

ACCA F9
FINANCIAL MANAGEMENT
REVISION PACK
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F9: Financial Management

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Formulae Sheet

Economic order quantity

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

Miller–Orr Model

$$\text{Return point} = \text{Lower limit} + \left(\frac{1}{3} \times \text{spread}\right)$$

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

The Capital Asset Pricing Model

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

The asset beta formula

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

The Growth Model

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

Gordon's growth approximation

$$g = br_e$$

The weighted average cost of capital

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

The Fisher formula

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

Purchasing power parity and interest rate parity

$$S_1 = S_0 \times \frac{(1 + h_c)}{(1 + h_b)} \quad F_0 = S_0 \times \frac{(1 + i_c)}{(1 + i_b)}$$

Present Value Table

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

Where r = discount rate

n = number of periods until payment

Discount rate (r)

Periods

(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

Annuity Table

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

Where r = discount rate
 n = number of periods

		Discount rate (r)									
Periods											
(n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	2
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	3
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	4
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	5
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	6
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	7
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	8
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	9
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	10
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	11
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	12
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	13
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	14
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	2
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	3
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	4
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	5
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	6
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	7
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	8
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	9
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	10
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	11
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	12
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	13
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	14
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	15

End of Question Paper

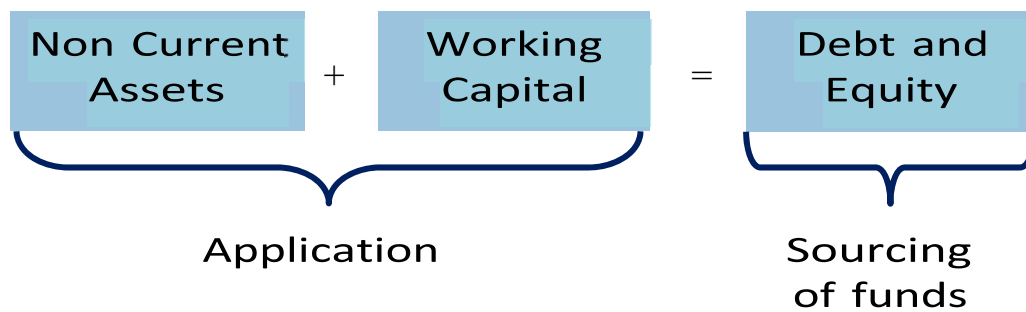
An Introduction

WHAT IS FINANCIAL MANAGEMENT?

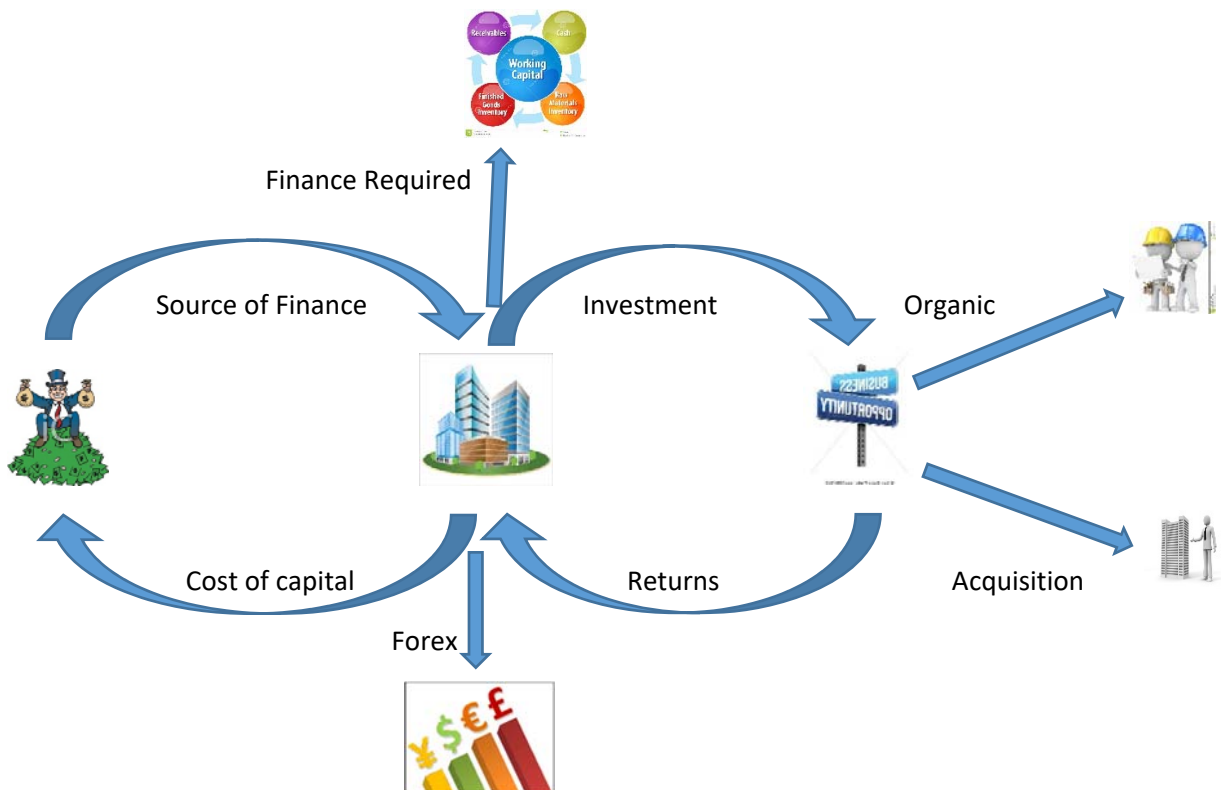
May be considered as:

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

Financial management and the accounting equation



The whole process can be illustrated below:



The three key decisions

Financial management is often has to make the three basic decisions to be made:

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

1. The investment decision

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

1. Capital assets
2. Working capital

Capital assets

The decision would include the following financial considerations:

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

Working capital

The cash resource available to the business on a day-to-day basis and used to fund the current assets such as inventory and receivables.

2. The financing decision

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

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

3. The dividend decision

The amount of return given back to shareholders. This will be determined by the following:

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

The Economic Environment and Financial Markets

Economic Environment

Fiscal Policy

Decisions relating to taxation and government spending with the aim of full employment, price stability, and economic growth

By changing tax laws, the government can alter the amount of disposable income available to its taxpayers. If taxes increased consumers would have less money to spend.

This difference in disposable income would go to the government instead of going to consumers, who would pass the money onto companies.

Or, the government could increase its spending by purchasing goods from companies. This would increase the flow of money through the economy and would eventually increase the disposable income available to consumers.

The four major objectives are:

1. Full employment
2. Price stability
3. A high, but sustainable, rate of economic growth
4. Keeping the Balance of Payments in equilibrium.

Full Employment

Full employment was considered very important after the Second World War.

Unemployment in the 80s was seen as an inevitable consequence of the steps taken to make industry more efficient.

De-industrialisation made higher unemployment feel inevitable, and so this objective became much less important than it had been

Growth & Low Inflation

Growth and low inflation have always been important.

Without growth peoples' standard of living will not increase, and if inflation is too high then the value of money falls negating any increase in living standards.

Sustainable growth means growth without inflation

Balance of payments

The total of all the money coming into a country from abroad less all of the money going out of the country during the same period.

Policies to reduce a BOP deficit:

1. Higher Interest Rates- will act to slowdown the growth of consumer demand and therefore lead to cutbacks in the demand for imports.

2. Fiscal policy (i.e. increases in direct taxes) might also be used to reduce aggregate demand.

The risk is that a sharp fall in consumer spending might lead to a steep economic slowdown (slower growth of GDP) or a full scale recession.

Is a BOP Deficit a bad Thing?

Yes...	No...
<ul style="list-style-type: none">➤ A current account deficit is financed through borrowing or foreign investment➤ Borrowing is unsustainable in the long term and countries will be burdened with high interest payments.➤ Export sector may be better at creating jobs➤ A Balance of Payments deficit may cause a loss of confidence	<ul style="list-style-type: none">➤ Current Account deficit could be used to finance investment➤ Japanese investment has been good for the UK economy not only did the economy benefit from increased investment but the Japanese firms also helped bring new working practices in which increased labour productivity.➤ With a floating exchange rate a large current account deficit should cause a devaluation which will help reduce the level of the deficit➤ It depend on the size of the budget deficit as a % of GDP, for example the US trade deficit has nearly reached 5% of GDP at this level it is concerning economists➤ It may well be offset by foreign investment

Monetary Policy

The regulation of the money supply and interest rates by a central bank in order to control inflation and stabilise currency

Monetary policy is one of the ways the government can impact the economy.

By impacting the effective cost of money, the government can affect the amount of money that is spent by consumers and businesses.

Affect on Growth

- When interest rates are high, fewer people and businesses can afford to borrow, so this usually slows the economy down.
- Also, more people will save (if they can) because they receive more on their savings rate.
- When the central banks set interest rates it is the amount they charge other banks to borrow money.
- This is a critical interest rate, in that it affects the entire supply of money, and hence the health of the economy.
- High interest rates can cause a recession.

Affect on Exchange rates

High interest rates attracts foreign investment \Rightarrow increase in exchange rates:

- exports dearer
- imports cheaper.

Effect on Inflation

High interest rates should restrict growth and inflation

Exchange Rate Policy

Policy of government towards the level of the exchange rate of its currency (Part of Monetary Policy)

It may want to influence the exchange rate by using its gold and foreign currency reserves held by its central bank to buy and sell its currency.

A fall in the exchange rate will mean that the price of imports will rise while exporters should become more internationally competitive. Import volumes should fall whilst export volumes should rise.

Output at home should rise, leading to higher economic growth and a fall in unemployment.

There should be an improvement in the current account of the balance of payments too as the gap between export values and import values improves.

However, higher import prices will feed through to a rise in inflation in the economy

Target	Fiscal Policy	Monetary Policy	Exchange Rates
Growth in the Economy	More Spending	Lower Interest Rates	Lower
Low Inflation	Lower Spending	Higher Interest Rates	Higher
BOP deficit reduction	Lower Spending	Higher Interest Rates	Lower

More policies

Competition policy

The Competition Commission prevents takeovers that are against the public interest

Competition policy aims to ensure:

- Wider consumer choice
- Technological innovation
- Effective price competition

Government assistance for business

Government grants available for certain investments and small business in areas such as rural development, energy efficiency, education etc.

Green policies

Airfuel tax for example can threaten an airline business but create opportunities for other forms of transport or makers of new greener aircraft.

Financial Markets

A financial market allows people to easily buy and sell financial securities (such as stocks and bonds), commodities (such as precious metals) etc.

General markets (many commodities) and specialised markets (one commodity) exist. Markets work by placing interested buyers and sellers in one "place", thus making it easier for them to find each other.

So, Financial markets facilitate

- The raising of capital (in the capital markets)
- The transfer of risk (in the derivatives markets)
- International trade (in the currency markets)
- Match those who want capital to those who have it

Euromarkets

An overall term for international capital markets dealing in offshore currency deposits held in banks outside their country of origin

Euro means external in this context. For example, eurodollars are dollars held by banks outside the United States

It allows large companies with excellent credit ratings to raise finance in a foreign currency. This market is organised by international commercial banks

Key Features

Size: Much bigger than the market for domestic bonds / debentures

Cheap debt finance: Can be sold by investors, and a wide pool of investors share the risk

Unsecured: Only issued by large companies with an excellent credit rating

Long-term: Debt in a foreign currency Typically 5-15 years, normally in euros or dollars but possible in any currency

Less regulation: By using Euromarkets, banks and financiers are able to avoid certain regulatory aspects such as reserve requirements and other rules.

Stock and Bond Market

A stock market (also known as a stock exchange) has two main functions

1. to provide companies with a way of issuing shares to people who want to invest in the company
2. to provide a venue for the buying and selling of shares

Money Market

The money market is the global financial market for short-term borrowing and lending

The money market is where short-term obligations are bought and sold such as

- Treasury bills
- Commercial paper and
- Bankers' acceptances

Capital Market

A capital market includes the stock market, commodities exchanges and the bond market amongst others. The capital market is an ideal environment for the creation of strategies that can result in raising long-term funds for bond issues or even mortgages.

Along with the stock exchanges, support organizations such as brokerage firms also form part of the capital market. These outward expressions of the capital market make it possible to keep the process ethical and more easily governed according to local laws and customs.

The Investment Appraisal

Capital Budgeting Cycle Steps

- Idea Generation
- Project Screening
- Financial & Non-financial Evaluation
- Approval
- Implementation
- Ongoing Monitoring
- Post Completion Audit

Financial Evaluation Methods

Basic Methods

- ❖ Accounting Rate of Return (ARR)
- ❖ Payback Period

Advanced Methods

- ❖ Net Present Value NPV
- ❖ Internal Rate of Return (IRR)
- ❖ Discounted Payback Period

Accounting Rate of Return(ARR)

The Average return of a project expressed as a percentage of the capital outlay or average investment

ARR Formula

$$\text{ARR} = \frac{\text{Average Annual profit}}{\text{Initial investment}} \times 100$$

$$\text{ARR} = \frac{\text{Average Annual profit}}{\text{Average Investment}} \times 100$$

Where "Average Investment" is

$$= \frac{\text{Initial Investment} + \text{Scrap value}}{2}$$

Decision rule

If ARR of the project > Target ARR then Accept the project. Else Reject the project.

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
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<ol style="list-style-type: none"> 1. It is easy to understand and easy to calculate. 2. The impact of the project on a company's financial statement can also be specified 3. Managers may be happy in expressing project attractiveness in the same terms in which their performance will be reported to shareholders, and according to which they will be evaluated and rewarded. 4. It takes into account the whole life of the project 5. It can be used as a relative measure in case of mutually exclusive projects 	<ol style="list-style-type: none"> 1. It fails to take account of the timing of cash flows and time value of money within that life 2. It uses accounting profit, hence subject to various accounting conventions. 3. It ignores the size of investment. 4. Like all rate of return measures, it is not a measurement of absolute gain in wealth for the business owners. 5. The ARR can be expressed in a variety of ways and is therefore susceptible to manipulation
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ILLUSTRATION 1

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

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

The cost of capital is 10%. And the target ARR is 20%

Company uses the straight line method for depreciation.

Required:

Calculate the ARR based on Average Investment?

Solution

Cashflows \$'000	Depreciation \$'000	Profit \$'000
50	19	31
40	19	21

30	19	11
25	19	6
20	19	1
Average Profit	<u><u>14</u></u>	
Depreciation	$\frac{(100 - 5)}{5}$	=19
Average Investment	$\frac{(100 + 5)}{2}$	=52.5
ARR Based on Average Investment		
	$\frac{\text{Average Profit}}{\text{Average Investment}} \times 100\%$	
	$\frac{14}{52.5} \times 100\%$	= 26.67%

Cash flows

<u>Relevant Cash flows</u>	<u>Irrelevant Cash flows</u>
<ul style="list-style-type: none"> ➤ Future Cash flows ➤ Variable Costs ➤ Incremental Cash flows ➤ Opportunity Cost 	<ul style="list-style-type: none"> ➤ Sunk Cost/ Historical Cost ➤ Non-cash Depreciation ➤ Indirect Costs ➤ General Overheads ➤ Central Office Overheads

Assumptions of Cashflows

- If Cash flows arise during the period, then it is assumed as it arises at the end of that period.
- If cash flow arise at the start of the period then it is assumed as if it arises at the end of the preceding period
- Period '0' is not a period, instead it represents start of period '1'.

Payback Period

It is the time period required to recover the initial investment

Decision rule

If Payback Period < Target Payback, Accept the Project. Else Reject the Project

ILUSTRATION 2

Required:

Using the data of ILUSTRATION 1, Calculate the Payback Period?

Solution

	Cashflows \$'000	Cumulative Cashflows \$'000
Y0	(100)	(100)
Y1	50	(50)
Y2	40	(10)
Y3	30	20
Y4	25	
Y5	25	

Last Year Negative Cumulative Cashflow X 12
Next Year Cashflow

=> 10 X12
30

=> 4 Months

Payback Period is 2 Years and 4 Months

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none">1. It is simple to use (calculate) and easy to understand2. It is a particularly useful approach for ranking projects where a company faces liquidity constraints and requires a fast repayment of investment.3. It is appropriate in situations where risky investments are made in uncertain market that are subject to fast design and product changes or where future cash flows are particularly difficult to predict.4. The method is often used as the first screening device to identify	<ol style="list-style-type: none">1. It does not give a measure of return, as such it can only be used in addition to other investment appraisal methods.2. It does not normally consider the impact of discounted cash flow although a discounted payback may be calculated (see later).3. It only considers cash flow up to the payback, any cash flows beyond that point are ignored.4. There is no objective measure of what is an acceptable payback period, any target payback is necessarily subjective

<p>projects which are worthy of further investigation.</p> <p>5. Unlike the other traditional methods payback uses cash flows, rather than accounting profits, and so is less likely to produce an unduly optimistic figure distorted by assorted accounting conventions</p>	
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DISCOUNTED CASH FLOW

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

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

Therefore we can express Present Values in terms of Future Values using the following formula of Compounding:

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

Where

PV - Present value.

FV - Future value.

r - Rate of interest or cost of capital.

n - Number of periods (years)

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

Revising the formula

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



Net Present Values (NPV)

The NPV of the project is the sum of the PVs of all cash flows that arise as a result of doing the project.

Decision Rule:-

If NPV of the project, discounted at cost of capital, is positive then Accept the project, Else Reject the Project.

ILUSTRATION 3

Required:

Using the data of ILUSTRATION 1, Calculate the NPV of the Project?

Solution

	Cashflows \$'000	Disc Factor (10%)	PV \$'000
Y0	(100)	1	(100)
Y1	50	0.909	45
Y2	40	0.826	33
Y3	30	0.751	23
Y4	25	0.683	17
Y5	25	0.621	16
			<hr/>
	NPV		34

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none">1. A project with a positive NPV increases the wealth of the company's, thus maximise the shareholders wealth.2. Takes into account the time value of money.	<ol style="list-style-type: none">1. Determination of the correct discount rate can be difficult.2. Non-financial managers may have difficulty understanding the concept.3. The speed of repayment of the original investment is not highlighted.

<p>3. Discount rate can be adjusted to take account of different level of risk inherent in different projects.</p> <p>4. Unlike the payback period, the NPV takes into account events throughout the life of the project.</p> <p>5. Better than accounting rate of return because it focuses on cash flows rather than profit.</p>	<p>4. The cash flow figures are estimates and may turn out to be incorrect.</p> <p>5. NPV assumes cash flows occur at the beginning or end of the year, and is not a technique that is easily used when complicated, mid-period cash flows are present</p>
--	--

Internal Rate of Return (IRR)

IRR is the total rate of return offered by an investment over its life. Calculative, The rate of return at which the NPV equals zero.

Formula to calculate

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b} (r_b - r_a)$$

r_a = lower discount rate chosen
 r_b = higher discount rate chosen
 N_a = NPV at r_a
 N_b = NPV at r_b

Decision Rule

If IRR of the project > Cost of capital, Accept the project. Else Reject the Project

ILUSTRATION 4

Required:

Using the data of ILUSTRATION 1 and assuming the NPV at 10% is \$34,000 , Calculate the IRR of the Project?

Solution

	Cashflows \$'000	Disc Factor (25%)	PV \$'000
Y0	(100)	1	(100)
Y1	50	0.800	40
Y2	40	0.640	26
Y3	30	0.512	15
Y4	25	0.410	10

Y5	25	0.328	8
NPV		(1)	
IRR =	$10\% + ((34/(34+1)) \times (25-10))\%$		
IRR =	24.57%		

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. Like the NPV method, IRR recognises the time value of money. 2. It is based on cash flows, not accounting profits. 3. More easily understood than NPV by non-accountant being a percentage return on investment. 4. For accept/ reject decisions on individual projects, the IRR method will reach the same decision as the NPV method 	<ol style="list-style-type: none"> 1. Does not indicate the size of the investment, thus the risk involve in the investment. 2. Assumes that earnings throughout the period of the investment are reinvested at the same rate of return. 3. It can give conflicting signals with mutually exclusive project. 4. If a project has irregular cash flows there is more than one IRR for that project (multiple IRRs).

Discounted Payback Period

The time period in which initial investment is recovered in terms of present value is known as payback period.

It is same as simple payback period. The only difference is that the discounted cash flows are used instead of simple cash flows for calculation.

Decision Rule

If Discounted Payback Period < Target Discounted Payback, Accept the Project. Else Reject the Project

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. It takes into account the time value of money and timings of cash flows. 2. It considers cash flows rather than accounting profits. 	<ol style="list-style-type: none"> 1. It does not consider the whole life of project. 2. It requires knowledge of cost of capital which is difficult to calculate.

3. Short payback period result in increased liquidity and enable business to grow more quickly	3. Life expectancy of a project is ignored. 4. It ignores cash flows after the payback period
--	--

Consistent Cashflows

If Cashflows arises in a series of equal cashflows then it is called Consistent Cashflows. These are of two Types:

Annuity: If Consistent cashflow for a certain Period. e.g Y_{1-5} or Y_{3-7}

Perpetuity: If Consistent cashflow for infinite period e.g. $Y_{1-\infty}$ or $Y_{3-\infty}$

Present Values of Consistent Cashflows

$$\text{The Annuity Factor} = \frac{1-(1+r)^n}{r}$$

$$\text{The Perpetuity Factor} = \frac{1}{r}$$

<u>Annuity</u>	<u>Perpetuity</u>
----------------	-------------------

If Cashflows Start from Period 1.

Annual Cashflow X Annuity Factor e.g. Y_{1-5} \$10,000 at Disc. Rate of 10% \$10,000 X 3.791(from annuity table) = \$37,910	Annual Cashflow X Perpetuity Factor e.g. $Y_{1-\infty}$ \$10,000 at Disc. Rate of 10% \$10,000 X (1/10%) = \$100,000
---	--

If Cashflows Start from Period 0.

Annual Cashflow X (Annuity Factor + 1) e.g. Y_{0-5} \$10,000 at Disc. Rate of 10% \$10,000 X (3.791+1) = \$47,910	Annual Cashflow X (Perpetuity Factor + 1) e.g. $Y_{0-\infty}$ \$10,000 at Disc. Rate of 10% \$10,000 X ((1/10%)+1) = \$110,000
---	--

If Cashflows Start from Subsequent Period e.g. Year 3.

Annual Cashflow X Annuity Factor of No. of periods X Discount factor of preceding period from Start e.g. Y_{4-8} \$10,000 at Disc. Rate of 10% \$10,000 X 3.791 X 0.751 = \$28,470	Annual Cashflow X Perpetuity Factor X Discount factor of preceding period from Start e.g. $Y_{4-\infty}$ \$10,000 at Disc. Rate of 10% \$10,000 X (1/10%) X 0.751 = \$75,100
--	--

Effect of Taxation in investment appraisal

- **Timing of Tax Cashflows:** Either in the same year or in arrears.
- **Calculation of cashflows**
 - **Tax on Operating Cashflows:** Operational Cashflows X Rate of Tax
 - **Tax Savings on Capital Allowances:** Calculate the capital Allowances/ Balancing Allowances and then multiply with Tax Rate.

Example

Initial Investment = 2000

Capital Allowances = 25% reducing balance

Useful life = 4 years, Tax rate = 30% payable in arrears, Scrap Value = 500

Years	Written Down Value	Capital Allowances @ 25%	Tax Savings @ 30%	Timing
1	2000	500	150	2
2	1500	375	113	3
3	1125	281	84	4
4	844	344	103	5

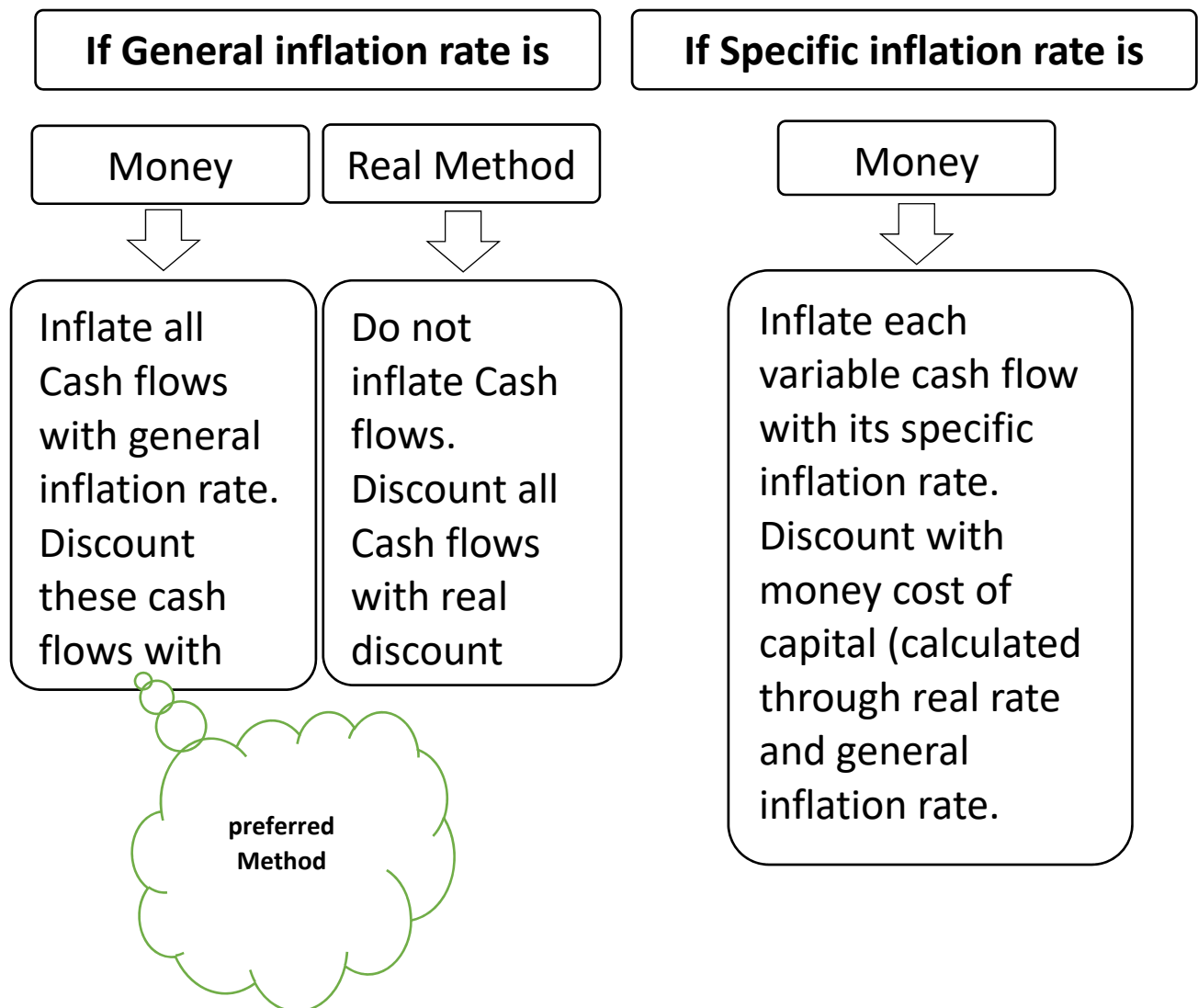
Effect of Inflation in investment appraisal:

Inflation may be defined as a general increase in prices, leading to general decline in the real value of money, (decrease in purchasing power).

- Real Rate of Return (r): Without inflation rate
- Money/ Nominal Rate of Return (n): With Inflation rate
- General Inflation (i)

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

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



After Inflation Cashflow = Real cashflows $(1 + i)^n$

Working Capital Change

Every business requires working capital for its operations.

Calculate working capital change in two steps:

1. Calculate working capital requirement one year in advance e.g. working capital is 10% of sales at the start of each year
2. Calculate incremental working capital by taking change of each year working capital and in last year there will be an assumption that all working capital will be recovered (Only for project and not for ongoing business)

ILLUSTRATION 5

A company is considering to invest in a project with its life of 4 years. Total working capital required at the beginning of each year is as follows:

Year	Cashflows \$'000
1	500
2	700
3	1000
4	600

Required:

Calculate the working capital cashflows of each year to be included in NPV calculation?

Solution

	Total Working Capital \$'000	Incrementle Working capital \$'000
Y0	500	(500)
Y1	700	(200)
Y2	1000	(300)
Y3	600	400
Y4	0	600

The Finance Cost

The Finance Cost will be a relevant cashflow however it will become the part of cashflows. This is because it is part of cost of capital.

Performa for Net Present Value

Years	0	1	2	3	4
Sales		X	X	X	X
Variable Cost		(X)	(X)	(X)	(X)
<u>Incremental Fixed Cost</u>		<u>(X)</u>	<u>(X)</u>	<u>(X)</u>	<u>(X)</u>
Operating Cashflows		X	X	X	X
Tax Expense		(X)	(X)	(X)	(X)

Tax Savings on Capital Allowances		X	X	X	X
Change in Working Capital	(X)	(X)	(X)	(X)	X
Initial Investment	(X)				
<u>Scrap Value</u>					X
Net Cash flows	(X)	X	X	X	X
<u>X Discount Factor</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>X</u>
Present Values	(X)	X	X	X	X
Net Present Value	X				

Investment Appraisal	Attempt	Question No.
	Dec-11	Q1-a,b
	Jun-12	Q1-a
	Dec-12	Q1
	Jun-13	Q1
	Dec-13	Q1
	Jun-14	Q1-a
	Dec-14	Q4
	Jun-15	Q5-a
	Dec-15	Q5
	Jun-16	Q5-a,b

Specific Investing Decision

The Three Specific Investing Decisions

- Capital Rationing
- Asset Replacement
- Lease or Buy

Capital rationing

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

- Hard capital rationing
- Soft Capital rationing

Hard capital rationing

Externally imposed. Usually by banks

Due to:

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

Soft capital rationing

Internally imposed by senior management.

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

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

Single period capital rationing

i.e. available finance is only in short supply during the current period, but will become freely available in subsequent periods.

Assumptions of Single Period Capital Rationing

- All projects are divisible

- Projects will be lost if not undertaken in current year(can not be postponed)
- The risk & uncertainty and strategic importance of all projects is same

Divisible – An entire project or any fraction of that project may be undertaken. Projects displaying the highest profitability indices (i.e. NPV/Initial Investment) will be preferred.

Indivisible – An entire project must be undertaken, since it is impossible to accept part of a project only. In this event different combination of projects are assessed with their NPV and the combination with the highest NPV is chosen.

Example – Divisible

Project	Investment	NPV	PI (NPV/Investment)	Ranking
A	1,000	500	0.5	3 rd
B	1,200	700	0.58	2 ND
C	800	300	0.375	4 TH
D	700	450	0.642	1 ST

Available Funds – \$ 2,500

The Investment Schedule

Project	Investment	NPV
D	700	450
B	1,200	700
A	600	300
Total	2,500	1,450

We will do Project D and B complete and Project A 60%.

Example – Non-Divisible

Project	Investment	NPV
A	1,000	500
B	1,200	700
C	800	300
D	700	450

Available Funds – \$ 2,500

Projects Combination	Total Investment	Total NPV
A,B	2,200	1,200

A,C,D	2,500	1,250
B,C	2,000	1,000
B,D	1,900	1,150

We will choose combination of A,C,D because it's gives the best NPV of \$1,250

Asset Replacement

Once the decision has been made to replace the asset, the question is how to replace an asset in the most cost-efficient manner.

Asset Replacement issues:

- How frequently an asset be replaced?
- Is it worth paying more for an asset that has a longer expected life.

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

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

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

Key ideas/assumptions:

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

ILLUSTRATION 1

A company bought an asset for \$80,000 having a useful life of three years.

It is now considering the right time to replace the asset.

The running cost on the asset is \$15,000 for year 1 and would increase by \$5,000 per year over the life of the project.

The expected scrap values at the end of each year are as follows:

<u>Year</u>	<u>Scrap Value (\$)</u>
1	40,000
2	25,000
3	15,000

The company has a cost of capital of 10%.

Required:

Determine whether the company should replace the asset after year 2 or year 3

Solution

Year	Discount Factor @10%	Replace After Year 2		Replace After Year 3	
		Cash Flow	Present Values	Cash Flow Values	Present
0	1.000	(80,000)	(80,000)	(80,000)	(80,000)
1	0.909	(15,000)	(13,635)	(15,000)	(13,635)
2	0.826	5,000	4,130	(20,000)	(16,520)
3	0.751			(10,000)	(7,510)
NPV			(89,505)		(117,665)
Annuity Factor			1.735		2.486
EAC			(51,588)		(47,331)

The annual equivalent cost for replacement after year 3 is less costly therefore asset should be replaced after every 3 years

Lease or Buy

The decision here is whether buying the asset or leasing the asset is more cost-effective

Lease

It is a rental agreement between two parties (lessee and lessor) for the use of an asset for some specific time period. Lessor is the provider of the asset whereas lessee is the user of asset.

Leases can be classified into two types namely finance lease and operating lease.

Difference between Operating and Finance Lease

Operating Lease	Finance Lease
➤ Major risk and reward belong to the lessor	➤ Major risk and reward belong to the lessee

➤ Maintenance is the responsibility of the lessor	➤ Maintenance is the responsibility of the lessee
➤ Useful life of the asset is considerably longer as compared to the lease term	➤ Lease term comprises of majority of the useful life of the asset

Calculation and decision Rule

1. Discount rate = post tax cost of borrowing

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

2. Cash flows

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

ILLUSTRATION 2

A firm has decided to acquire a new machine. The machine would cost \$6.4 million and would have an economic life of five years.

Tax-allowable depreciation of 25% pa on a reducing balance basis is available for the investment.

Taxation of 30% is payable on operating cash flows, one year in arrears.

The firm intends to finance the new plant by means of a five-year fixed interest loan at a pre-tax cost of 11.4% pa, principal repayable in five years' time.

As an alternative, a leasing company has proposed a finance lease over five years at \$1.42 million pa payable in advance.

Scrap value of the machine under each financing alternative will be zero.

Required:

Evaluate the two options for acquiring the machine and advise the company on the best alternative.

Solution

(W1) Calculation of the tax relief on tax-allowable depreciation if asset bought:

Note: The asset is bought at time $t=0$ as usual with the first amount of tax-allowable depreciation in the year ended time one. Given the one-year time lag on the tax, the first tax effect is at time $t=2$.

Year	Narrative	WDV \$'000	Tax Saved \$'000	Time of cashflow
0	Cost Capital	6,400		
1	Allowances	<u>1,600</u>	480	2
		4,800		
2	Capital Allowances	<u>1,200</u>	360	3
		3,600		
3	Capital Allowances	<u>900</u>	270	4
		2,700		
4	Capital Allowances	<u>675</u>	203	5
		2,025		
5	Disposal Proceed	-		
	Balancing Allowance	<u>2,025</u>	608	6

(W2) Calculation of the post-tax cost of borrowing.

The pre-tax cost of borrowing is 11.4%.

The post-tax cost of borrowing can be approximated by multiplying this by $(1 - \text{tax rate})$, i.e. $11.4\% \times (1 - 0.3) = 7.98\%$, say 8%

Cost of Borrowing to Buy

Time	0 \$'000	1 \$'000	2 \$'000	3 \$'000	4 \$'000	5 \$'000	6 \$'000
Asset	(6,400)						
Tax Savings on CA (W-1)			480	360	270	203	608
Net Cashflow	(6,400)	-	480	360	270	203	608
Disc Factor (8%) (W-2)	1	0.926	0.857	0.794	0.735	0.681	0.630
Present Value	(6,400)	-	411	286	198	138	383
NPV (\$'000)	(4,984)						

Cost of Leasing

Time	Narrative	Cashflows \$'000	Disc factor 8%	Present Value \$'000
0-4	Lease Payment	(1,420)	1+3.312	(6,123)
2-6	Tax Saving	426	3.993X0.926	1,575
				<hr/>
				(4,548)

The cost of leasing is lower than the cost of buying and the asset should therefore be acquired under a finance lease.

Risk

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

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

Techniques available:

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

Sensitivity Analysis

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

Formula to calculate sensitivity of a particular variable:-

$$\text{Sensitivity} = \frac{\text{Net present value}}{\text{After-tax Present value of particular variable}} \times 100\%$$

It indicates which variables may impact most upon the net present value (critical variables) and the extent to which those variables may change before the investment results in a negative NPV.

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
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<ol style="list-style-type: none"> 1. This is not a complicated theory to understand. 2. Information will be presented to management in a form, which facilitates subjective judgment to decide the likelihood of the various possible outcomes considered. 3. Indicates just how critical are some of the forecast which are considered to be uncertain 	<ol style="list-style-type: none"> 1. It assumes that changes to variables can be made independently or in isolation. 2. It only identifies how far a variable needs to change; it does not look at the probability of such a change. 3. It is not an optimizing technique. It provides information on the basis of which decision can be made
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Expected Values

Where there are a range of possible outcomes which can be identified and a probability distribution can be attached to those values. The expected value is the arithmetic mean of the outcomes as expressed below:

$$EV = \sum px$$

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

Example

Outcomes	%	EV
100,000	0.25	25,000
200,000	0.50	100,000
300,000	0.25	75,000
Expected Value		200,000

Adjusted Discount Rate

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

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

Specific Investing Decision and Risk	Attempt	Question No.
	Dec-11	Q1-c,d
	Jun-12	Q1-b,c
	Jun-14	Q1-b,c
	Jun-15	Q5-b
	Jun-16	Q5-c

Cost of Capital

Basics of Cost of Capital

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

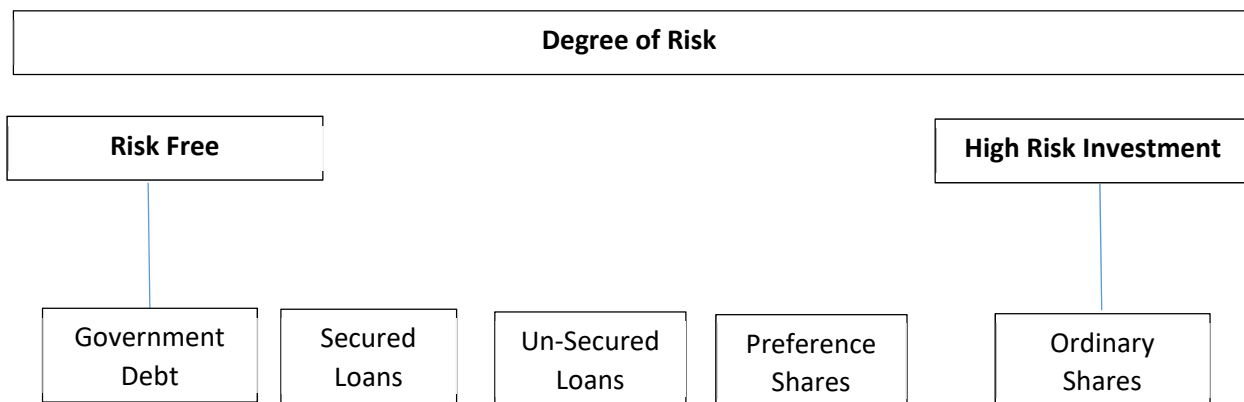
Risk and Return

The relationship between risk and return is easy to see, the higher the risk, the higher the required to cover that risk.

Overall Return

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

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



The WACC

Weighted Average Cost of Capital (WACC)		
Cost of Equity (K_e)	Cost of Debt (K_d)	Cost of Preference (K_p)

Cost of equity: the rate of return that is expected by the equity holders of the company. The symbol used to represent cost of equity is K_e .

Cost of debt: this is the after-tax return expected by the debt holders of the company. The symbol used to represent after-tax cost of debt is $K_d(1 - t)$.

Cost of preference shares: the return expected by the preference shareholders of the company. The symbol used to represent cost of preference shares is K_p .

Cost of Equity

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

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

Dividend Valuation Model

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

Where,

- D_1 = next year dividend = $D_0 (1 + g)$
- P_0 = Current Ex-market value of equity share
- g = sustainable growth rate

Estimating Growth

There are 2 main methods of determining growth:

1 THE AVERAGING METHOD

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

where d_o = current dividend

d_n = dividend n years ago

ILLUSTRATION 1

Munero Ltd paid a dividend of 6p per share 8 years ago, and the current dividend is 11p. The current share price is \$2.58 ex div

Required:
Calculate the cost of equity

Solution

$$g = \sqrt[8]{\frac{11}{6}} - 1 = 7.9\%$$

$$K_e = \frac{0.11(1+7.9\%)}{2.58} + 7.9\% = 12.47\%$$

2. GORDON'S GROWTH MODEL

$$g = rb$$

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

ILLUSTRATION 2

The ordinary shares of Titan Ltd are quoted at \$5.00 cum div. A dividend of 40p is just about to be paid. The company has an annual accounting rate of return of 12% and each year pays out 30% of its profits after tax as dividends.

Required:
Estimate the cost of equity

SOLUTION

$$g = 12\% \times (1-30\%) = 8.4\%$$

$$K_e = \frac{0.4(1+8.4\%)}{5} + 8.4\% = 17.07\%$$

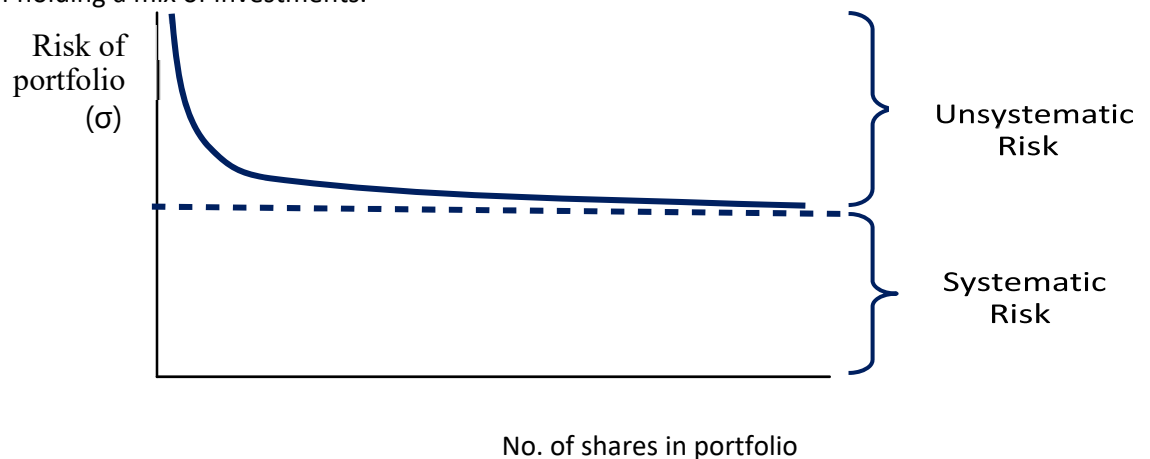
Capital Asset Pricing Model

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

Portfolio theory

Risk and Return

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



Systematic and non-systematic risk

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

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

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

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

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

Implications

1. If an investor wants to avoid risk altogether, he must invest in a portfolio consisting entirely of risk-free securities such as government debt.
2. If the investor holds only an undiversified portfolio of shares he will suffer unsystematic risk as well as systematic risk.
3. If an investor holds a 'balanced portfolio' of all the stocks and shares on the stock market, he will suffer systematic risk which is the same as the average systematic risk in the market.
4. Individual shares will have systematic risk characteristics which are different to this market average. Their risk will be determined by the industry sector and gearing (see later). Some shares will be more risky and some less.

β (beta) factor

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

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

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

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

The security market line

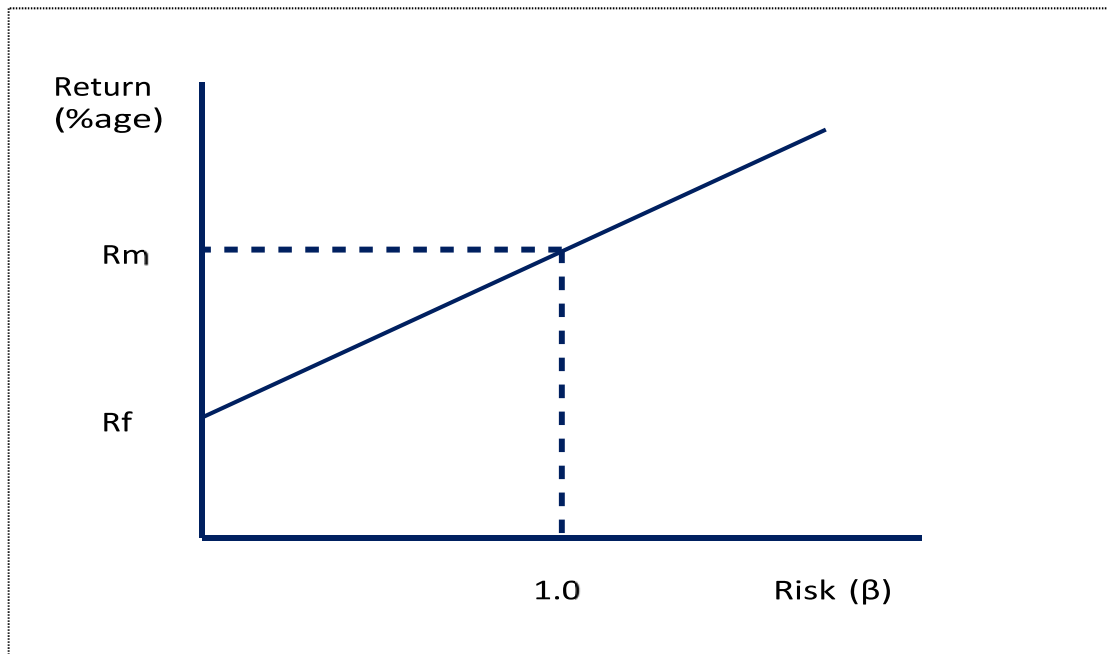
The security market line gives the relationship between systematic risk and return. We know 2 relationships.

1 The risk-free security

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

2 The market portfolio

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



From the graph it can be seen that the higher the systematic risk, the higher the required rate of return.

The relationship between required return and risk can be shown using the following formula:

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

where K_e = required return from individual security

β = Beta factor of individual security

R_f = risk-free rate of interest

R_m = return on market portfolio

Criticisms of the CAPM

1. CAPM is a single period model, this means that the values calculated are only valid for a finite period of time and will need to be recalculated or updated at regular intervals.
2. CAPM assumes no transaction costs associated with trading securities

3. Any β value calculated will be based on historic data which may not be appropriate currently. This is particularly so if the company has changed the capital structure of the business or the type of business they are trading in.
4. The market return may change considerably over short periods of time.
5. CAPM assumes an efficient investment market where it is possible to diversify away risk. This is not necessarily the case meaning that some unsystematic risk may remain.
6. Additionally the idea that all unsystematic risk is diversified away will not hold true if stocks change in terms of volatility. As stocks change over time it is very likely that the portfolio becomes less than optimal.
7. CAPM assumes all stocks relate to going concerns, this may not be the case

ILLUSTRATION 3

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

Required:

What is the cost of capital?

SOLUTION 3

$$K_e = 8\% + 1.2 (15\% - 8\%) = \mathbf{16.4\%}$$

The Cost of Debt

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

We would expect this to be lower than the cost of equity. The value of debt is assumed to be the present value of its future cash flows.

Terminology

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

K_d for irredeemable debt

$$K_{d(net)} = \frac{i(1-t)}{P_0} \times 100\%$$

where i = interest paid
 t = marginal rate of tax
 P₀ = ex interest (similar to ex div) market price of the loan stock.

ILLUSTRATION 4

The 10% irredeemable loan notes of Rifa plc are quoted at \$120 ex-interest. Corporation tax is payable at 30%

Required:

What is the cost of debt net?

SOLUTION

$$K_{d(net)} = \frac{10(1-30\%)}{120} \times 100\% = 5.83\%$$

K_d for redeemable debt

The K_{d(net)} for redeemable debt is given by the IRR of the relevant cash flows. The relevant cash flows would be:

Years	Cashflows
0	Market Value of Loan Note (P ₀)
1-n	Annual Interest Payment (i(1-T))
n	Redemption Value (RV)

ILLUSTRATION 5

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

Required:

What is the cost of debt net?

SOLUTION					
Years	Cashflows (\$)	Disc Factor (7%)	PV at 7%	Disc Factor (4%)	PV at 4%
0	(102)	1	(102)	1	(102)
1-5	10(1-30%) = 7	4.1	28.7	4.452	31.16
5	100	0.713	71.3	0.822	82.20
			(2)		11.36

$$IRR = 4\% + \left[\frac{11.36}{11.36 + 2} \times (7 - 4) \right] \% = 6.55\%$$

Convertible debt

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

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

ILLUSTRATION 6

Continuing the ILLUSTRATION 5, it has come to know that the loan note was convertible into 40 ordinary shares. The expected share price at the redemption date will be expected to be \$2.6

Required:

What is the cost of debt net?

SOLUTION

Redemption Value = \$100.

Conversion Value = (\$2.6 X 40) = \$104.

As the conversion value is higher so we will use conversion value at redemption date

Years	Cashflows (\$)	Disc Factor (7%)	PV at 7%	Disc Factor (9%)	PV at 9%
0	(102)	1	(102)	1	(102)
1-5	10(1-30%) = 7	4.1	28.7	3.89	27.23
5	104	0.713	74.15	0.65	67.6
			0.85		(7.17)

$$IRR = 7\% + \left[\frac{0.85}{0.85 + 7.17} \times (9 - 7) \right] \% = 7.21\%$$

Non-tradeable debt

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

$$K_{d(\text{net})} = \text{Interest (Coupon) rate} \times (1 - T)$$

ILLUSTRATION 7

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

Required:

What is the cost of debt net?

SOLUTION

$$K_{d(\text{net})} = 12\% (1 - 30\%) = 8.4\%$$

The Cost of Preference

A fixed rate charge to the company in the form of a dividend rather than in terms of interest.

Preference shares are normally treated as debt rather than equity but they are not tax deductible.

They can be treated using the dividend valuation model with no growth.

- $$K_p = \frac{d}{P_0} \times 100\%$$

ILLUSTRATION 7

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

Required:

What is the cost of Preference?

SOLUTION

- $$K_p = \frac{0.09}{1.4} \times 100\% = 6.43\%$$

The Calculation of WACC

Source	Proportion (in Market Values) X Cost	WACC
Equity	Proportion of Equity X K_e	X%
Debt	Proportion of Debt X $K_{d(\text{net})}$	X%
Preference Share	Proportion of Preference X K_p	X%
WACC		X%

ILLUSTRATION 8

Bar plc has 20m ordinary 25p shares quoted at \$3, and \$8m of loan notes quoted at \$85. The cost of equity has already been calculated at 15% and the cost of debt (net of tax) is 7.6%.

Required:

Calculate WACC?

SOLUTION

Market Value of Equity = 20m X \$3 = \$60m

Market Value of Debt = \$8m X 85/100 = \$6.8m

Total capital (60+6.8) = \$66.8m

Source	Proportion X Cost	WACC
Equity	(60/66.8) X 15%	13.47%
Debt	(6.8/66.8) X 7.6%	0.77%
		<u><u>14.25%</u></u>

Cost of Capital	Attempt	Question No.
	Dec-11	Q3-c
	Jun-12	Q4-b
	Dec-12	Q3-a,b
	Jun-13	Q2
	Dec-13	Q2-a,b,c
	Jun-14	Q3-a,c
	Dec-14	Q5-a
	Jun-16	Q4-a

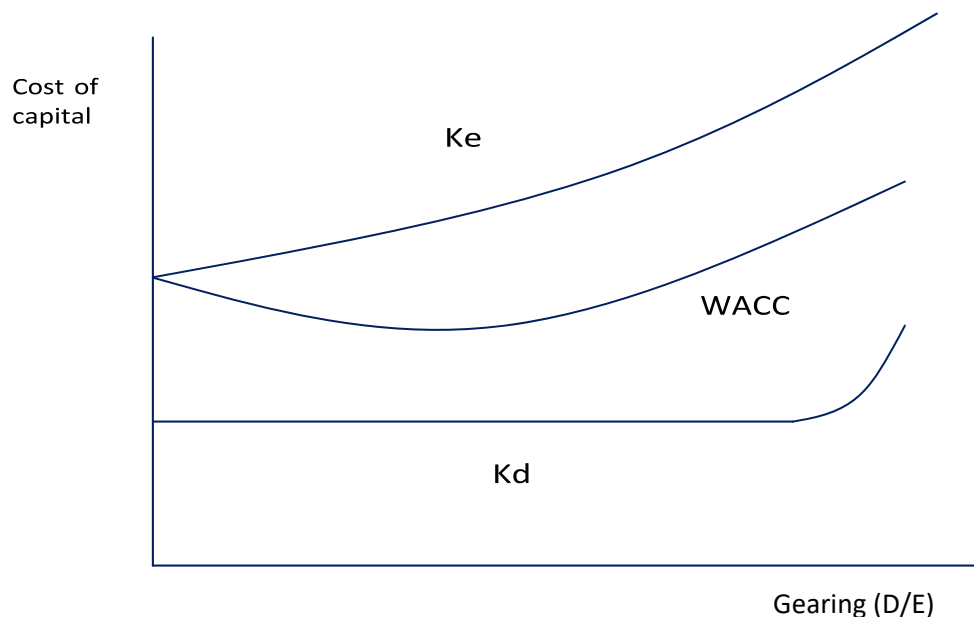
Capital Structure and WACC

Gearing Theories

The Traditional View

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

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



Key point : There is an optimal level of gearing at which the WACC is minimized and the value of the company is maximized.

The MM View (With Out Tax)

Cost of equity: K_e rises at a constant rate to reflect the level of increase in risk associated with gearing.

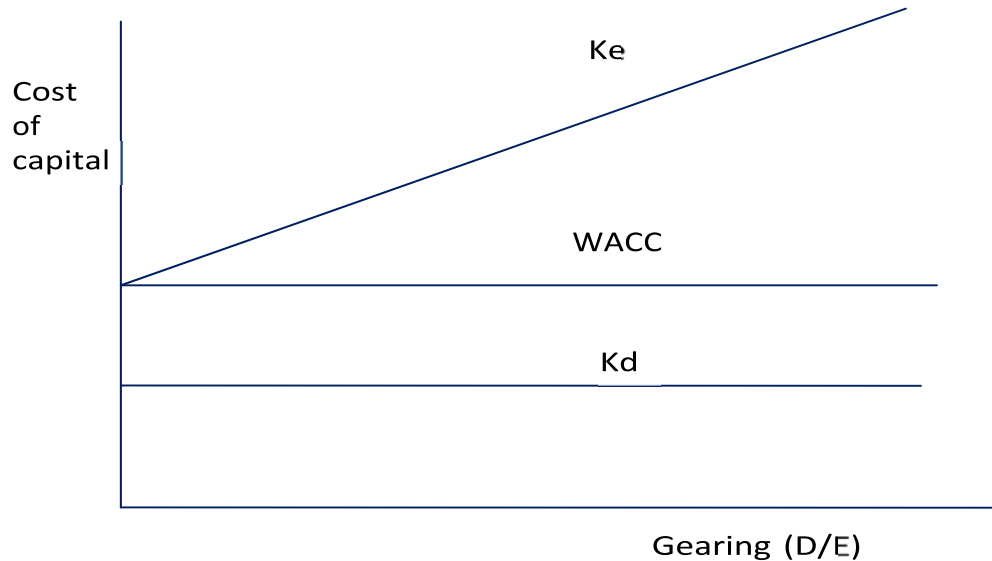
Cost of debt: There is no impact on the cost of debt until the level of gearing is prohibitively high

Assumptions:

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

7. Debt is risk free.

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

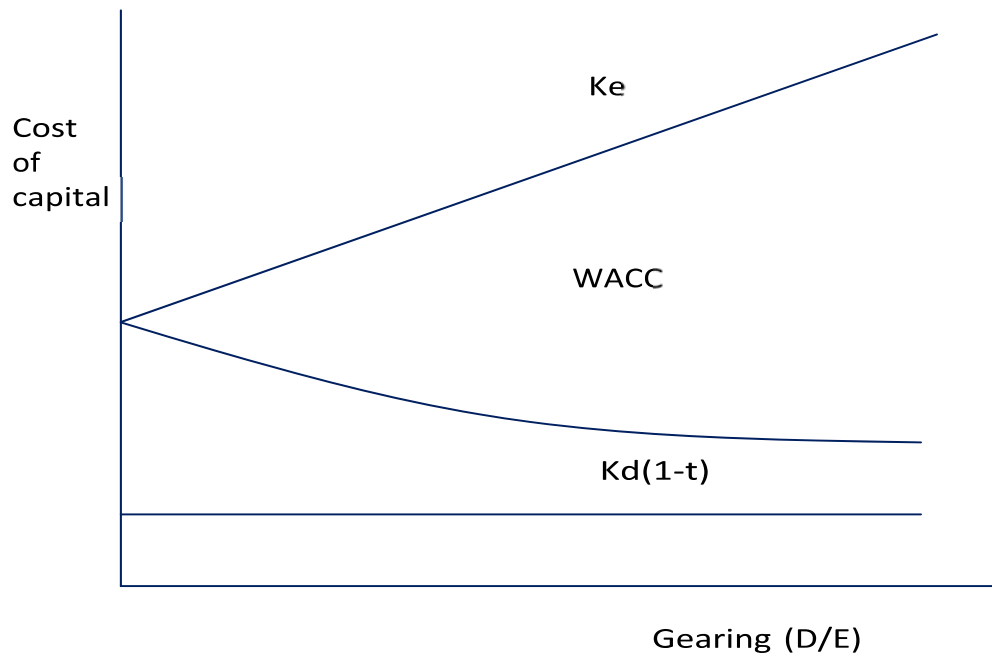


If the weighted average cost of capital is to remain constant at all levels of gearing it follows that any benefit from the use of cheaper debt finance must be exactly offset by the increase in the cost of equity.

The MM View (With Tax)

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

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



Pecking Order Theory

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

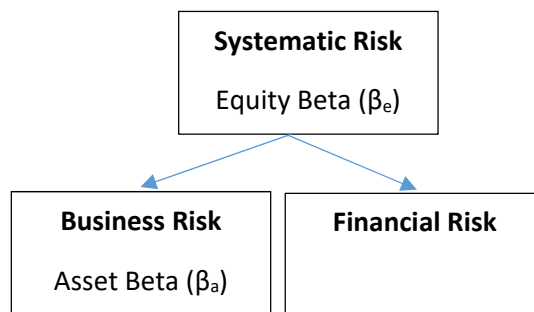
A suggested order is as follows:

1st retained earnings

2nd bank debt

3rd issue of equity.

CAPM and MM Combined



Business Risk

Risk due to nature of the business operations or the type of industry.

Financial Risk

Risk due to inclusion of debt in the financial structure. This Risk will be zero if the company or investment is 100% equity financed.

Equity Beta (β_e)

It is the Beta of a geared Company so it has both Financial and Business Risk

Asset Beta (β_a)

It is the Beta of an un-geared Company so it has Business Risk only.

The Formula

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

Where:

V_e = Market Value of Equity

V_d = Market Value of Debt

Should Company's WACC be Used for Investment Appraisal?

If the Investment's Business risk and Financial Risk are similar to the company, then we use the company's WACC to appraise the investment. However, if any of the risk is different then we have to calculate investment specific cost of capital.

Project Specific Cos of Capital

Following are the steps of calculating the project specific cost of capital.

Financial Risk is Different	Business Risk is Different
<ol style="list-style-type: none"> 1. Chose the β_e of the company. 2. Calculate the β_a using the company's current financial structure (Un-gearing Beta). $\beta_a = \frac{V_e}{V_e + V_d(1 - T)} \times \beta_e$ 3. Calculate β_e of the investment using capital structure to be used for the investment. (Re-gearing Beta) $\beta_e = \frac{V_e + V_d(1 - T)}{V_e} \times \beta_a$ 4. Use β_e to calculate K_e using CAPM 5. Calculate WACC 	<ol style="list-style-type: none"> 1. Identify a proxy company having same Business Risk 2. Chose the β_e of that proxy company. 3. Calculate the β_a using the Proxy company's current financial structure (Un-gearing Beta). $\beta_a = \frac{V_e}{V_e + V_d(1 - T)} \times \beta_e$ 4. Calculate β_e of the investment using capital structure to be used for the investment. (Re-gearing Beta) $\beta_e = \frac{V_e + V_d(1 - T)}{V_e} \times \beta_a$ 5. Use β_e to calculate K_e using CAPM 6. Calculate WACC

ILLUSTRATION 1

Techno, an all equity agro-chemical firm, is about to invest in a diversification in the consumer pharmaceutical industry. Its current equity beta is 0.8, whilst the average equity β of pharmaceutical firms is 1.3. Gearing in the pharmaceutical industry averages 40% debt, 60% equity. Corporate debt is available at 5%.

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

Required:

What would be a suitable discount rate for the new investment if Techno were to finance the new project with 30% debt and 70% equity?

SOLUTION

1. Pharmaceutical Industry $\beta_e = 1.3$
2. $\beta_a = \frac{60}{60+40(1-30\%)} \times 1.3 = 0.89$
3. $\beta_e = \frac{70+30(1-30\%)}{70} \times 0.89 = 1.16$
4. $K_e = 4\% + 1.16 (14\% - 4\%) = 15.6\%$

5. WACC		
Source	Propotion X Cost	WACC
Equity	70% X 15.6%	10.92%
Debt	30% X 5% (1-30%)	1.05%
WACC		11.97%

Capital Structure and WACC	Attempt	Question No.
	Dec-11	Q3-d
	Jun-12	Q4-d
	Dec-13	Q2-d,e
	Jun-14	Q3-b
	Dec-15	Q4-b

Source of Finance

Factors to consider in choosing appropriate source of finance

- 1) Cost of funds (Normally debt is cheaper)
 - Since secured hence low risk for provider
 - Guaranteed returns
 - Definite maturity
 - Tax saving by interest
- 2) Duration of need (Matching)
- 3) Gearing ratio (High gearing → High risk)
- 4) Accessibility - Generally difficult for small co. to raise debt

Equity

Ordinary Shares

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

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none">1. No fixed charges (e.g. interest payments).2. No repayment required.3. Carries a higher return than loan finance.4. Shares in listed companies can be easily disposed of at a fair value	<ol style="list-style-type: none">1. Issuing equity finance can be expensive in the case of a public issue (see later).2. Problem of dilution of ownership if new shares issued.3. Dividends are not tax-deductible.4. A high proportion of equity can increase the overall cost of capital for the company.5. Shares in unlisted companies are difficult to value and sell

Stock Market Listing

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. Access to wider pool of finance 2. Better image 3. Releasing capital for other uses 4. Possibilities of acquisition and growth 	<ol style="list-style-type: none"> 1. Increased public scrutiny of the company 2. Possibility of dilution of control 3. Increased costs e.g. corporate governance, internal audit

Types of Equity Finance

Retained Earnings (Retain funds): These are readily available and have no issuance cost however they may be not sufficient to fund large projects

New Share Issuance

- Offer for Sale (By tender or at fixed price)
- Placing
- Rights Issue

Comparison Between Offer for Sale of its Shares & Placing

- Placing is much cheaper.
- Placing is a relatively quicker method
- Placing involves less disclosure of information
- Placing might give institutional shareholders the control of the company

Right Issues

It provides that any new issue of shares shall first be offered to the existing shareholders in the ratio of their shareholdings. This preserves the existing pattern of shareholding and control.

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. It is a cheaper method of financing as compared to a public offer. 2. The existing shareholders get shares at a low price and their shareholding is not diluted. 3. Gearing would decrease 	The amount that can be raised is limited

Valuing a Right Issue

- Theoretical ex rights price (TERP)

$$TERP = \frac{\text{Existing Market Value} + \text{Funds Raised}}{\text{Number of shares after right issue}}$$

- **Fund Raised** = Right issue shares × right issue price
- **Value of rights** = TERP – Rights issue price

ILLUSTRATION 1

Existing Shares = 1,000,000

Existing Share Price = \$4/Share

Company wants to raise \$800,000 using a rights issue, incurring an issuance cost of 20,000.

Right Price = \$3/Share

Solution

Rights Shares = $800000 / 3 = 266,667$

TERP = $\frac{(1000000 \times 4) + (800000 - 20000)}{1000000 + 266667}$

= \$3.77/Share

Value of Right = TERP – Right Price

= $3.77 - 3$

= \$0.77

Is the Right Issue Beneficial For Shareholders?

- Funds raised through rights issue can be used to repay a loan this will reduce interest expense and earnings would increase.
- Funds raised through rights issue can be used to invest in new project which will increase the profitability of project

From both the market value after the right issue will be changed. So,

If revised market value > TERP, then shareholders wealth will be Maximized.

Preference Share

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

Debt

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

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

Security

The debtholder will normally require some form of security against which the funds are advanced. This means that in the event of default the lender will be able to take assets in exchange of the amounts owing.

Covenants

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

- Dividend restrictions
- Financial ratios
- Financial reports
- Issue of further debt

Types of Debt

Debt may be raised from two general sources, banks or investors

Bank Finance

For companies that are unlisted and for many listed companies the first port of call for borrowing money would be the banks. This is a confidential agreement that is by negotiation between both parties

Debentures

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

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

Types of Debentures

- Irredeemable

- Redeemable
 - Convertible (Option to convert into certain number of shares)
 - Non-Convertible (can only be redeemed at a pre agreed redemption value)

When Debt Financing Would Be More Appropriate than Equity Financing

- When company has lower financial risk
- The gearing and interest cover are close to industry average
- When company is in healthy comparative position
- Cash flows and profit margins are stable
- Tangible assets are available to be offered as a security

Venture Capital

Venture capital is a risk capital, normally provided in return for an equity stake.

Types of Venture:

- Business start-ups
- Business development
- Management buyout
- Helping a company where one of its owners wants to realize all or part of his investment

Venture capitalists will assess an investment prospect on the basis of its:

- financial outlook
- management credibility
- depth of market research
- technical abilities
- degree of influence offered:
 - controlling stake?
 - board seat?
- exit route.

SMEs

SMEs can often face difficulties when raising finance since investing in an SME is inherently more risky than investing in a larger company due to:

- the lack of business history or proven track record
- the lower level of public scrutiny over accounts and records

Source of Finance for SMEs

- Financial investors including:
 - Business angels
 - Venture capitalists
- Various government solutions including:
 - increasing the marketability of shares
 - providing tax incentives
 - other specific forms of assistance
- Other practices including:
 - supply chain financing
 - crowdfunding
 - peer-to-peer funding

Ratio Analysis

Performance Ratios

- Return on Capital Employed

$$\frac{\text{Profit before interest and tax}}{\text{Book value of equity} + \text{book value of debt}} \times 100\%$$

- Return on Equity

$$\frac{\text{Profit after tax}}{\text{Book value of equity}} \times 100\%$$

Share Holders Wealth

- Dividend Yield

$$\frac{\text{Dividend per share}}{\text{Opening Market Share Price}} \times 100\%$$

- Capital Gains

$$\frac{\text{Closing market value} - \text{opening market value}}{\text{Opening Market Share Price}} \times 100\%$$

- Total Return (Dividend Yield + Capital Gains)

$$\frac{\text{Closing market value} - \text{opening market value} + \text{dividends}}{\text{Opening Market Share Price}} \times 100\%$$

- Dividend Cover

$$\frac{\text{Earning per Share}}{\text{Dividend per Share}}$$

- Price/Earning Ratio

$$\frac{\text{Market Share Price}}{\text{Earning per Share}}$$

- Dividend Yield

$$\frac{\text{Earning per share}}{\text{Opening Market Share Price}} \times 100\%$$

Financial Risk

- Financial Gearing

$$\frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times 100\% \quad \text{OR} \quad \frac{\text{Debt}}{\text{Equity}} \times 100\%$$

- Interest Cover Ratio

$$\frac{\text{Profit before interest and tax}}{\text{interest}}$$

Dividend Policy Theories

Dividend policy is a strategy whereby the management distribute profits to the shareholders. There are two such theories:

- Irrelevancy theory
- Relevancy theory

Irrelevancy theory

According to MM theory dividends are irrelevant, it does not matter, what actually matters that is earning power.

The extent and timing of dividend payouts is irrelevant. Investors are indifferent to whether they receive their earnings by way of dividends or capital gains.

Since prime importance is given to investment decisions, dividends are determined as a residual amount. There may even be no dividends if the retained earnings are consumed by investment projects. However, the expected future earnings of the company will push the share prices up. In this manner, a shareholder gains in capital appreciation even if he does not receive dividend payments.

It was argued that if shareholders needed cash when no dividends were declared, they could sell some of their shares and generate cash.

Assumptions

- This theory is based on the following assumptions:
- Capital markets are perfect.
- There are no taxes at the corporate or personal level. There are no issue costs for the securities.

Relevancy Theory

Markets are not perfect, dividends play a role of signal: A dividend which differs from shareholders expectations about dividends might send signals to the market and affect share price. A higher than expected dividend may signal that the board of directors are confident about the future and may lead to an increase in share price lower than expected dividend may signal that the company is in financial difficulties and lead to a fall in share price.

Liquidity Preference: Investors have their own liquidity needs so they will prefer cash now to later

Tax Position

- Tax on dividends is income tax whereas tax on selling shares is capital gains tax
- If company changes its dividend policy, it will disturb investors tax position

Factors Affecting Dividend Policy

- The need to remain profitable
- The government impose direct restrictions on the amount of dividends companies can pay
- Any dividend restraints that may be imposed by loan agreements
- The effect of inflation and the need to retain some profit in the business just to maintain its operating capacity
- The company's gearing level
- The need to repay debt in near future
- The ease with which the company can raise extra finance from sources other than retained earnings
- The signaling effect of dividends to shareholders and financial markets in general
- The amount of earnings the company wishes to retain may be affected by the number suitable investment opportunities available to the company. if there are few investment projects available which can generate sufficient return than surplus cash should be returned to shareholders

Scrip Dividend

A scrip dividend is the dividend paid by issue of additional company shares, rather than cash.

A company that wants to retain cash for reinvestment but does not want to reduce its dividends might offer its shareholders a scrip dividend.

The rules of the stock exchange might require that when a company wants to make a scrip dividend, it must offer a cash dividend alternative, so that shareholders can choose between new shares and cash.

Advantages

- They can preserve a company's cash position if a substantial number of shareholders take up the shares option.
- Investors may be able to take tax advantages if dividends are in form of shares.
- Investors looking to expand their holding can do so without incurring the transaction costs of buying more shares.
- A small scrip issue will not dilute the share price significantly.
- A share issue will decrease the company's gearing and therefore enhance its borrowing capacity

Share Repurchase

Purchase by a company of its own shares can take place for various reasons and must be in accordance with any requirements of legislation.

If a company has surplus cash in the form of a higher dividend.

If a company chooses to pay higher dividend, this might act as a signal shareholder who then expect high dividends in future years too. If the cash is used for share repurchases instead of higher dividends, future dividend expectations will not be affected.

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none">1. Finding a use of surplus cash, this may be a 'dead assets'.2. Increase in earnings per share through a reduction in the number of shares in issue.3. Readjustment of the company's equity base to more appropriate level, for a company whose business is in decline.4. Possibly preventing a takeover or enabling a quoted company to withdraw from the stock market.5. Increase in gearing	<ol style="list-style-type: none">1. It can be hard to arrive at a price that will be fair both to the vendors and to any shareholders who are not selling shares to the company.2. A repurchase of shares could be seen as an admission that the company can not make better use of funds than the shareholders.3. Some shareholders may suffer from being taxed on capital gains following the purchase of their shares rather than receiving dividend income.

Islamic Finance

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

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

Prohibited activities

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

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

Riba

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

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

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

Islamic Finance Contracts

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

- Murabaha – trade credit
- Ijara – lease finance
- Mudaraba – equity finance
- Sukuk – debt finance
- Musharaka – venture capital

Islamic Finance Transaction	Similar To	Differences
Murabaha	Trade credit / loan	There is a pre-agreed mark-up to be paid in recognition of the convenience of paying later for an asset that is transferred immediately. There is no interest charged

Musharaka	Venture Capital	Profits are shared according to a pre-agreed contract. There are no dividends paid. Losses are solely attributable to the provider of capital
Mudaraba	Equity	Profits are shared according to a pre-agreed contract. There are no dividends paid. Losses are solely attributable to the provider of capital
Ijara	Leasing	Whether an operating or finance transaction, in Ijara the lessor is still the owner of the asset and incurs the risk of ownership. This means that the lessor will be responsible for major maintenance and insurance which is different from a conventional finance lease.
Sukuk	Bonds	There is an underlying tangible asset that the sukuk holder shares in the risk and rewards of ownership. This gives the sukuk properties of equity finance as well as debt finance

Sources of Finance	Attempt	Question No.
	Dec-11	Q4
	Jun-12	Q3-a,b,c
	Dec-12	Q3-d
	Jun-13	Q4-b,c,d
	Dec-13	Q4
	Jun-14	Q4-c,d
	Dec-14	Q5-b
	Jun-15	Q4
	Dec-15	Q1 & Q4-a
	Jun-16	Q4-b,c

Business Valuation

Need

Businesses need to be valued for a number of reasons such as

- For Acquisitions & Merger
- To get listed on stock Exchange
- For tax Purpose

Equity Valuation Methods

- Cash-Flow based Method
 - Dividend Valuation Model
 - Present Value of Future Cashflows (not generally examined in F9)
- Net Asset Method
 - The book value approach
 - Net Realizable values of the assets less liabilities
 - Replacement values
- Income based Method
 - P/E Ratio
 - Earning Yield

Cashflow Based Method

Dividend Valuation Method

The dividend valuation model (or growth model) suggests that the market value of a share is supported by the present value of future dividends. The formula for consistent dividend or growth starting from year 1.

$$P_0 = \frac{d_1}{k_e - g}$$

Where:

P_0 = Price of Share.

d_1 = Expected dividend in year 1 and can be estimated as $d_0(1+g)$

g = growth rate

When dividends are not consistent from start then calculate present value of each year independently.

ILLUSTRATION 1

A company is expected to pay future dividend as follows

$$Y_1 = \$1$$

$$Y_2 = \$1.5$$

$$Y_3 = \$2$$

From Y_4 the dividend will consistently grow by 4% each year. The K_e is 10%.

Required:

Estimate the market Price of each share.

Solution

Market price of each share should be the present value of future dividends discounted at k_e

Years	dividends	disc factor at K_e	PV
1	1	0.909	0.91
2	1.5	0.826	1.24
3	2	0.751	1.50
4-∞	$2(1+4\%) = 2.08$	$(1/(10\%-4\%)) \times 0.751$	26.03
			29.68

Market capitalization

Mv/share × number of shares

Advantages & Disadvantages

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. Considers the time value of money and has an acceptable theoretical basis. 2. Particularly useful when valuing a minority stake of a business. 	<ol style="list-style-type: none"> 1. Difficulty estimating an appropriate growth rate. 2. The model is sensitive to key variables. 3. The growth rate is unlikely to be constant in practice

Asset Based Approach

The business is estimated as being worth the value of its Net Assets.

$$\text{Net Assets} = \text{Total Assets} - \text{Total Liabilities} - \text{Preference Share Value}$$

Ways of valuing Net Assets

- **Book Value Approach** -The book value of non-current assets is based on historical (sunk) costs. These amounts are unlikely to be relevant to any purchaser (or seller).
- **Net Realizable values of the assets less liabilities** - This amount would represent what should be left for shareholders if the assets were sold off and the liabilities settled.
- **Replacement values** - The approach tries to determine what it would cost to set up the business if it were being started now.

Weakness

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

Uses of Asset Based Method

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

Income Based

This method of particular use when valuing a majority shareholding:

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

Price/Earning Method

This method relies on finding listed companies in similar businesses to the company being valued (the target company), and then looking at the relationship they show between share price and earnings.

Market Value of Target Company = Earnings per Share of Target Company X P/E Ratio of Proxy or (Industry Average)

ILLUSTRATION 2

Henery Ltd, an unlisted company:

Ordinary share capital is 200,000 50¢ shares.

Extract from income statement for the year ended 31 Dec 20X7:

	\$
Profit before taxation	430,000
Less: Corporation tax	110,000
Profit after taxation	320,000

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

Required:

Value 200,000 shares in Henery Ltd on a PE basis.

SOLUTION

EPS

$$\frac{320,000}{200,000} = 1.6$$

Market Price = $10 \times 1.6 = \$16/\text{Share}$

Total Value of 200,000 shares = $16 \times 200,000 = \mathbf{\$3,200,000}$

Earning Yield

The earnings yield is the inverse of the PE ratio:

$$\text{Earning Yield} = \frac{\text{EPS}}{\text{Price per share}} \times 100\% \quad \text{Or} \quad \text{Earning Yield} = \frac{\text{Profit after Tax}}{\text{Market Value}} \times 100\%$$

It can therefore be used to value the shares or market capitalisation of a company

$$\text{Price per share} = \frac{\text{EPS}}{\text{Earning Yield}} \quad \text{Or} \quad \text{Market Value} = \frac{\text{Profit after Tax}}{\text{Earning Yield}}$$

ILUSTRATION 3

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

Required:

Find the market capitalization of each company.

SOLUTION

$$\text{Price per share} = \frac{300,000}{12.5\%} = \mathbf{\$2,400,000}$$

Debt Valuation

Value of debt is the sum of Present value of future interest payments, discounted at K_d

Irredeemable

$$\text{Market Price} = \frac{\text{interest cost}}{k_d}$$

ILUSTRATION 4

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

Required:

The current market value of the debt.

SOLUTION

$$\text{Market Price} = \frac{\$9}{6\%} = \$150$$

Redeemable

Years	Cashflows	Disc at K_d	Present Value
1-n	Interest cost	Annuity Factor	X
n	Redemption Value	Discount Factor	X
Market Price			X

ILLUSTRATION 5

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

Required:

The current market value of the debt.

SOLUTION

Years	Cashflows	Disc at K_d	Present Value
1-5	\$10	3.993	\$39.93
5	\$100	0.681	\$68.1
Market Price			\$108.03

Efficient Market Hypothesis

A market is efficient if

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

Form of Efficiency

Weak Form

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

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

Semi-Strong

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

- (i) all relevant information about past price movement and their implications; and
- (ii) publicly available information about the company.

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

Strong

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

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

Implication of Efficient Market Hypothesis

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

1. The timing of issues of debt or equity is not critical, as the prices quoted in the market are 'fair'. That is price will always reflect the true worth of the company, no over or under valuation at any point.
2. An entity cannot mislead the markets by adopting creative accounting techniques.
3. The entity's share price will reflect the net present value of its future cash flows, so managers must only ensure that all investments are expected to exceed the company's cost of capital.
4. Large quantities of new shares can be sold without depressing the share price.
5. The market will decide what level of return it requires for the risk involved in making an investment in the company. It is pointless for the company to try to change the market's view by issuing different types of capital instrument.
6. Mergers and takeovers. If shares are correctly priced this means that the rationale behind mergers and takeovers may be questioned. If companies are acquired at their current

market valuation then the purchasers will only gain if they can generate synergies (operating economies or rationalisation). In an efficient market these synergies would be known, and therefore already incorporated into the price demanded by the target company shareholders.

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

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

Business Valuation	Attempt	Question No.
	Dec-11	Q3-a,b
	Jun-12	Q4-a
	Dec-12	Q4
	Jun-13	Q4-a
	Jun-14	Q3-d & Q4-b
	Dec-14	Q2
	Jun-15	Q2
	Jun-16	Q3

Risk Management

Forex

Quotes

Quotes	Quoted	Example (Pakistan)	Converting foreign currency to local
Direct	Local/foreign	Rs. 100/1\$	Multiply eg. \$10 = (100 X 10) = Rs. 1,000
Indirect	Foreign/local	\$0.01/1Re.	Divide eg. \$10 = (10/0.01) = Rs. 1,000

BID and OFFER Rates

NOTE: Remember the rule. **(BANK ALWAYS WIN).**

- Hence bank always buy the foreign currency at low price and sell it at high price (Direct quote).
- Hence bank always give few foreign currency and receive more foreign currency against local. (Indirect Quote)

Bid price is a price at which bank is willing to **buy** foreign currency

Offer price is a price at which bank is willing to **sell** foreign currency.

NOTE: Our prospective is opposite as if we want to sell foreign currency then it means bank will buy.

Customer → Receiving foreign currency → we want to sell foreign currency → bank will buy → use Bid Price

Supplier → Paying foreign currency → we want to Buy foreign currency → bank will Sell → use Offer Price

	Bid	Offer
Direct	Lower	Higher
Indirect	Higher	Lower

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

FOREX Risk

There are three risks associated with foreign currency:

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

Transaction Risk

The risk associated with short-term cash flow transactions.

This may include:

- Commercial trade – this is normally reflected by the sale of goods in a foreign currency but with a delay in payment. The receipt will have an uncertain value in the home currency.

- Borrowing or lending in another currency – subsequent cash flows relating to interest payments would be uncertain in the home currency.

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

Economic Risk

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

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

Translation Risk

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

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

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

Predicting Exchange Rates

Purchase Power Parity

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

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

$$S_1 = S_0 \times \frac{1 + h_a}{1 + h_b}$$

Where:

S_1 = Future Expected Spot Rate

S_0 = Current Spot Rate

h_a = Rate of inflation in country a

h_b = Rate of inflation in country b

Note

The rate of inflation in nominator is the country's currency in nominator. Vice Versa

ILLUSTRATION 1

The current exchange rate is \$2.000/£.

Required

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

SOLUTION

$$S_1 = \$2.000/\text{£} \times \frac{1 + 7\%}{1 + 4\%} = \$2.058/\text{£}$$

Problems with Purchase Power Parity

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

Interest Rate Parity

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

$$F = S_0 \times \frac{1 + i_a}{1 + i_b}$$

Where:

F = Future Expected Spot Rate

S₀ = Current Spot Rate

i_a = Rate of interest in country a

i_b = Rate of interest in country b

Note

The rate of interest in nominator is the country's currency in nominator. Vice Versa

ILLUSTRATION 2

The current exchange rate is \$2.000/£.

Required

What would the Forward exchange rate be in 1 year if the interest rates in UK is 6.08% and 9.14% in USA?

SOLUTION

$$S_1 = \$2.000/\text{£} \times \frac{1 + 9.14\%}{1 + 6.08\%} = \$2.058/\text{£}$$

Hedging

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

Internal measures and managing the risk exposure internally.

External measures involve a bank or financial market.

Internal Hedging Techniques

Invoicing in Home Currency

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

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

Leading Payments

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

Matching

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

Do Nothing

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

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

External Hedging Techniques

Forward Contracts

Features

1. An agreement with the bank to exchange currency for a specific amount at a future date.
2. It is an obligation that must be completed once entered into.
3. The forward rate offers a perfect hedge because it is for the exact amount required by the transaction on the appropriate date and the future rate is known with certainty.

ILLUSTRATION 3

The current spot rate is \$2.1086/£ - 2.1178/£. The UK based company is expecting to receive \$400,000 in three months. The forward rate offered by bank is \$2.1076/£ - \$2.1168/£.

Required

Calculate the Amount in pound to be received in 3 months' time using FRA

Solution

The rate relevant here is \$2.1168/£ being the FRA rate and bid rate as this is the question of receipt. Bid rate is the higher because it is an indirect quote.

$$\frac{\$400,000}{\$2.1168/\text{£}} = \text{£}188,964.47$$

Money Market Hedge

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

Steps of Setting-up Money Market Hedge

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

Calculating the Outcome of Money Market Hedge

$$\frac{\text{Foreign Currency Value}}{1 + \text{interest rate in Foreign country}} \rightarrow \text{convert in Home Currency Value} \rightarrow X (1 + \text{interest rate in Home Country})$$

Note:

- In case of Receipt investing rate should be used in home currency and borrowing rate in foreign currency. Vice Versa for Payments
- Remember to time proportionate the interest rate.

ILLUSTRATION 4

Abrew is a UK company trading extensively in the US. The current exchange rate is \$1.9750±0.003/£.

We wish to Hedge the Receipt of \$500,000 in 1 month

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

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

Required

- i) In which currency, we will borrow and in which we will invest to set up the money market hedge?
- ii) The amount of cash received using money market hedge.

SOLUTION

- i) We will borrow in Dollars (the Foreign Currency) and we will invest in Pound Sterlings (the Home Currency)
- ii) This is the question of receipt so we use the investing rate of UK and borrowing rate of USA. So the UK investing rate is 0.33% ($4\% \times 1/12$) and USA borrowing rate is 0.625% ($7.5\% \times 1/12$)

$$\frac{\$500,000}{1 + 0.625\%} \div 1.9753 \times (1 + 0.33\%) = \text{£}252,384$$

Currency Futures

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

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

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

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

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

Currency Options

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

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

Interest Rate Risk

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

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

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

Reason for Fluctuating Interest Rates

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

- To control inflation, higher interest rates will reduce demand for funds, aggregate demand and hence inflationary pressure.
- To protect the currency, contrary to IRPT an increase in the interest rates will have a one-off effect of attracting speculative funds and increasing the value of the economy.

To 'kick-start' the economy, a reduction in interest rates can stimulate economic activity by encouraging borrowing.

Hedging Interest Rate Risk

Forward Rate Agreement

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

1. Date
2. Amount, and
3. Term

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

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

Interest Rate Futures

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

Interest Rate Options

Similar to currency options, the option gives protection against the downside for the payment of a premium.

Interest Rate Collars

A further step of Interest rate options in effort to reduce the transaction cost of hedge.

Long Term Hedging-SWAPS

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

A swap allows the company to change the exposure (fixed to variable or vice versa) without having to redeem existing debt. To prepare a swap we need the following steps

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

Advantages of SWAP

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

Risk Management	Attempt	Question No.
	Jun-12	Q3-d,e
	Jun-13	Q3-c,d
	Dec-14	Q3
	Jun-15	Q1
	Dec-15	Q2
	Jun-16	Q2

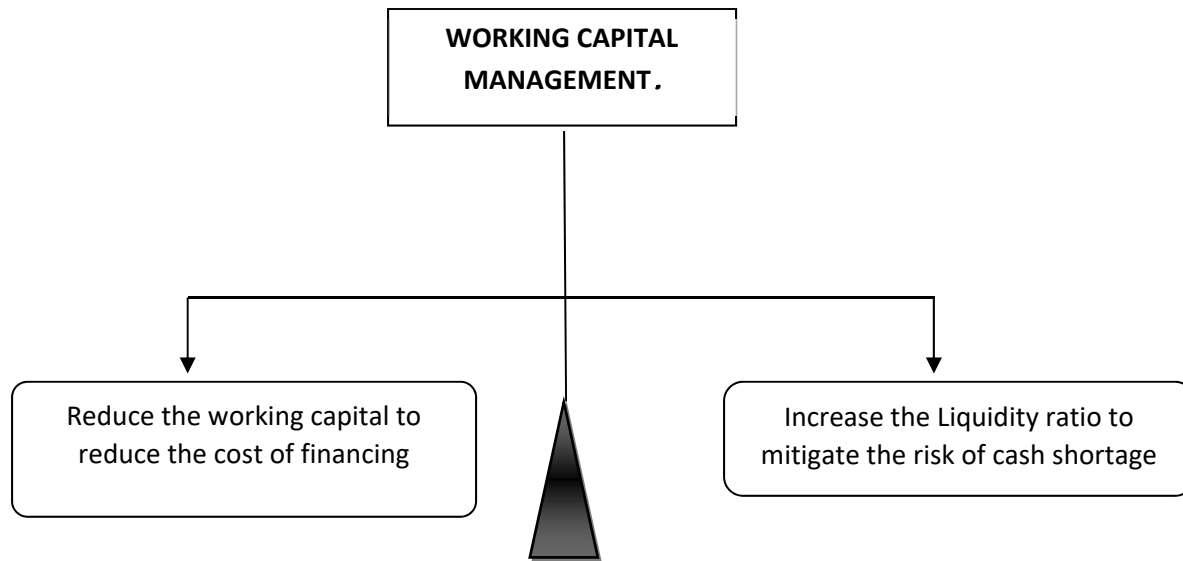
Working Capital Management

What is Working Capital

Working capital is the name given to net current assets which are available for day-to-day operating activities.

It normally includes inventories, receivables, cash (and cash equivalents), less payables.

Working capital = receivables + cash + inventory – payables



The objectives of the working capital are profitability and liquidity. The objective of profitability is to maximize the shareholder's wealth and the objective of liquidity is to ensure that business is able to pay of its liabilities. Meeting the objectives are therefore conflicting, hence good working capital management is to achieve a balance between these objectives.

Liquidity Vs Profitability

- There is always a conflict between liquidity and profitability.
- If we maintain more liquid assets, profitability will be reduced.
- If we maintain less liquid assets, profitability will be increased as more assets are invested but risk of insolvency increased

Investment in Working Capital

This can be calculated as:

Inventory + Receivables – Payables

Cash Operating Cycle

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

This can be calculated as:

Receivable Period
Add: Inventory Period
Less: Payable Period

Reduce cycle time by:

- Improving production efficiency
- Improving finished goods and / or raw material inventory turnover
- Improving receivable collection and payables payment periods

Appropriate Working Capital

An appropriate working capital will depend on:

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

Working Capital Ratios

Liquidity Ratios

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad \text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

Receivable Period

$$\text{Receivable Days} = \frac{\text{Average Receivable} \times 365}{\text{Credit Sales}}$$

Inventory Period

$$\text{Raw Material Inventory Days} = \frac{\text{Average Raw Material Inventory} \times 365}{\text{Purchases}}$$

$$\text{Work in Process Inventory Days} = \frac{\text{Average Work in Process Inventory} \times 365}{\text{Cost of Sales} \times \% \text{ of completion}}$$

$$\text{Finished Good Inventory Days} = \frac{\text{Average Finished Goods Inventory} \times 365}{\text{Cost of Sales}}$$

Payable Period

$$\text{Payable Days} = \frac{\text{Average Payables} \times 365}{\text{Cost of Sales}}$$

Note:

- Generally closing balances will be considered as average balances.
- If not mentioned, all the sales and purchases are considered to be on credit.
- In the absence of purchases, Cost of sales will be used.
- If not given, all inventory will be considered as finished goods

ILLUSTRATION 1

Profit and loss account extract		\$
Turnover		250,000
Cost of Sales		160,000
Gross profit		90,000
Balance Sheet extract	\$	
<u>Current Assets</u>		
Inventory	30,000	
Debtors	60,000	
<u>Current Liabilities</u>		
Creditors	50,000	

Required

Prepare the cash operating cycle

SOLUTION

Receivable	$\frac{\$60,000 \times 365}{\$250,000}$	87.6 Days
Add: Inventory	$\frac{\$30,000 \times 365}{\$160,000}$	68.4 Days
Less: Payable	$\frac{\$50,000 \times 365}{\$160,000}$	(114.1 Days)
		41.9 Days

Working Capital Finance Cost

Working capital finance cost = Investment in Working Capital X % of interest.

Overtrading

A business which is trying to do too much too quickly with too little long-term capital is overtrading”

Symptoms of overtrading:

- Rapid increase in turnover.
- Rapid increase in the volume of current assets and possibly also non-current assets. High Inventory and accounts receivable period.
- Only a small increase in equity capital. Most of the increase in assets is financed by credit, especially:
 - Trade accounts payable
 - Bank overdraft
- Some debt and liquidity ratios alter dramatically.
- Current ratio and quick ratio fall
- Business might have a liquid deficit i.e. an excess of current liabilities over current assets.
- Proportion of total assets financed by equity capital falls and the proportion financed by credit rise.
- Sales/working capital ratio is increasing over time, working capital should increase in line with sales.

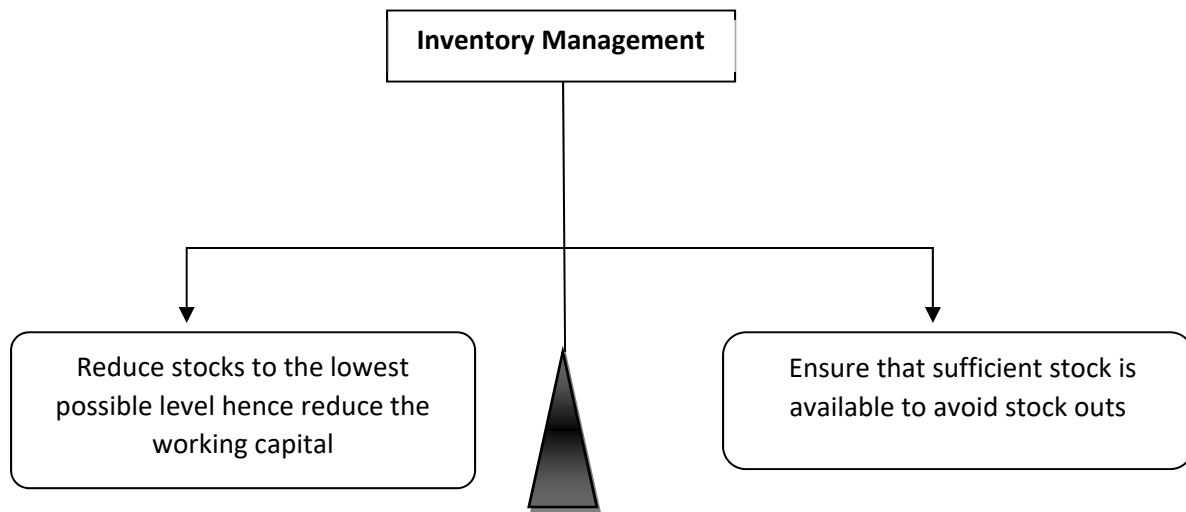
Solutions to Overtrading

- New capital could be injected from shareholders
- The growth can be financed through long-term loans.
- Better control could be applied to management of inventories and accounts receivable.
- The company could postpone ambitious plans for increased sales and fixed asset investment.

Over Capitalization

If there are excessive inventories, accounts receivable and cash and very few accounts payable, there will be an over-investment by company in current assets and the company will be in this respect over-capitalized.

The Inventory Management



Material Cost

Purchasing cost	Cost of purchasing items of stock
Ordering cost	The administrative and accounting cost of placing an order and its delivery. They are usually assumed to be independent of size of order
Holding cost	It includes items such as: <ol style="list-style-type: none"> 1. The opportunity cost of investment in stock 2. Storage cost 3. Material handling cost 4. Insurance cost etc.
Stock-out cost	It includes items such as: <ol style="list-style-type: none"> 1. Loss contribution through loss of sales 2. Loss of customers 3. Cost of emergency orders 4. The cost of production stoppages <p>In an efficient organization the cost of stock-out is assumed to be zero</p>

Inventory Levels

Re-order level	Max. Usage X Max. Lead Time
Maximum Inventory level	Re-order level + Re-order quantity – (Min. usage X Min. Lead time)

Average Inventory levels	Buffer stock + $\frac{\text{Re-order Quantity}}{2}$
Minimum Inventory Levels	Re-order level - (Avg. Usage X Avg. Lead Time)

ECONOMIC ORDER QUANTITY (EOQ)

The EOQ is a re-order quantity where the total holding cost and ordering cost is minimized. At EOQ Annual holding cost is equals to the Annual Ordering Cost

Formula:

$$\text{EOQ} = \sqrt{\frac{2C_o D}{C_h}}$$

C_o = Ordering cost per order

C_h = Holding cost per unit per annum

D = Annual Demand

Annual Holding Cost: $\frac{Q}{2} \times C_h$

Annual Ordering Cost: $\frac{D}{Q} \times C_o$

BULK PURCHASE DISCOUNTS

If the bulk purchase discounts are available then before deciding check that whether the EOQ quantity is still the cheapest option or not.

JUST IN TIME (JIT) STOCK MANAGEMENT

An alternate view of stock management is just in time in which stock level is either reduced or eliminated, since stock is seen as waste. Organization order the material when it requires for production.

ILLUSTRATION 2

Annual demand is 200,000 units

Per order cost is 20\$

Holding cost is 0.2\$ per unit

Purchase price is 1\$/unit

Current order quantity= 50,000 units

Required

- a) What is the total cost if order quantity remains at 50,000?
- b) What is the total cost of inventory if company follows EOQ model?
- c) Supplier has offered 1% discount if order quantity is at least 30,000 units What is the total cost if company accept the supplier's offer?

Solution

(a)

Purchase cost	= \$1 × 200,000	= \$200,000
Ordering cost	= \$20 × 200,000 / 50,000	= \$80
Holding cost	= \$0.2 × 50,000 / 2	= \$5,000
Total cost		= \$205,080

(b)

$$EOQ = \sqrt{2 \times 200,000 \times 20 / 0.2} = 6325$$

Purchase cost	= \$1 × 200,000	= \$200,000
Ordering cost	= \$20 × 200,000 / 6,325	= \$632
Holding cost	= 0.2 × 6325 / 2	= \$632
Total cost		= \$201,264

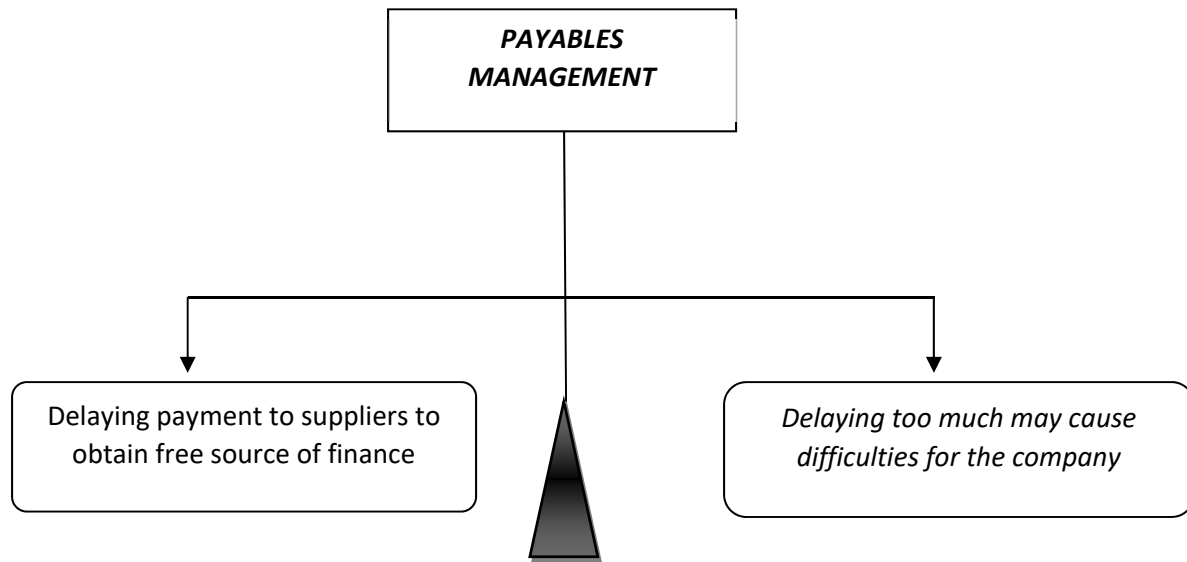
(c)

Purchase cost	= \$1 × 200,000 × 99%	= \$198,000
Ordering cost	= \$20 × 200,000 / 30,000	= \$133
Holding cost	= 0.2 × 30,000 / 2	= \$3,000
Total cost		= \$201,133

IMPLICATIONS OF JUST IN TIME STOCK MANAGEMENT

- There will be higher dependence on the supplier for both quality and reliability.
- There might be long-term contract developed with the supplier to develop the system necessary for JIT to operate effectively
- Supplier must be ideally located close to our organization
- There must be close working relationships with suppliers so that response to the problems/developments can be immediate
- Better factory design can also reduce the work in process.
- Only produce for customer demand hence no finished good stock
- JIT will reduce or eliminate holding cost
- Operating JIT successful can then open up further business opportunities by investing capital somewhere else.

The Payable Management



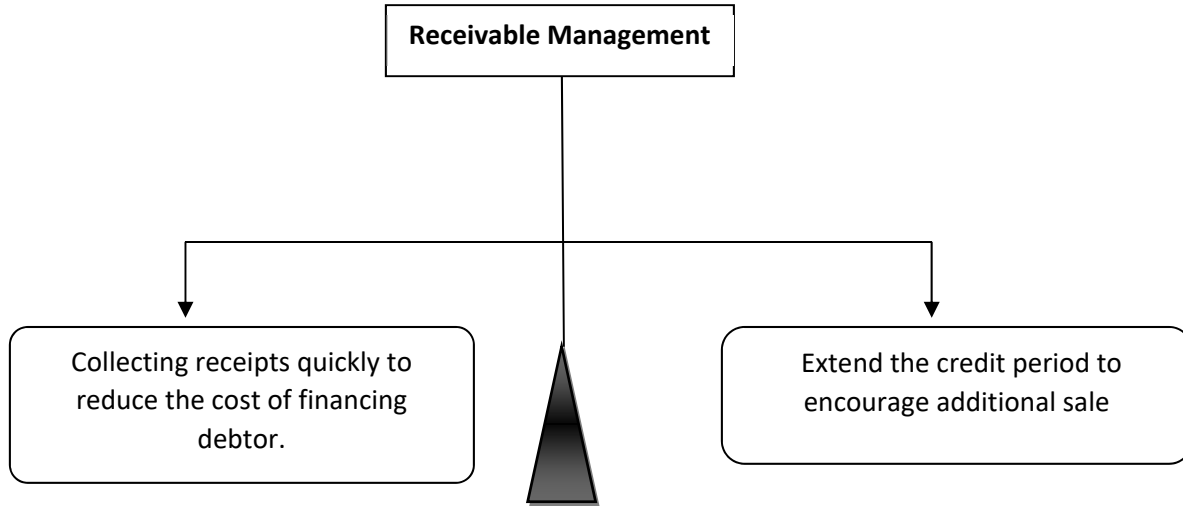
Trade payable is a cheap and most important source of short-term finance as it carries no interest. Management of trade payables involve

- Attempting to obtain satisfactory credit terms from suppliers
- Attempting to extend credit during periods of cash shortage
- Maintaining good relationships with regular and important suppliers

However, delaying payments to creditors beyond the credit limits may cause some problems i.e.

- Supplier may refuse to supply in future or may not grant credit in future
- Loss of reputation
- Supplier may increase price in future

The Receivable Management



Cost of Receivable

- Administrative cost to record and collecting debts
- Cost of irrecoverable debts (Sales X % of bad debt)
- Cost of early Settlement Discount = (Sales X % of discount X % of customers taken the discount)
- Finance Cost (Average Receivable X % of interest rate)

ILLUSTRATION 3

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

Required

- Calculate the receivable period
- Calculate the cost of financing receivables

SOLUTION

a) Receivable period = $\frac{\$8m \times 365}{\$40m}$ 48.67 days
⇒ \$8m X 14% = \$1.12m

Early Settlement Discount

Discounts for early settlement can be offered to customers. The annual effective rate of discount can be calculated as follows

$$(1 + r)^n - 1$$

Where 'r' is effective discount rate per period and can be calculated as $r = \frac{\text{rate of discount}}{1 - \text{rate of discount}} \times 100\%$

Tackling Question in Exam

Current Policy	Proposed Policy
<ul style="list-style-type: none"> ➤ Finance Cost of Receivable ➤ Early Settlement Discount Cost ➤ Bad debts ➤ Administration cost (includes Factoring fee if any) 	<ul style="list-style-type: none"> ➤ Finance Cost of Receivable ➤ Early Settlement Discount Cost ➤ Bad debts ➤ Administration cost (includes Factoring fee if any)
Total Cost	Total Cost

Compare them and chose with the least cost.

ILUSTRATION 4

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

Required

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

Solution

Current Policy		Proposed Policy	
Finance cost (\$8m X 14%)	\$1.12m	Finance Cost (\$5.64m (W) X 14%)	\$0.67m
		Discount Cost (\$60m X 2% X 50%)	\$0.6m
	\$1.12m		\$1.27m

Shanky should not offer the early settlement discount

Working for revised receivables

$$\begin{aligned}
 \text{Existing receivables} &= \frac{48.67 \times \$60m}{365} \times 50\% = \$4m \\
 \text{Who take early discount receivables} &= \frac{10 \times \$60m}{365} \times 50\% = \$0.82m \\
 \text{Total receivables} &= \mathbf{\$4.82m}
 \end{aligned}$$

Debt Factoring

Factoring is an arrangement to have debts collected by a factor company, which advances a proportion of the money it is due to collect.

Factoring can be used to help short-term liquidity or to reduce administrative costs.

Aspects of Factoring

The main aspects of factoring include the following

- **Administration of the client's invoicing**, sales accounting and debt collection service.
- **Credit protection** for the client's debts, whereby the factor takes over the risk of loss from bad debts and so insures the client against such losses. This is known as **non-recourse service**.
- Making payments to the client in advance of collecting the debts. This is referred to as '**factor finance**'

ILLUSTRATION 5

Shaky again but a factor has offered a debt collection service which should shorten the debtor collection period on average to 30 days. It charges 1.6% of turnover but should reduce administration costs to the company by \$175,000.

Required

Should the company use the factor facility?

Solution

Current Policy		Proposed Policy	
Finance cost (\$8m X 14%)	\$1.12m	Finance Cost (\$4.93m (W) X 14%)	\$0.69m
Administration cost	\$0.175m	Factor fee (\$60m X 1.6%)	\$0.96m
	\$1.295m		\$1.65m

Shanky should not use factor services.

Working for revised receivables

$$\text{Existing receivables} = \frac{30 \times \$60m}{365} = \$4.93m$$

ILLUSTRATION 6

A company makes annual credit sales of \$1,500,000. Credit terms are 30 days, but its debt administration has been poor and the average collection period has been 45 days with 0.5% of sales resulting in bad debts which are written off.

A factor would take on the task of debt administration and credit checking, at an annual fee of 2.5% of credit sales. The company would save \$30,000 a year in administration costs. The payment period would be 30 days.

It is assumed that the factor would advance an amount equal to 80% of the invoiced debts, and the balance 30 days later. It is also assumed that factor will completely avoid the bad debt.

The factor would also provide an advance of 80% of invoiced debts at an interest rate of 14% (3% over the current base rate). The company can obtain an overdraft facility to finance its accounts receivable at a rate of 2.5% over base rate.

Required:

Should the factor's services be accepted? Assume a constant monthly turnover.

Solution

Current Policy		Proposed Policy	
Finance cost 45/365 x \$1,500,000 x 13.5% (11% + 2.5%)	\$24,966	Finance Cost (w) Factor fee 2.5% x \$1,500,000	\$17,137 \$37,500
Bad debts	\$7,500		

0.5% x \$1,500,000 Administration cost	\$30,000		
	\$62,466		\$54,637

As factoring is cheaper for the company so the company should factor its receivables.

Finance cost in proposed policy

Factor's finance $30/365 \times \$1,200,000 \times 14\%$	13,808
Overdraft $30/365 \times \$300,000 \times 13.5\%$	<u>3,329</u>
	17,137

Advantages & Disadvantages of Factoring

<u>Advantages</u>	<u>Disadvantages</u>
<ol style="list-style-type: none"> 1. Business can pay its suppliers on time and so be able to take advantage of early payment discounts. 2. Optimum inventory level can be maintained because management will have enough cash. 3. Growth can be financed through sales rather than injecting new capital 4. The cost of running sales ledger department is over. 5. Business can use the expertise of debtor management that the factor specializes. 6. Management time is saved because managers don't have to spend their time on debtor management. 7. Business gets its finance linked to its volume of sales 	<ol style="list-style-type: none"> 1. Factoring is likely to be more costly than an efficiently run internal credit control department. 2. Customers may not like to deal with factors. 3. Company loses control to decide to whom to grant credit period and the length of credit period for each customer 4. Once a company hires a factor, it is difficult to go back to an internal credit control system again. 5. Factoring may have a bad reputation for the company. It may indicate that the company has financial issues

Credit Control Policies

- Overall policy
 - Not to offer credit
 - Offer credit to specific customers only
 - Total credit is limited to x% of sale
- Procedures for offering credit
 - Obtain references
 - Bank References

- Trade References
 - Published Information
 - Credit Rating Agencies
 - Companies Own Sales Record
 - Department of Trade & Industry.
 - Press Comments & Releases
- Review account information
- Customer visits
- Formal agreement
 - Complies with legislation
 - Probationary period
 - Settlement terms
- Collection of Receivables
 - Collection of funds efficiently
 - The customer is fully aware of the terms
 - The invoice is correctly drawn up and issued promptly.
 - They are aware of any potential quirks in the customer's system
 - Queries are resolved quickly
 - Monthly statements are issued promptly
 - Collection of overdue debt
 - Instituting reminders or final demands
 - Chasing payment by telephone
 - Making a personal approach
 - Notifying debt collection section
 - Handling over debt collection to specialist debt collection section
 - Instituting legal action to recover the debt
 - Hiring external debt collection agency to recover debt.

Managing Foreign Account Receivable

REDUCING INVESTMENT IN FOREIGN ACCOUNTS RECEIVABLE

A company can reduce its investment in foreign accounts receivable by asking for full or part payment in advance of supplying goods. However this may be resisted by consumers, particularly if competitors do not ask for payment up front.

Forfaiting

- Forfaiting involves the purchase of foreign accounts receivable from the seller by a forfaiter.
- The forfaiter takes on all of the credit risk from the transaction (without recourse) and therefore the forfaiter purchases the receivables from the seller at a discount.
- The purchased receivables become a form of debt instrument (such as bills of exchange) which can be sold on the money market.
- The non-recourse side of the transaction makes this an attractive arrangement for businesses, but as a result the cost of forfaiting is relatively high.

Letter of Credit

This is a further way of reducing the investment in foreign accounts receivable and can give a business a risk-free method of securing payment for goods or services.

There are a number of steps in arranging a letter of credit:

- Both parties set the terms for the sale of goods or services
- The purchaser (importer) requests their bank to issue a letter of credit in favor of the seller (exporter)
- The letter of credit is issued to the seller's bank, guaranteeing payment to the seller once the conditions specified in the letter have been complied with
- The goods are dispatched to the customer and the shipping documentation is sent to the purchaser's bank
- The bank then issues a banker's acceptance
- The seller can either hold the banker's acceptance until maturity or sell it on the money market at a discounted value
- It takes significant amount of time and therefore are slow to arrange.
- The use of letters of credit may be considered necessary if there is a high level of non-payment risk.
- Customers with a poor or no credit history may not be able to obtain a letter of credit from their own bank. Letters of credit are costly to customers and also restrict their flexibility:
- Collection under a letter of credit depends on the conditions in the letter being fulfilled. Collection only occurs if the seller presents exactly the documents stated in the conditions

Counter Trading

In a countertrade arrangement, goods or services are exchanged for other goods or services instead of for cash.

The benefits of countertrading include the fact that it facilitates conservation of foreign currency and can help a business enter foreign markets that it may not otherwise be able to.

Export Credit Insurance

- Export credit insurance protects a business against the risk of non-payment by a foreign customer. Exporters can protect their foreign accounts receivable against a number of risks which could result in non-payment. Export credit insurance usually insures
- insolvency of the purchaser or slow payment,
- insures against certain political risks, for example war, riots.
- Disadvantages include the relatively high cost of premiums and the fact that the insurance does not typically cover 100% of the value of the foreign sales

Export Factoring

An export factor provides the same functions in relation to foreign accounts receivable as a factor covering domestic accounts receivable and therefore can help with the cash flow of a business.

However, export factoring can be more costly than export credit insurance and it may not be available for all countries, particularly developing countries.

Managing Cash

Treasury Management

Treasury management can be defined as

- Corporate handling of all financial matters,
- The generation of external and internal funds for business,
- The management of currencies and cash flows,
- The complex strategies,
- Policies and procedures of corporate finance

Centralized Treasury Management	Decentralized Treasury Management
<ol style="list-style-type: none">1. Large volume of cash is available to invest, leading to better short-term investment opportunities.2. Borrowing can be arranged in bulk at lower interest rate.3. Foreign exchange risk management will be improved through matching foreign currency income earned by one subsidiary with expenditure in the same currency by another subsidiary.4. Treasure management will be efficient because a centralized treasury department can employ experts.5. Liquidity management will be improved through centralized treasury department	<ol style="list-style-type: none">1. Greater autonomy will be given to subsidiaries2. A decentralized treasury function may be more responsive to the needs of individual operating units.3. Sources of finance will be diversified

Objective of holding Cash:

John Maynard Keynes identified three reasons for holding cash.

- **Transactions Motive:** Every business needs cash to meet its regular commitments of paying its accounts payable like employee wages, taxes, annual dividends ...
- **Precautionary motive:** There is a need to maintain a 'buffer of cash for unforeseen contingencies.

- **Speculative Motive:** Sometimes businesses hold surplus cash as a speculative asset in the hope that interest rates will rise in future

Cash Budget

Months	1	2	3
Cash Inflows			
Receivable Collection	X	X	X
Dividends Received	X	X	X
Sale of non-current assets	X	X	X
Cash Outflow			
Trade payable payment	(X)	(X)	(X)
Purchase of non-current assets	(X)	(X)	(X)
Wages	(X)	(X)	(X)
Net Cash Flows	X	X	X
Opening Balance	X	X	X
Closing Balance	X	X	X

Baumol Model

The Baumol model is based on the idea that an optimum cash balance is like deciding an optimum inventory level. It uses the same EOQ formula that is used to calculate the optimum inventory level

$$Q = \sqrt{\frac{2CS}{I}}$$

Where

- Q = Optimum amount of cash to be raised
- S = Amount of cash to be used in each time period
- C = Cost per sale of securities

I = Interest cost of holding cash or near cash equivalents

ILLUSTRATION 7

Flag Co faces a fixed cost of \$4,000 to obtain new funds. There is a requirement for \$24,000 of cash over each period of one year for the foreseeable future. The interest cost of new funds is 12% per annum; the interest rate earned on short-term securities is 9% per annum.

Required:

How much finance should Flag raise at a time?

Solution

The cost of holding cash is $12\% - 9\% = 3\%$

The optimum level of Q (the 'recorder quantity') is:

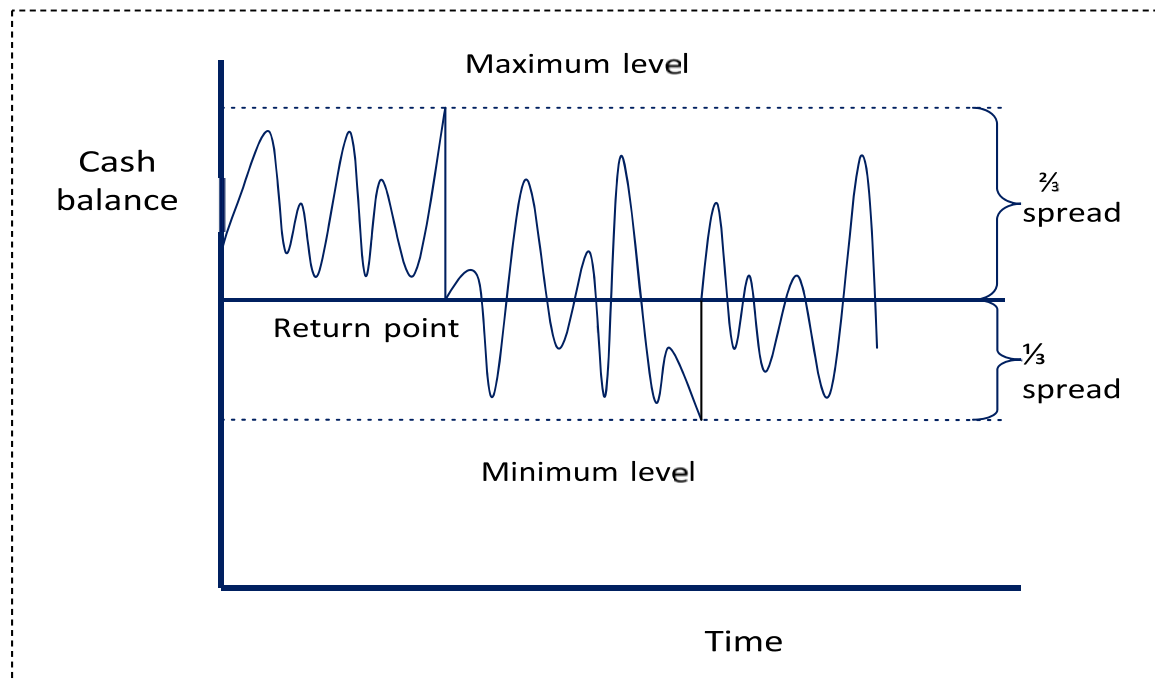
$$\sqrt{\frac{2 \times 4,000 \times 24,000}{0.03}} = \$80,000$$

The optimum amount of new funds to raise is **\$80,000**.

This amount is raised every $80,000 \div 24,000 = 3^{1/3}$ years

The Miller-Orr Model

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



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

- Minimum level – given in the question
- $$\text{Spread} = 3 \left[\frac{\frac{3}{4} \times \text{Transaction Cost} \times \text{variance of Cashflows}}{\text{interest rate}} \right]^{\frac{1}{3}}$$
- Maximum level = minimum level + spread
- Return point = minimum level + $\frac{1}{3}$ spread

ILLUSTRATION 8

The following data applies to a company.

- The minimum cash balance is \$8,000.
- The variance of daily cash flows is 4,000,000, equivalent to a standard deviation of \$2,000 per
- The transaction cost for buying or selling securities is \$50. The interest rate is 0.025 per cent day.

Required:

You are required to formulate a decision rule using the Miller-Orr model

Solution

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

$$\begin{aligned} \text{➤ Spread} &= 3 \left[\frac{\frac{3}{4} \times \text{Transaction Cost} \times \text{variance of Cashflows}}{\text{interest rate}} \right]^{\frac{1}{3}} \\ &= 3 \left[\frac{\frac{3}{4} \times 50 \times 4,000,000}{0.00025} \right]^{\frac{1}{3}} \\ &= \$25,303, \text{ say } \$25,300 \end{aligned}$$

The upper limit and return point are now calculated.

Upper limit = Lower limit + \$25,300 = \$8,000 + \$25,300 = \$33,300

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

The decision rule is as follows. If the cash balance reaches \$33,300, buy \$16,900 (= 33,300 – 16,400) in marketable securities. If the cash balance falls to \$8,000, sell \$8,400 of marketable securities for cash.

Short Term Investments

- Deposited with a bank or similar financial institution
- Invested in short-term debt instruments, such as Treasury bills or CDs

- Invested in longer-term debt instruments such as government bonds, which can be sold when the company eventually needs the cash
- Invested in shares of listed companies, which can be sold on the stock market when the company eventually needs the cash

Short Term Finance

- Short term Bank Loan
- Overdraft
- Payables
- Factoring and invoice discounting

Working Capital investment Policy

A company can adopt a working capital strategy for managing its working capital depending on the important risks associated with working capitals. It can choose from three different working capital strategies. These strategies are as follows:

- Conservative Approach
- Aggressive Approach
- Moderate Approach

Conservative Approach

A conservative working capital management policy aims to reduce the risk of system breakdown by holding high levels of working capital”

- Customers are allowed generous payments terms to stimulate demand,
- Finished goods inventories are high to ensure availability for customers,
- Raw material and work in progress are high
- Suppliers are paid promptly to ensure their goodwill

Aggressive Approach

An aggressive working capital management policy aims to reduce financing cost and increase profitability:

- by cutting inventories to kept it at minimum level.
- speeding up collections: Customers are allowed a limited payment period and discounts are given for prompt payment
- delaying payments to supplier.

Moderate Approach

A moderate working capital management policy is a middle way between the aggressive and conservative approaches.

Working Capital Financing Policy

Assets can be divided into three types in order to understand different working capital management strategies

- **Non-current assets:** These are long term assets from which an organization expects to derive benefit over a number of periods. For example, plant and machinery. The company should use long term Source of Finance
- **Permanent current assets:** This is the amount required to meet minimum long-term needs and sustain normal trading activity. For example, inventory and average receivables. Ideally, company should use long term source of finance for this. However, an aggressive approached management might use part of it by short term source of finance.
- **Fluctuating current assets:** These are current assets which vary according to normal business activity. Example include fluctuate in working capital due to seasonal variations. The company should use short term source of finance. However, a conservative management might use part of long term source of finance as well.

Working Capital Management	Attempt	Question No.
	Dec-11	Q2
	Jun-12	Q2
	Dec-12	Q2
	Jun-13	Q3-a,b
	Dec-13	Q3
	Jun-14	Q2
	Dec-14	Q1
	Jun-15	Q3
	Dec-15	Q3
	Jun-16	Q1