limited information.

Lecture 17

FINANCIAL MANAGEMENT ENVIRONMENT

1 Economic Policy and Objectives

Macroeconomic policy can affect planning and decision-making in various ways, for example via interest rate changes, which affect borrowing costs and required rates of return

The policies pursued by government may serve various objectives:
Economic growth
Control price inflation
Full employment
Balance of payment stability

In order to achieve the objectives, there are different policy tools or instruments for government to adopt –

(a) Monetary policy
Monetary policy aims to influence monetary variables such as the rate of interest and the money supply in order to achieve targets set for employment, inflation, economic growth and the balance of payments.

(b) Fiscal policy
Fiscal policy involves using government spending and taxation in order to influence aggregate demand in the economy.

(c) Exchange rate policy
Some economists argue that economic objectives can be achieved through management of the exchange rate by the Government. The strength or weakness of sterling's value, for example, will influence the volume of UK imports and exports, the balance of payments and interest rates.

(d) External trade policy
A government might have a policy for promoting economic growth by stimulating exports; for example, by managing the exchange rate to make exports cheaper for foreign purchasers. Another argument is that there should be import controls to provide some form of protection for domestic manufacturing industries by making the cost of imports higher and the volume of imports lower. Protection could encourage domestic output to rise, stimulating the domestic economy

Thus, responsibility accounting operates under the system of **decentralisation.**

2 Competition Policy

A school of thought argues government should regulate the market when market is failed to work efficiently. Various forms of market failure are -

- Imperfect competition
- Social costs
- Imperfect information
- Equity

Regulation can be defined as any form of state interference with the operation of the free market. This could involve regulating demand, supply, price, profit, quantity, quality, entry, exit, information, technology, or any other aspect of production and consumption in the market.

In many markets the participants (especially the firms) may decide to maintain a system of voluntary selfregulation,possibly in order to try to avert the imposition of government controls. Areas where selfregulation often exists include the professions (eg the Law Society, the British Medical Association and other professional bodies).

Some countries have legislation which deals with restrictive practices that distort, restrict or prevent competition. A notable example of a restrictive practice would be agreements with direct competitors resulting in them colluding to the disadvantage of the consumer (eg price-fixing agreements). The legislation may also deal with abuse of dominant position offences, such as predatory pricing (charging low prices to unfairly destroy competition) or refusing to supply so as to restrict competition.

3 Government Assistance

A government may provide finance to companies in cash grants and other forms of official direct assistance, as part of its policy of helping to develop the national economy, especially in high technology industries and in areas of high unemployment. Government incentives might be offered on:

(a) A regional basis, giving help to firms that invest in an economically depressed area of the country;

(b) A selective national basis, giving help to firms that invest in an industry that the Government would like to see developing more quickly, for example robotics or fibre optics

4 Green Policy

The environment is increasingly seen as an important issue facing managers in both the public and private sectors. The problems of pollution and the environment appear to call for international co-operation between governments. Pollutants expelled into the atmosphere in the UK are said to cause acid rain to fall in Scandinavia, for example.

5 Corporate Governance Regulations

Corporate governance has emerged as a major issue in the last 20 years in the light of several high profile collapses. Guidance has been given because of the lack of confidence perceived in financial reporting and in the ability of auditors to provide the assurances required by the users of financial accounts.

6 Financial Intermediaries

The term 'intermediation' refers to the process whereby potential borrowers are bought together with potential lenders by a third party, the intermediary. Financial intermediaries can be divided into banks and non banks.

The main bank financial intermediaries are:

- Commercial bank, which offer both primary and secondary services to both corporates and individuals.
- Discount houses, which deal in the secondary bill market – they do only wholesale business
- The Bank of England, which is the central bank of UK and as such plays a supervisory and monitoring role in the economy.

The main non bank financial intermediaries are:

- Building societies, dealing mainly with financing of houses
- Finance companies, dealing mainly with the finance lease and hire purchase
- Insurance companies

- Unit trust and investment trust
- Pension funds

Roles of financial intermediaries include:

- **Maturity transformation** : The financial intermediary is able to give liquidity to those depositors who want it and at the same time to allow borrowers longer time to repay.
- **Funds aggregation :** The financial intermediary accumulate funds from many small depositors and lend them to a corporate client which need huge funds.
- **Risk transformation :** A bank provides a relatively risk free place to deposit savings. When a borrower does not repay it's debt, the bad debt is absorbed by the bank and the depositors are not affected. However, too many borrowers not repaying their loans may cause the bank to collapse and in such rare case, the depositors loose their money.

7 Financial Markets

Financial system works on the basis that there is a group of people who have surplus funds (surplus unit) and wish to save the surplus funds for future consumption and there is another group of people who have insufficient and request additional funds (deficit unit). The two parties are brought together through the **financial market**. Financial market is the medium through which financial instruments are bought and sold. The surplus unit provides funds to the deficit unit through the financial market. The deficit unit in return issues financial instrument or security to the surplus unit as the prove of the investment by the surplus unit, again through the financial market. Financial instrument includes shares, debentures, bills, etc.

There are essentially two different types of financial market, the primary and the secondary market. The **primary market** transfer funds directly from the surplus units or lenders to the deficit units or borrowers through the issue of new securities. For example, a company issue shares directly to the public investors to raise equity capital to finance a new project.

Secondary market, on the other hand, involves the trading of securities, which already exist in the financial market. Secondary market transactions do not give rise to new securities. Taking the example above, secondary transaction may mean the selling of the shares issued above by the initial shareholders to other investors in the public. As you can see, these secondary transactions have no direct impact on the funds available to the company or the borrower above.

The following are the major financial markets in the UK, both offering primary and secondary markets:

(i) The Capital Market

This market trades financial instruments with maturity period of more than a year. The bulk of this business is conducted on the stock exchange. Types of securities traded are shares, debentures, eurobonds.

(ii) The Money Market

This market is mainly for trading of short term loans. These are wholesale markets for funds, largely between financial institutions. No physical location exists, the major participants are banks, local authorities, building societies and companies. The money market deals with hire purchase, leasing and trade credit.