CS EXECUTIVE
NEW SYLLABUS

EDITION - 3

FINANCIAL MANAGEMENT

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INDEX

CHAPTER 1
NATURE, SIGNIFICANCE & SCOPE OF FINANCIAL MANAGEMENT

⇒ **CONCEPT 1**

MEANING OF FINANCE

Finance may be defined as an Art or Science of managing money & includes activites like investing, borrowing, lending, budgeting, saving and forecasting.

It refers to provisioning of money at the time when it is needed.

⇒ **CONCEPT 2**

MEANING OF BUSINESS FINANCE

Business finance is that business activity which concerns with the acquisition and conversion of capital funds in meeting financial needs and overall objectives of a business enterprise".

Corporate finance is concerned with budgeting, financial forecasting, cash management, credit administration, investment analysis and fund procurement for the business needs to adopt modern technology and application suitable to the dynamic global environment.

⇒ **CONCEPT 3**

DEFINITION OF FINANCIAL MANAGEMENT

Financial management "is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations.

It is broadly concerned with raising of funds, creating value to the assets of the business enterprise by efficient allocation of funds. It is the study of integration of the flow of funds in the most optimal manner to maximize the returns of a firm by taking proper decisions in utilizing the funds.

On basis of above discussion, it can be said that financial management involves following basic questions.

(i) From where to raise funds? i.e. Financing Decision.
(ii) Where to invest? i.e. Investment Decision
(iii) How much earning to be distributed as divided? i.e. Dividend Decision.
(iv) How to manage working capital? i.e. Working Capital Management Decision.

Thus Wealth of Company is function of investment, finance, Dividend, Working Capital

⇒ **CONCEPT 4**

SCOPE OF FINANCIAL MANAGEMENT

Traditional Theory on Finance

Traditionally finance was only limited to procurement of the funds for the organization. The funds were needed to finance the expansion or diversification. As these activities were rare and required large amount of funds, the emphasis was on the long-term resources and as a result only long-term finance was considered as important. Finance function was generally concern with the issues regarding procurement of funds, administration of funds, administration of covenants imposed by supplier of funds, etc. Thus finance function was mainly an outsider looking.

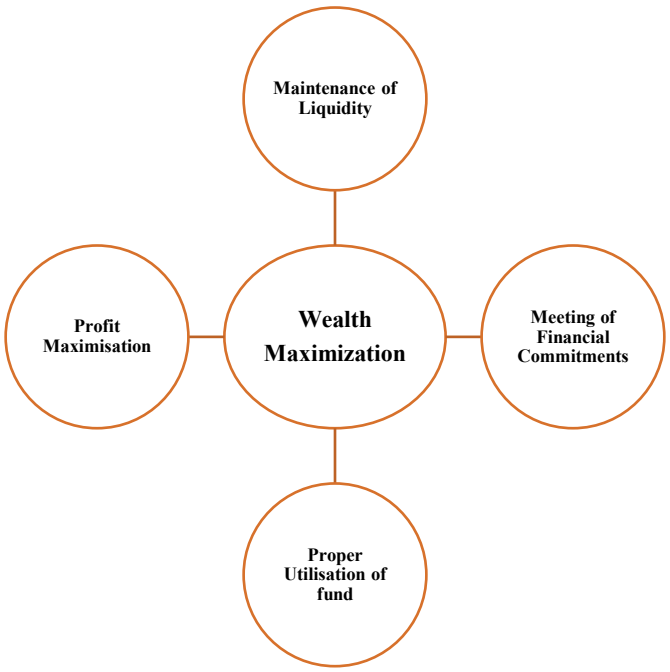
Modern Theory on Finance

Modern Theory of finance considered finance as a separate discipline and have a wider perspective. It's not only limited to procurement but increased its limit to cover efficient allocation and effective administration of fund. In modern days finance management has become an integral part of overall management.

⇒ **CONCEPT 5**

OBJECTIVES OF FINANCIAL MANAGEMENT

Primary Objectives	Other Objectives
Profit Maximization	Maintenance of Liqudity
Wealth Maximization	Meeting of Financial Commitments
	Proper utilization of funds



⇒ **CONCEPT 6**

PROFIT MAXIMIZATION VS WEALTH MAXIMIZATION

Profit Maximisation	Wealth Maximisation
Does not consider the effect of future cash flows, dividend decisions, EPS etc.	Recognizes the effect of all future cash flows, dividends, EPS etc.
A firm with profit Maximization objective may refrain from payment of dividend to its Shareholders.	A firm with Wealth Maximization objective may pay regular dividends to its Shareholders
Ignores time pattern of returns.	Recognizes the time pattern of returns.
Focus on Short-Term.	Focus on Medium / Long-Term.
Does not consider the effect of uncertainty / risk.	Recognizes the risk-return relationships.
Comparatively easy to determine the relationship between financial decision and profits.	Offers no clear or specific relationship between financial decisions and share market prices.

⇒ **CONCEPT 7**

TYPES OF FINANCIAL MANAGEMENT DECISION

The Financial Management can be broken down in to three major decisions or functions of finance. They are: (i) the investment decision, (ii) the financing decision and (iii) the dividend policy decision

1. INVESTMENT DECISION

The investment decision relates to the selection of assets in which funds will be invested by a firm. The assets as per their duration of benefits, can be categorized into two groups: (i) long-term assets which yield a return over a period of time in future (ii) short-term or current assents which in the normal course of business are convertible into cash usually with in a year. Accordingly, the asset selection decision of a firm is of two types. The investment in long-term assets is popularly known as capital budgeting and in short-term assets, working capital management.

1. **Capital budgeting:** Capital budgeting – the long term investment decision – is probably the most crucial financial decision of a firm. It relates to the selection of an asset or investment proposal or course of action that benefits are likely to be available in future over the lifetime of the project. The long-term investment may relate to acquisition of new asset or replacement of old assets.

2. **Working Capital Management:** Working capital management is concerned with the management of the current assets. As we know, the short-term survival is a pre-requisite to long-term success. The major thrust of working capital managementis the trade-off between profitability and risk (liquidity), which are inversely related to each other. If a firm does not have adequate working capital it may not have the ability to meet its current obligations and thus invite the risk of bankrupt. One the other hand if the current assets are too large the firm will be loosing the opportunity of making a good return and thus may not serve the requirements of suppliers of funds. Thus, the profitability and liquidity are the two major dimensions of working capital management. In addition, the individual current assets should be efficiently managed so that neither inadequate nor unnecessary funds are locked up.

2. FINANCING DECISIONS

The second major decision involved in financial management is the financing decision, which is concerned with the financing i.e. mix of capital structure to finance a given investment

opportunity. The term capital structure refers to the combination of debt (fixed interest sources of financing) and equity capital (variable – dividend securities/source of funds). The financing decision of a firm relates to the choice of the proportion of these sources to finance the investment requirements. Debt/implies a higher return to the shareholders and also the higher financial risk and vice versa. A proper balance between debt and equity is a must to ensure a trade–off between risk and return to the shareholders. A capital structure with a reasonable proportion of debt and equity capital is called the optimum capital structure. The second aspect of the financing decision is the determination of an appropriate capital structure, which will result, is maximum return to the shareholders and in turn maximizes the worth of the firm. Thus, the financing decision covers two inter-related aspects: (a) capital structure theory, and (b) capital structure decision.

3. DIVIDEND POLICY DECISIONS

The third major decision of financial management is relating to dividend policy. The firm has two alternatives with regard to management of profits of a firm. They can be either distributed to the shareholder in the form of dividends or they can be retained in the business or even distribute some portion and retain the remaining. The course of action to be followed is a significant element in the dividend decision. The dividend pay out ratio i. e. the proportion of net profits to be paid out to the shareholders should be in tune with the investment opportunities available within the firm. The second major aspect of the dividend decision is the study of factors determining dividend policy of a firm in practice.

⇒ **CONCEPT 8**

INTER-RELATION SHIP BETWEEN INVESTMENT, FINANCING & DIVIDEND DECISION

The finance functions are divided into three major decisions, viz, investment, financing and dividend decisions. It is correct to say that these decisions are inter-related because the underlying objective of these three decisions is the same. i.e. maximization of shareholders' wealth. Since investment, financing & divided decisions are interrelated, one has to consider the joint impact of these decisions on the market price of the company's shares and these decisions should also be solved jointly.

The basic objective of financial management is maximization of shareholders wealth. The evaluation of each decision in relation to its effect, on the shareholders wealth is to be considered. The decision to invest in a new project needs the financing for the investment. Hence investment & financing decision are interrelated. The financing decision, in turn, is influenced by and influences dividend decision because retained earning used in internal

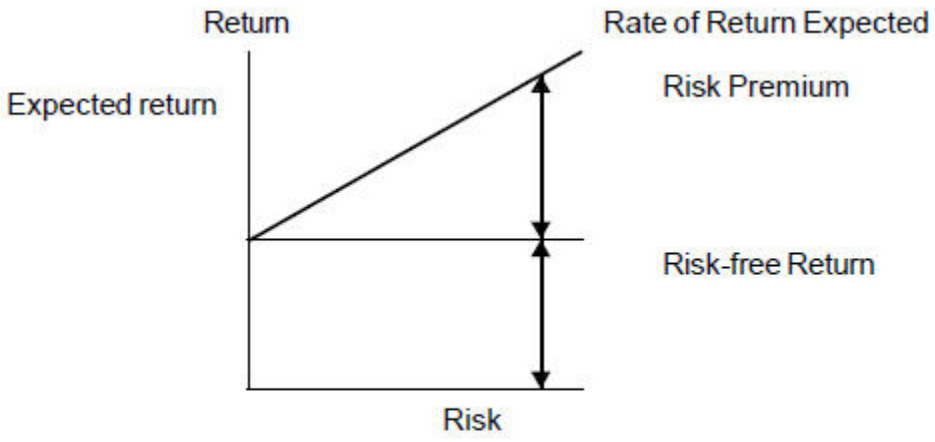
financing deprive shareholders of their dividends. Hence financing & dividend decisions are interrelated. Further the company is basically making investments for its equity shareholders, so as to give them higher dividends. Thus investment & dividend decisions are interrelated.

The above discussion makes it clear that investment, financing and dividend decisions are interrelated and are to be taken jointly keeping in view their joint effect on the shareholders' wealth.

⇒ **CONCEPT 9**

VALUE OF FIRM – RISK AND RETURN

Financial decisions incur different degree of risk. An investor's decision to invest in risk free government bonds has less risk as interest rate is known and the risk of default is very less. On the other hand, an investor would incur more risk if he decides to invest in shares, as the return is not certain. However, the investor can expect a lower return from government bond and higher from shares. Risk and expected return move in tandem; the greater the risk the greater would be the expected return. The following figure shows the risk-return relationship.



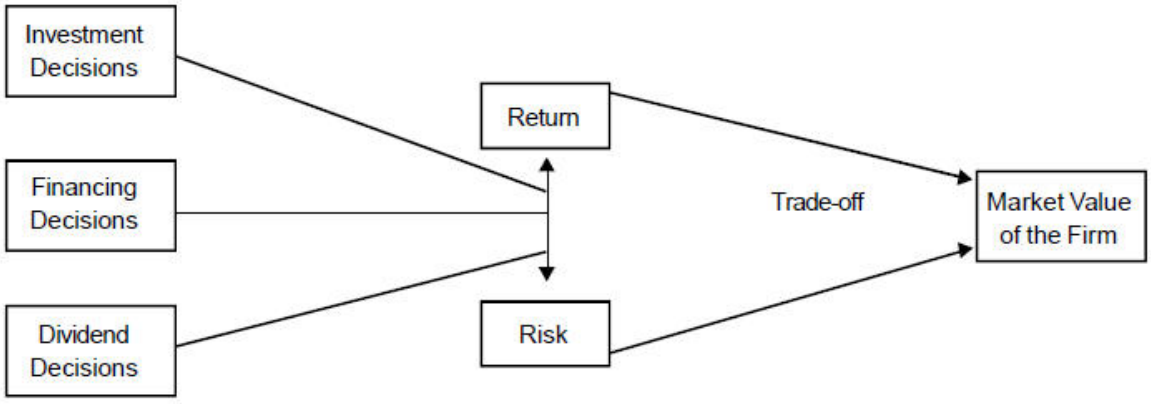
The Risk-return relationship

As discussed earlier, a finance manager has to take various types of decision- investment decisions, financing decisions and dividend decisions. A finance manager takes these decisions in the light of the objective of wealth maximisation as reflected in the market price of the shares. The finance manager should also know as to what are the factors which may affect the market price of the shares. The various decisions will be taken in the light of these

factors, otherwise any attempt to achieve the objective of maximisation of market price of the shares may not be achieved.

A finance manager cannot avoid the risk altogether nor can he make a decision by considering the return aspect only. Usually, as the return from an investment increases, the risk associated with it also increases. In an attempt to increase the return, the finance manager will have to undertake greater degree of risk also. Therefore, a finance manager is often required to trade-off between the risk and return. At the time of taking any decision, the finance manager tries to achieve the proper balance between the consideration of risk and return associated with various financial management decisions to maximise the market value of the firm. A particular combination of risk and return where both are optimized may be known as Risk-return trade off and at this level of risk-return, the market price of the shares will be maximised.

The figure below demonstrates the relationship between market value of the firm, return and risk, on the one hand and financial management decision on the other.



⇒ **CONCEPT 10**

LIQUDITY

Liquidity is an important concept in financial management and is defined as ability of the business to meet its shortterm obligations. It shows the quickness with which a business/company can convert its assets into cash to pay what it owes in the near future. It measures a company's ability to meet expected as well as unexpected requirements of cash to expand its assets, reduce its liabilities and cover up any operating losses. Liquidity, as a decision criterion, is widely used in financial management. It is used for managing liquid resources or current assets or near cash assets so as to enhance the effectiveness with which

they are utilized with a view to minimising costs. It also focuses attention on the availability of funds. Enhancement of liquidity enables a corporate body to have more funds from the market.

Liquidity is assessed through the use of ratio analysis. Liquidity ratios provide an insight into the present cash solvency of a firm and its ability to remain solvent in the event of calamities

To conclude, liquidity, as a decision criterion is an important tool in financial management. Financial decisions are affected by liquidity analysis of a company in the following areas:

1. Management of cash and marketable securities;
2. Credit policy of a firm and procedures for realisation;
3. Management and control of inventories;
4. Administration of fixed assets;
5. Taking decisions for efficient use of current assets at minimum cost; and
6. Decisions to keep the company's position on sound basis to avoid eventualities.

⇒ **CONCEPT 11**

PROFITABILITY

Profitability as a decision criterion is another important tool in financial management for taking decisions from different angles after evaluating the performance of the company in different spheres.

Because different users look at the profitability of a company from different angles, they use different ratios. Short-term creditors, long-term lenders, equity shareholders, investors, etc. all are interested in profitable operations of a concern.

They use the ratios which best suit their requirements. Profitability can be related to sales or to total capital employed or to net worth of the company. But then different figures for profits are taken into account.

Profitability to sales ratio, reflects the company's ability to generate profits per unit of sales. If sales lack sufficient margin of profit, it is difficult for the business enterprise to cover its fixed cost, including fixed charges on debt, and to earn profit for shareholders. From investors point of view profits are compared by the investors as percentage to the capital employed in the business enterprise. Absence of adequate profitability ratio on sales reflects

the company's inability to utilise assets effectively. This is analysed through the asset turnover ratio.

Return on Investment: This is an important profitability ratio from the angle of shareholders and reflects on the ability of management to earn a return on resources put in by the shareholders. The beauty of the ROI ratio is that earning of the company can be viewed from different angles so as to take decisions on different causes responsible, to reduce or to enhance the profitability of the company. One way of finding out rate of return on assets employed in the company is to find the ratio of earnings before interest and taxes (EBIT) to capital employed. This ratio indicates operating income to the assets used to produce income.

In this way, we find that profitability as decision making criterion in financial management, is crucial for business managers.

⇒ **CONCEPT 13**

PROFITABILITY Vs LIQUDITY

One of the most important problems faced by the finance manager is the dilemma of liquidity vs. profitability. Liquidity ensures the ability of the firm to honour its short term commitments, that means, the firm has adequate cash; to pay for its bills, to make unexpected large purchases and to meet contingencies, at all times. It also reflects the ability of the firm to convert its assets into cash and pay off liabilities quickly. Generally, "Liquidity measure a company's ability to meet expected as well as unexpected requirements of cash to expand its assets, reduce its liabilities and cover up any operating losses." Under liquidity management, the finance manger is expected to manage all its current assets including near cash assets in such a way as to ensure its affectivity with the view to minimize its costs. On the other hand, under profitability objective, the finance manger is expected to utilize the funds of the firm in such a manner as to ensure the highest return. However, the two objectives of liquidity and profitability have inverse relationship. If liquidity increases profitability decreases and vice- versa. Thus, in almost all the decisions taken by the finance manger, profitability and liquidity goals conflict. For example, the finance manger may follow a liberal credit policy with the view to push-up its sales and thus generate higher revenue, but its liquidity position will affect adversely. Hence the finance manger has to strike a balance between these two conflicting objectives.

⇒ **CONCEPT 14**

FINANCIAL DISTRESS AND INSOLVENCY

Generally the affairs of a firm should be managed in such a way that the total risk – business as well as financial – borne by equity holders is minimized and is manageable, otherwise, the firm would obviously face difficulties. In managing business risk, the firm has to cope with the variability of the demand for its products, their prices, input prices, etc. It has also to keep a tab on fixed costs. As regards financial risk, high proportion of debt in the capital structure entails a high level of interest payments. If cash inflow is inadequate, the firm will face difficulties in payment of interest and repayment of principal. If the situation continues long enough, a time will come when the firm would face pressure from creditors. Failure of sales can also cause difficulties in carrying out production operations. The firm would find itself in a tight spot. Investors would not invest further. Creditors would recall their loans. Capital market would heavily discount its securities. Thus, the firm would find itself in a situation called distress. It may have to sell its assets to discharge its obligations to outsiders at prices below their economic values i.e. resort to distress sale. So when the sale proceeds is inadequate to meet outside liabilities, the firm is said to have failed or become bankrupt or (after due processes of law are gone through) insolvent.

Failure of a firm is technical if it is unable to meet its current obligations. The failure could be temporary and might be remediable. When liabilities exceed assets i.e. the net worth becomes negative, bankruptcy, as commonly understood, arises. Technical bankruptcy can be ascertained by comparing current assets and current liabilities i.e. working out current ratio or quick ratio. On the other hand, solvency ratios indicate long term liquidity i.e. the ability of the firm to discharge its term-liabilities. Examples of solvency ratios are Debt to Equity ratio, Debt to total Funds Ratios, and Interest coverage ratio. Trend analysis should be made for the past three to five years to pick up signals of bankruptcy, if any.

⇒ **CONCEPT 15**

FUNCTIONS OF FINANCIAL MANAGER

To achieve the objective of the financial management i.e. to maximise the owner's wealth, the financial executives have to perform variety of tasks to discharge their responsibilities. When the Financial Manager is involved in management of asset, he is performing the role of the decision-maker and when he is managing funds, he is performing the staff function. In the light of different responsibilities of the financial manager, he performs mainly the following duties.

1. ***Forecasting of Cash Flow:*** it involves matching cash inflow against outflows.

2. ***Raising Funds:*** The Financial Manager has to plan for mobilising funds from different sources so that the requisite amount of funds are made available to the business enterprise to meet its requirements for short term, medium term and long term.

3. ***To Facilitate Cost Control:*** The Financial Manager is generally the first person to recognise when the costs for the supplies or production processes are exceeding the standard costs/budgeted figures. Consequently, he can make recommendations to the top management for controlling the costs.

4. ***To Facilitate Pricing of Product, Product Lines and Services:*** The Financial Manager can supply important information about cost changes and cost at varying levels of production and the profit margins needed to carry on the business successfully. In fact, financial manager provides tools of analysis of information in pricing decisions and contribute to the formulation of pricing policies jointly with the marketing manager.

5. ***Forecasting Profits:*** The Financial manager is usually responsible for collecting the relevant data to make forecasts of profit levels in future.

6. ***Measuring Required Return:*** The acceptance or rejection of an investment proposal depends on whether the expected return from the proposed investment is equal to or more than the required rate of return. An investment project is accepted if the expected return is equal or more than the required rate of return.

7. ***Managing Funds:*** Funds may be viewed as the liquid assets of the firm.The manager is responsible for having sufficient funds for the firm to conduct its business and to pay its bills. Money must be located to finance receivables and inventories, to make arrangements for the purchase of assets, and to identify the sources of long-term financing. Cash must be available to pay dividends declared by the board of directors. The management of funds has therefore, both liquidity and profitability aspects. If the firm's funds are inadequate, the firm may default on the payment of liabilities and may have to pay higher interest. If the firm does not carefully choose its financing methods, it may pay excessive interest costs with a subsequent decline in profits.

8. ***Managing Assets:***

(i) Find out total amount of assets needed by firm to carry out its operations
(ii) Determine composition or mix of asset that will help firm to achieve its goals.
(iii) Identify ways to use existing asset more effectively & unwarranted expenses.

CHAPTER 2

TIME VALUE OF MONEY

One of the essential features of a sound appraisal method for capital expenditure proposals is the consideration of the time value of money. A project and many other financial problems involve cash flows occurring at different points of time. For evaluating such cash flows an explicit consideration of time value of money is required. In order to decide whether the project is viable a mere matching of present outlays (Cash outflows) and the benefits (cash inflows) in future period is not sufficient. For a meaningful comparison the two variable must be strictly comparable. One basic requirement of comparability is the incorporation of the time element in the calculation. It is necessary to convert the sums of money to a common time. The net inflows of the future periods have to be discounted to ascertain their present values. These then have to be compared with the present values of investment. Thus, time value of money is an important factor to be considered in investment decisions.

This time value of money principle is based on the following four reasons:

- **Inflation –** under inflationary conditions the value of money, expressed in terms of its purchasing power over goods and services, declines

- **Risk –** Rs 1 now is certain, whereas Rs 1 receivable tomorrow is less certain. This 'Bird-in-the-hand' Principle is extremely important in investment appraisal.

- **Personal Consumption Preference-** Many individuals have a strong preference for immediate rather than delayed consumption. The promise of a bowl of rice next week counts for little to the starving man.

- **Investment opportunities-** Money like any other desirable commodity, has a price, given the choice of RS 100 now or the same amount in one year's time, it is always preferable to take the Rs 100 now because it could be invested over the next year at (say) 18% interest rate to produce Rs 118 at the end of one year. If 18% is the best risk-free return available, then you would be indifferent to receiving Rs 100 now or Rs 118 in one year's time. Expressed another way, the present value of Rs 118 receivable one year hence is Rs 100.

⇒ **CONCEPT I**

COMPUTATION OF PRESENT VALUE WHEN CASH FLOW ARE NOT CONSTANT

$$PV = \frac{Cf_1}{(1+i)^1} + \frac{Cf_2}{(1+i)^2} + \frac{Cf_3}{(1+i)^3}$$

$\forall$ ***i = opportunity Cost***

Or

$$PV = CF_1\,(PVF)_{\substack{n=1\\r=i}} + CF_2\,(PVF)_{\substack{n=2\\r=i}} + CF_3\,(PVF)_{\substack{n=3\\r=i}}$$

Example:-

Find Present Value of inflows of a project if Cash inflows for

Year 1	10000
Year 2	15000
Year 3	20000

Opportunity Cost = 10%

Answer:

$$PV = 10000(PVF)_{\substack{n=1\\r=10\%}} + 15000 \times (PVF)_{\substack{n=2\\r=10\%}} + 20000(PVAF)_{\substack{n=3\\r=10\%}}$$

$$= 10000 \times .909 + 15000 \times .826 + 20000 \times .751 = RS\ 36500.$$

⇒ **CONCEPT II**

COMPUTATION OF PRESENT VALUE WHEN CASH FLOW ARE NOT CONSTANT

$$PV = CF\ (PVAF)_{\substack{n= \\ r=i}}$$

PROOF;

$$PV = \frac{Cf_1}{(1+i)^1} + \frac{Cf_2}{(1+i)^2} + \frac{Cf_3}{(1+i)^3}$$

$$= CF\left[\frac{1}{(1+i)^1} + \frac{2}{(1+i)^2} + \frac{3}{(1+i)^3}\right]$$

$$= CF\left[(PVF)_{\substack{n=1 \\ r=i}} + (PVF)_{\substack{n=2 \\ r=i}} + (PVF)_{\substack{n=3 \\ r=i}}\right]$$

$$= CF\ (PVAF)_{\substack{n=3 \\ r=i}}$$

Example:

Find Present value of inflows of a project if project generate Rs 10000 P.A. for 3 Consecutive Years. Opp. Cost = 10%

$$PV = CF\ (PVAF)_{\substack{n=3 \\ r=10\%}} = 10000\ (PVAF)_{\substack{n=3 \\ r=10\%}}$$

$$= 10000\ (2.4868\ ) = 24868$$

⇒ **CONCEPT III**

COMPUTATION OF PRESENT VALUE OF PERPETUITY

$$Pv = \frac{cf}{i}$$

PROOF;

$$PV = \frac{Cf_1}{(1+i)^1} + \frac{Cf_2}{(1+i)^2} + \frac{Cf_3}{(1+i)^3} \pm - - - - \infty$$

$$= CF\left[\frac{1}{(1+i)^1} + \frac{2}{(1+i)^2} + \frac{3}{(1+i)^3} + - - - - - \infty\right]$$

$$= CF[Sum\ of\ Geomatric\ progression\ upto\ \infty]$$

$$= CF\left[\frac{a}{1-r}\right] \forall\ a = 1st\ Term$$

r = common ratio = $\frac{1}{1+i}$

$$= CF\left[\frac{\frac{1}{1+i}}{1_{-\frac{1}{1+i}}}\right]$$

$$= \left[\frac{CF}{i}\right]$$

For Example

Find Present value of cash inflows related to a project, that will generate Rs 20000 P.A. forever if opportunity cost = 10%

$$PV = \frac{CF}{i} = \frac{20000}{0.10} = Rs\ 200{,}000$$

⇒ **CONCEPT IV**

An annuity where first payment is delayed beyond one year, the annuity is called as deferred Annuity

PV of deferred Annuity

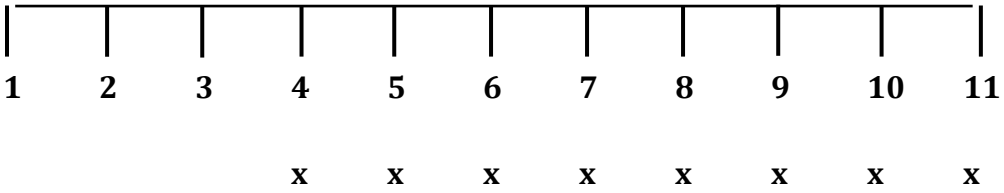
Example

Assume that a Rs.20,00,000 plant expansion is to be financed as follows: The firm makes a 15% down payment and borrows the remainder at 9% interest rate. The loan is to be repaid in 8 equal annual installments beginning 4 years from now. What is the size of the required annual loan payments?

ANSWER

Amount required	**=**	**Rs 20 Lakhs**
Down payment	**=**	**15% i.e. Rs 3 Lakhs**
Loan Amount	**=**	**17 Lakha**
Rate of Interest	**=**	**9% P.A.**
No. of Instalments	**=**	**8**
1St Instalment	**=**	**End of 4th Year**

(Step I) Computation of PV at end of 3rd Year



$$PV\ (at\ end\ of\ 3rd\ Year) = x\ \times (PVAF)_{\substack{n=8 \\ r=9\%}}$$

$$PV = x\ \times (PVAF)_{\substack{n=8 \\ r=9\%}} \times (PVF)_{\substack{n=3 \\ r=9\%}}$$

$$17Lakh\ = x\ \times 5.5348 \times .7722$$

$$397756 = x$$

UNSOLVED QUESTION

Question 1.

Assume that a deposit is to be made at year zero into an account that will earn 8% compounded annually. It is desired to withdraw Rs.5,000 three years from now and Rs.7,000 six years from now. What is the size of the year zero deposit that will produce these future payments.

Answer: 8380

Question 2.

A potential investor is considering the purchase of a bond that has the following characteristics: the bond pays 8% per year on its Rs.1,000 principal, or face value. The bond will mature in 20 years. At maturity, the bondholder will receive interest for year 20 plus the Rs.1,000 face value. What is the maximum purchase price that should be paid for this bond if the investor requires a 10% rate of return?

Answer: 830.12

Question 3.

An investor deposits a sum of Rs.1,00,000 in a bank account on which interest is credited @ 10% p.a. How much amount can be withdrawn annually for a period of 15 years?

Answer: 13148)

Question 4.

What is the present value of cash flows of Rs.750 per year forever (a) at an interest rate of 8% and (b) at an interest rate of 10%?

Answer: (a) Rs.9,375, and (b) Rs.7,500.]

Question 5.

What is the present worth of operating expenditures of Rs.1,00,000 per year which are assumed to be incurred continuously throughout 8 years period if the effective annual rate of interest is 12%?

Answer: Rs.4,96,800.]

CHAPTER 3
COST OF CAPITAL

LEARN OBJECTIVE

After studying this chapter you will be able to:

- Understand the concept of "Cost of Capital" that impacts the capital investment decisions for a business.
- Understand what are the different sources of capital (Debt, Equity Shares, preference share etc.)
- Understand what is the cost of employing each of these sources of capital?
- Know what is weighted average cost of capital (WACC) (Overall cost of capital) for a business and also what is marginal cost of capital?
- Summarize how cost of capital is important in financial management.

⇒ **CONCEPT 1**

INTRODUCTTON

The financing decision relates to the composition of relative proportion of various sources of finance. The sources could be:-

1. Shareholders Fund: - Equity Share Capital, Preference Share Capital, Accumulated Profits.

2. Borrowing From Outside Agencies:- Debentures, Loans from Financial institutions

The financial management weighs the merits and demerits of different sources of finance while taking the financing decision. Whether the companies choose shareholders funds or borrowed funds or a combination of both (which is generally the case), each type of fund carries a cost.

The cost of equity is the minimum return the shareholders would have received if they had invested elsewhere. **Borrowed funds cost** involve interest payment.

Both types of funds incur cost and this is the cost of capital to the company. This means, cost of capital is the minimum return expected by the company.

Whenever funds are to be raised to finance investments, capital structure decision is involved. A demand for raising funds generates a new capital structure since a decision has to be made as to the quantity and forms of financing.

⇒ **CONCEPT 2**

DEFINITION OF COST OF CAPITAL

In simple terms Cost of capital refers to the discount rate that is used in determining the present value of the estimated future cash proceeds of the business /new project and eventually deciding whether the business/new project is worth undertaking or now.

It is also the minimum rate of return that a firm must earn on its investment which will maintain the market value of share at its current level.

It can also be stated as the opportunity cost of an investment, i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected. For example, when an investor purchases stock in a company, he/she expects to see a return on that investment. Since the individual expects to get back more than his/her initial investment, the cost of capital is equal to this minimum return that the investor expects to receive (also termed as investor opportunity cost).

The cost of each source of capital (Equity Share or Debt) is called specific cost of capital. When these specific costs are combined for all the sources of capital for a business, then we arrive at overall cost of capital for a business.

We will first discuss the specific cost of capital for each source of capital before discussing and defining the overall cost of capital.

⇒ **CONCEPT 3**

MEASUREMENT OF COST OF CAPITAL

In order to calculate the specific cost of each type of capital, recognition should be given to the explicit and the implicit cost. The cost of capital can be either explicit of implicit.

The explicit cost of any source of capital may be defined as the discount rate that equals that present value of the cash inflows that are incremental to the taking of financing opportunity with the present value of its incremental cash outflows.

lmplicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm was accepted. Opportunity costs are technically referred to as implicit cost of capital.

The distinction between explicit and implicit costs is important from the point of view d, the computation of the cost of capital.

The first step in the measurement of the cost of the capital of the firm is the calculation of the cost of individual sources of raising funds. From the viewpoint of capital budgeting decisions, the long term sources of funds are relevant as they constitute the major sources of financing the fixed assets. ln calculating the cost of capital, therefore the focus on longterm funds and which are:-

i. Long term debt (including Debentures)
ii. Preference Shares
iii. Equity Capital
iv. Retained Earnings

⇒ **CONCEPT 4**

COST OF DEBT

The calculation of the cost of debt is relatively easy, A debt may be in the form of Bond or Debenture.

A bond is a long term debt instrument or security. Bonds issued by the government do not have any risk of default. The government honour obligations on its bonds. Bonds of the public sector companies in India are generally secured, but they are not free from the risk of default.

The private sector companies also issue bonds, which are also called debentures in India. A company in India can issue secured or unsecured debentures.

The chief characteristics of a bond or debenture are as follows:

Face value: Face value is called par value. A bond or debenture is generally issued at a par value of Rs. 100 or Rs. 1,000, and interest is paid on face value.

Interest rate: interest rate is fixed and known to bondholders or debenture holders. Interest paid on a bond or debenture is tax deductible. The interest rate is also called coupon rate. Coupons are detachable certificates of interest.

Maturity: A bond or debenture is generally issued for a specified period of time. It is repaid on maturity.

Redemption value: The value that a bondholder or debenture holder will get on maturity is called redemption or maturity value. A bond or debenture may be redeemed at par or at premium (more than par value) or at discount (less than par value).

Market value: A bond or debenture may be traded in a stock exchange. The price at which it is currently sold or bought is called the market value of the bond or debenture. Market value may be different from par value or redemption value.

⇒ **CONCEPT 5**

COST OF DEBENTURES

The cost of debentures and long term loans is the contractual interest rate adjusted further for the tax liability of the company. For a company, the higher the interest charges, the lower the amount of tax payable by the company. An illustration will help you in understanding this point.

Illustration 1:

Consider two companies X and Y:

	Company X	**Company Y**
Earnings before interest and taxes (EBIT)	100	100
Interest (l)	-	40
Profit before tax (PBT)	100	60
Tax (T)[1]	35	21
Profit after tax (PAT)	65	39

Assume an effective rate of tax of 35 percent

Solution

A comparison of the two companies shows that an interest payment of 40 in company Y results in a tax shield of 14 - that is 40 multiplied by 0.35, the corporate tax rate.

The important point to remember, while calculating the average cost of capital, is that the post-tax cost of debt must be used and not the pre-tax cost of debt.

⇒ **CONCEPT 6**

COST OF IRREDEEMABLE DEBENTURES:

Cost of debentures not redeemable during the life time of the company.

$$K_d = \frac{1}{NP}(1-t)$$

Where,

K_d	=	Cost of debt after tax
I	=	Annual interest payment
NP	=	Net proceeds of debentures
t	=	Tax Rate

⇒ **CONCEPT 7**

COST OF REDEEMABLE DEBENTURES

lf the debentures are redeemable after the expiry of a fixed period, the cost of debentures would be:

$$K_d = \frac{I(I-t) + (RV - NP)/N}{\frac{RV + NP}{2}}$$

Where,

I	=	Annual interest payment
NP	=	Net proceeds of debentures
RV	=	Redemption value of debentures
t	=	Tax Rate
N	=	Life of debentures.

Illustration 2:

A company issued 10,000, 10% debentures of Rs. 100 each on 1.4.2006 to be matured on1.4.2011. If the market price of the debentures is Rs.80. Compute the cost of debt assuming 35% tax rate.

Solution

$$K_d = \frac{I(I-t) + \frac{RV - NP}{N}}{\frac{RV + NP}{2}}$$

$$K_d = \frac{10(1-.35) + \left(\frac{100-80}{5}\right)}{\frac{100+80}{2}}$$

$$= \frac{6.5 + 4}{90}$$

$$= 0.1166$$

$$= 0.12$$

Illustration 3:

Five years ago, Sona Limited issued 12 per cent irredeemable debentures at Rs. 103, a Rs. 3 premium to their par value of Rs. 100. The current market price of these debentures is Rs. 94. If the company pays corporate tax at a rate of 35 per cent what is its current cost of debenture capital?

Solution

K_d = 12/94 = 12.8 per cent

K_d (after tax) = 12.8× (1-0.35) = 8.3 per cent

⇒ **CONCEPT 8**

COST OF PREFERENCE SHARES

The cost of preference share capital is the dividend expected by its holders. Though payment of dividend is not mandatory, non-payment may result in exercise of voting rights by them.

The payment of preference dividend is not adjusted for taxes as they are paid after taxes and is not deductible.

The cost of preference share capital is calculated by dividing the fixed dividend per share by the price per preference share.

Illustration 5: lf Reliance Energy is issuing preferred stock at Rs.100 per share, with a stated dividend of Rs.12, and a floatation cost of 3% then, what is the cost of preference share?

Solution

$$\boldsymbol{K_p} = \frac{\text{Preferred stock dividend}}{\text{Market priceof preferred stock}(1 - \text{floatation cost})}$$

$$= \frac{Rs.12}{Rs.100(1-0.03)} = 12.4\%$$

⇒ **CONCEPT 9**

COST OF IRREDEEMABLE PREFERENCE SHARES

Cost of irredeemable preference shares $= \frac{PD}{PO}$

Where,

P_D	=	Annual preference dividend
P_o	=	Net proceeds in issue of preference shares.

Cost of irredeemable preference shares where Dividend Tax is paid over the actual dividend payment $= \frac{PD}{\mathbf{Po}}\ (1 + D_t)$

Where,

P_D	=	Annual preference dividend
P_o	=	Net proceeds in issue of preference shares.
D_t	=	Tax on preference dividend

Illustration 6:

XYZ & Co. issues 2,000 10% preference shares of Rs. 100 each at Rs.95 each. Calculate the cost of preference shares.

$$\mathbf{K_p} = \frac{\text{PD}}{P_0}$$

$$\mathbf{K_p} = \frac{(10 \times 2{,}000)}{(95 \times 2{,}000)}$$

$$= \frac{10}{95}$$

$$= 0.1053$$

⇒ **CONCEPT 10**

COST OF REDEEMABLE PREFERENCE SHARES:

lf the preference shares are redeemable after the expiry of a fixed period the cost of preference shares would be:

$$K_p = \frac{\text{PD} + (\text{RV} - \text{NP})/\text{N}}{\frac{\text{RV} + \text{NP}}{2}}$$

Where,

PD	=	Annual preference dividend
RV	=	Redemption value of preference shares
NP	=	Net proceeds on issue of preference shares
N	=	Life of preference shares.

However, since dividend of preference shares is not allowed as deduction from income for income tax purposes, there is no question of tax advantage in the case of cost of preference shares.

The cost of redeemable preference share could also be calculated seen as the discount rate that equates the net proceeds of the sale of preference shares with the present value of the future dividends and principal payments.

It would, thus, be seen that both in the case of debt as well as preference shares, cost of capital is calculated by reference to the obligations incurred and proceeds received.

Illustration 7:

Referring to the earlier question but taking into consideration that if the company proposes to redeem the preference shares at the end of 10th year from the date of issue. Calculate the cost of preference share?

Solution

$$K_p = \frac{PD + (RV - NP)/N}{\frac{RV + NP}{2}}$$

$$K_p = \frac{10 + \left(\frac{100 - 95}{10}\right)}{\left(\frac{100 + 95}{2}\right)} = .107 \text{ (approx)}$$

⇒ **CONCEPT 11**

COST OF EQUITY

It may prima facie appear that equity capital does not carry any cost. But this is not true. The market share price is a function of return that equity shareholders expect and get. If the company does not meet their requirements. it will have an adverse effect on the market share price' Also, it is relatively the highest cost of capital. Since expectations of equity holders are high, higher cost is associated with it.

In simple words Cost of equity capital is the rate of return which equates the present value of expected dividends with the market share price. In theory the management strives to maximize the position of equity holders and the effort involves many decisions.

The calculation of equity capital cost raises a lot of problems. Different methods are employed to compute the cost of equity capital.

(a) Dividend Price Approach: Here, cost of equity capital is computed by dividing the current dividend by average market price per share. However, this method cannot be used to calculate cost of equity of units suffering losses.

This dividend price ratio expresses the cost of equity capital in relation to what yield the company should pay to attract investors.

$$K_e = \frac{D_1}{P_o}$$

Where,

$\mathbf{K_e}$ = Cost of equity

D_1 = Annual dividend

P_o = Market value of equity (ex dividend)

This model assumes that dividends are paid at a constant rate to perpetuity. It ignores taxation.

Earnings and dividends do not remain constant and the price of equity shares is a/so directly influenced by the growth rate in dividends. Where earnings, dividends and equity share price all grow at the same rate, the cost of equity capital may be computed as follows:

$$K_e = (D_1/P_o) + G$$

Where,

D_1 = [Do (1+G)] i.e. next expected dividend

P_o = Current Market price per share

G = constant Growth Rate of Dividend.

Cost of newly issued shares, K_n, is estimated with the constant dividend growth model so as to allow for flotation costs.

$$K_n = (D_1/P_o) + G$$

Where,

F = Amount of flotation cost per share

Illustration 8:

A company has paid dividend of Rs. 1 per share (of face value of Rs. 10 each) last year and it is expected to grow @ 10% next year. Calculate the cost of equity if the market price of share is Rs. 55.

Solution

$$K_e = \frac{D}{P} + G$$

$$K_e = \frac{1(1 + .10)}{55} + .10$$

= .1202 (approx)

(b) Earning/ Price Approach: The advocates of this approach co-relate the earnings of the company with the market price of its share.

Accordingly, the cost of ordinary share capital would be based upon the expected rate of earnings of a company. The argument is that each investor expects a certain amount of earnings, whether distributed or not from the company in whose shares he invests.

Thus, if an investor expects that the company in which he is going to subscribe for shares should have at least a 20% rate of earning, the cost of ordinary share capital can be construed on this basis. Suppose the company is expected to earn 30% the investor will be prepared to pay Rs. 150 $\left(\text{Rs.}\frac{30}{20} \times 100\right)$ tor each share of Rs. 100.

So, cost of equity will be given by.

$$K_e = (E/P)$$

Where,

E = Current earring per share
P = Market share price

Since practically earning do not remain constant and the price of equity shares is also directly influenced by the growth rate in earning, we need to modify the above calculation with an element of growth,

So, cost of equity will be given by.

$$K_e = (E/P)$$

Where,

E = Current earring per share
P = Market share price
G = Annual growth rate of earnings.

The calculation of 'G' (the growth rate) is an important factor in calculating cost of equity capital. The past trend in earnings and dividends may be used as an approximation to predict the future growth rate if the growth rate of dividend is fairly stable in the past.

$G = 1.0\ (1+G)^n$ where n is the number of years

The Earning Price Approach is similar to the dividend price approach; only it seeks to nullify the effect of changes in the dividend policy.

(c) Realized Yield Approach: According to this approach, the average rate of return realized in the past few years is historically regarded as 'expected return' in the future. The yield of equity for the year is:

$$\frac{D_t + P_t - P_{t-1}}{P_{t-1}}$$

Where,

Y_1	=	Yield for the year t,
D_t	=	Dividend for share for end of the year t
P_t	=	Price per share at the end of the year t
P_{t-1}	=	Price per share at the beginning and at the end of the year t

Though, this approach provides a single mechanism of calculating cost of equity, it has unrealistic assumptions. If the earnings do not remain stable, this method is not practical.

(d) **Capital Asset Pricing Model Approach (CAPM):** CAPM model describes the risk return trade-off for securities. It describes the linear relationship between risk and return for securities. The risks to which a security is exposed are divided into two groups, diversifiable and non-diversifiable.

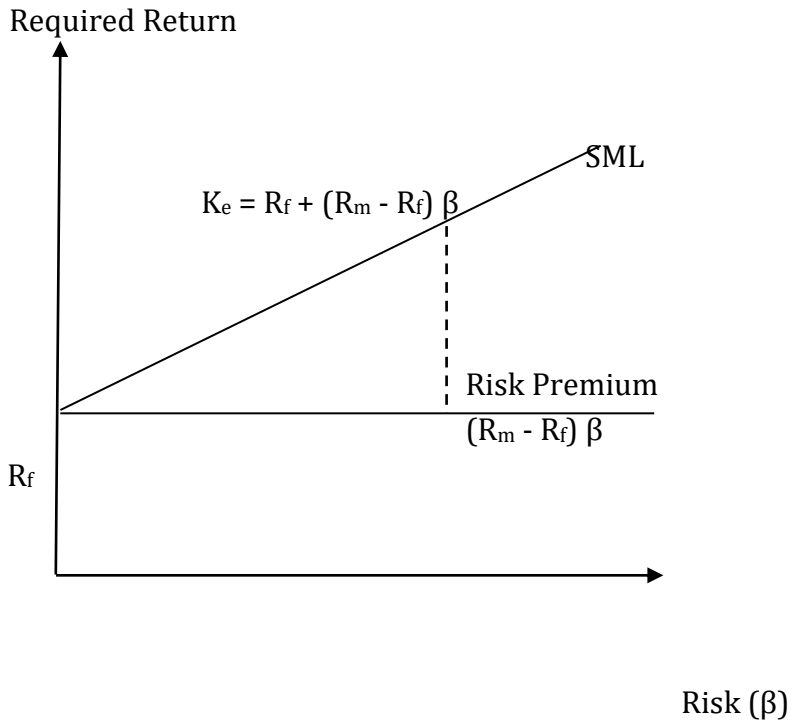
The diversifiable risk can be eliminated through a portfolio consisting of large number of well diversified securities.

The non-diversifiable risk is attributable to factors that affect all businesses. Examples of such risks are:-

- Interest Rate Chances
- Inflation
- Political Changes etc.

As diversifiable risk can be eliminated by an inventor through diversification, the non' diversifiable risk in the only element risk, therefore a business should be concerned as per CAPM method, solely with non-diversifiable risk.

The non-diversifiable risks are assessed in terms of beta coefficient (b or p) through fitting regression equation between return of a security and the return on a market portfolio.



Cost of Equity under CAPM

Thus, the cost of equity capital can be calculated under this approach as:

$$K_e = R_f + b\ (R_m - R_1)$$

Where,

K_e	=	Cost of equity capital
R_f	=	Rate of return on security
b	=	Beta coefficient
R_m	=	Rate of return on market portfolio

Therefore, required rate of return = risk free rate + risk premium

The idea behind CAPM is that investors need to be compensated in two ways- time value of money and risk.

- The time value of money is represented by the risk- free rate in the formula and compensates the investors for placing money in any investment over a period of time.

- The other half of the formula represents risk and calculates the amount of compensation the investor needs for taking on additional risk. This is calculated by taking a risk measure (beta) which compares the returns of the asset to the market over a period of time and compares it to the market premium.

The CAPM says that the expected return of a security or a portfolio equals the rate on a risk free security plus a risk premium. If this expected return does not meet or beat the required return, then the investment should not be undertaken.

The shortcomings of this approach are:

a) Estimation of betas with historical data is unrealistic; and
b) Market imperfections may lead investors to unsystematic risk.

Despite these shortcomings, the capital asset pricing approach is useful in calculating cost of equity, even when the firm is suffering losses.

The basic factor behind determining the cost of ordinary share capital is to measure the expectation of investors from the ordinary shares of that particular company. Therefore, the whole question of determining the cost of ordinary shares hinges upon the factors which go into the expectations of particular group of investors in a company of a particular risk class.

Illustration 9:

Calculate the cost of equity capital of H Ltd., whose risk free rate of return equals 10%. The firm's beta equals 1.75 and the return on the market portfolio equals to 15%.

Solution

$K_e = R_r + b\ (R_m - R_r)$
$K_e = .10 + 1.75\ (.15 - .10)$
$= .10 + 1.75\ (.05)$
$= .1875$

⇒ **CONCEPT 12**

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

WACC (weighted average cost of capital) represents the investors' opportunity cost of taking on the risk of putting money into a company.

Since every company has a capital structure i.e. what percentage of funds comes from retained earnings, equity shares, preference shares, debt and bonds, so by taking a weighted average, it can be seen how much cost/interest the company has to pay for every rupee it borrows/invest. This is the weighted average cost of capital.

The weighted average cost of capital for a firm is of use in two major areas:-

1. In consideration of the firm's position
2. Evaluation of proposed changes necessitating a change in the firm's capital. Thus, a weighted average technique may be used in a quasi-marginal way to evaluate a proposed investment project, such as the construction of a new building.

Thus, weighted average cost of capital is the weighted average after tax costs of the individual components of firm's capital structure. That is, the after tax cost of each debt and equity is calculated separately and added together to a single overall cost of capital.

$$\mathbf{K_o} = \%D(Mkt)(K_i)(1-t) + (\%\ Psmkt)K_p + (C_s\ mkt)K_e$$

Where,

K_o	=	overall cost of capital
K_i	=	Before tax cost of debt
1-t	=	1- Corporate tax rate
K_p	=	Cost of preference capital
K_e	=	Cost of equity
% Dmkt	=	% of debt in capital Structure
% Psmkt	=	% of preference share in capital structure
% Cs	=	% of equity share in capital structure.

The cost of weighted average method is preferred because the proportions of various sources of funds in the capital structure are different. To be representative, therefore, cost of capital should take into account the relative proportions of different sources of finance.

Securities analysts employ WACC all the time when valuing and selecting investments. In discounted cash flow analysis, WACC is used as the discount rate applied to future cash flows for deriving a business's net present value. WACC can be used as a hurdle rate against which to assess return on investment capital performance. It also plays a key role in economic value added (EVA) calculations.

Investors use WACC as a tool to decide whether or not to invest. The WACC represents the minimum rate of return at which a company produces value for its investors. Let's say a company produces a return of 20o/o and has a WACC of 110/o. By contrast, if the company's return is less than WACC, the company is shedding value, which indicates that investors should put their money elsewhere.

Therefore, WACC serves as a useful reality check for investors.

⇒ **CONCEPT 13**

MARGINAL COST OF CAPITAL

The marginal cost of capital may be defined as the cost of raising an additional rupee of capital.

Since the capital is raised in substantial amount in practice marginal cost is referred to as the cost incurred in raising new funds. Marginal cost of capital is derived, when the average cost of capital is calculated using the marginal weights.

The marginal weights represent the proportion of funds the firm intends to employ. Thus, the problem of choosing between the book value weights and the market value weights does not arise in the case of marginal cost of capital computation.

To calculate the marginal cost of capital, the intended financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. When a firm raises funds in proportional manner and the component's cost remains unchanged, there will be no difference between average cost of capital (of the total funds) and the marginal cost of capital. The component costs may remain constant upto certain level of funds raised and then start increasing with amount of funds raised.

For example, the cost of debt may remain 7% (after tax) till Rs. 10 lakhs of debt is raised, between Rs. 10 lakhs and Rs. 15 lakhs, the cost may be 8% and so on. Similarly, if the firm has to use the external equity when the retained profits are not sufficient, the cost of equity will be higher because of the floatation costs. When the components cost start rising, the average cost of capital will rise and the marginal cost of capital will however, rise at a faster rate.

PART I :- SPECIFIC COST OF CAPITAL

(A)COST OF DEBENTURE (Kd)

TYPE -1 WHEN REDEMPTION INFORMATION IS GIVEN.

$$\boldsymbol{kd} = \frac{interest\ (1-t) + \frac{R_V - B_o}{N}}{\left(\frac{R_v + B_o}{2}\right)} \times 100$$

Where,

Kd= cost of debt
Interest = coupon rate X face value
R_V = Redemption value
B_o = net proceeds
N = no. of years for which debentures are issued
t = tax rate

Question 1.

ASC Ltd issued Rs 100 lakh 12% debentures of Rs 100 each redeemable after 5 years at par. Compute cost of debt.

(i) If debentures are issued at par with no floatation cost
(ii) If debentures are issued at par with 5% floatation cost
(iii) If debentures are issued at 10% premium with 5% floatation cost
(iv) If debentures are issued at 10% discount with 5% floatation cost (Assume Corporate tax -40%)

Answer.

(a) 7.2% (b) 8.41% (c) 6.16% (d) 10.89%

Question 2.

A Ltd issued Rs 100 lakh 12% debentures of Rs 100 each redeemable after 5 years at premium of 5%, if debentures are issued at par with no floatation cost (Assume corporate tax 40%).

Answer. 8%

Question 3.

[Cost of Debt Redeemable (at par) in Lump Sum Payment]

Tulsian Ltd. issued Rs. 100 Lakhs 12% Debentures of Rs. 100 each redeemable at par after 5 years. Calculate the cost of debt according to Approximation Method in each of the following alternative cases. (Assume corporate tax rate being 40%)

Case (a) If Debentures are issued at par with no flotation cost.
Case (b) If Debentures are issued at par with 5% flotation cost.
Case (c) If Debentures are issued at 10% premium with 5% flotation cost.
Case (d) If Debentures are issued at 10% discount with 5% flotation cost.

Answer.

(a)7.20% **(b)** 8.41% **(c)** 6.16% **(d)** 10.89%

TYPE -2 WHEN REDEMPTION INFORMATION IS NOT GIVEN.

$$\boldsymbol{kd} = \frac{interest\ (1-t)}{B_o} \times 100$$

Question 4.

(Cost of Perpetual / Irredeemable Debt)

ASC Ltd. issued Rs. 100 Lakhs 12% Debentures of Rs. 100 each. Calculate the cost of debt in each of the following cases. (Assume corporate tax rate being 40%)

Case (a) If Debentures are issued at par with no flotation cost.
Case (b) If Debentures are issued at par with 5% flotation cost.
Case (c) If Debentures are issued at 10% premium with 5% flotation cost.
Case (d) If Debentures are issued at 10% discount with 5% flotation cost.

Answer.

(a) 7.20% **(b)** 7.58% **(c)** 6.89% **(d)** 8.42%

TYPE 3 SHORT-CUT $\boldsymbol{kd = [CR\ (i-t)]}$

Question 5.

A Ltd issued 10% Debt of Rs 100 each tax rate 40%

Answer. 6%

Question 6.
A Ltd issued 10% Debt of Rs 100 each redeemable after 5 years, tax rate 40%

Answer. 6%

(B)COST OF PREFERENCE (KP)

TYPE 1 WHEN REDEMPTION INFORMATION IS GIVEN

$$Kp = \frac{PD(1 + CDT) + \frac{R_v - P_o}{N}}{\left(\frac{R_v + P_0}{2}\right)}$$

PD = Preference dividend (CR x face value)
R_v= Redemption value
P_o = Net Proceed (fv + premium - discount - brokerage)
N = years for which preference shares are issued.
CDT = Corporate dividend tax.

Question 7.
[Cost of Preference Shares Redeemable (at par) in Lump Sum Payment]
Tulsian Ltd. issued Rs. 100 Lakhs 12% Preference Shares of Rs. 100 each redeemable at par after 5 years. Calculate the cost of Preference Share According to Approximation Method in each of the following cases : (Assume dividend tax rate being 20%)

Case (a) If Preference shares are issued at par with no flotation cost.
Case (b) If Preference shares are issued at par with 5% flotation cost.
Case (c) If Preference shares are issued at 10% premium with 5% flotation cost.
Case (d) If Preference shares are issued at 10% discount with 5% flotation cost.

Answer. **(a)** 14.4% **(b)** 15.79% **(c)** 13.20% **(d)** 18.65%

Question 8.
A Ltd. issued 9% preference share capital @ 100 each for Rs. 100 Lakhs redeemable after 5 years at par find cost of preference share if flotation cost 5%.

Answer. 10.26%

TYPE 2 WHEN REDEMPTION INFORMATION IS NOT GIVEN.

Question 9.

[Calculation of Cost of Irredeemable Preference Shares]

Tulsian Ltd. issued Rs. 100 Lakhs 12% Preference shares of Rs. 100 each. Calculate the cost of Preference Share in each of the following cases : (Assume dividend tax rate being 20%)

Case (a) If Preference shares are issued at par with no flotation cost.
Case (b) If Preference shares are issued at par with 5% flotation cost.
Case (c) If Preference shares are issued at 10% premium with 5% flotation cost.
Case (d) If Preference shares are issued at 10% discount with 5% flotation cost.

Answer. **(a)** 14.4% **(b)** 15.16% **(c)** 13.78% **(d)** 18.84%

TYPE 3 SHORT-CUT

Question 10.

X Ltd. issued 9% preference share Rs 100 Lakhs @ 100 each.

Answer. 9%

Question 11.

X Ltd. issued 9% preference share Rs 100 Lakhs redeemable at par after 5 years.

Answer. 9%

(C) COST OF EQUITY

TYPE 1 DIVIDEND MODEL

$$K_e = \frac{D}{P_o} \times 100$$

Question 12.

(New firm) : X Ltd. issued equity shares Rs. 100 each at premium of 10% flotation cost Rs. 2 Dividend payable at constant rate of 5% find cost of Equity.

Answer. 4.63%

Question 13.

(Existing firm) : An equity share of the currently selling for Rs. 60. The earnings per share is Rs. 7.50, if company's payout ratio is 60% find cost of equity.

Answer. 7.5%

TYPE 2 DIVIDEND GROWTH MODEL $\rightarrow K_e = \frac{D_1}{P_o} + g$

Question 14.

Calculate the cost of Equity (k_e) in each fo the following alternative cases :-

An equity share of the company is currently selling for Rs. 50. The company expects to pay Rs. 6 per share at the end of current year. Dividend per share is expected to grow at the rate 8% p.a.

Answer. 20%

Question 15.

An equity share of the company is currently selling for Rs. 50. The company expects to earn Rs. 6 per share at the end of current year. Dividend payout ratio is 60%. Dividend per share is expected to grow at the rate of 8% p.a.

Answer. 15.2%

Question 16.

An equity share of the company is currently selling for Rs. 50. The company had paid dividend of Rs. 6 per share at the end of last year. Dividend per share is expected to grow at the rate of 8% p.a.

Answer. 20.96%

Question 17.

An equity share of the company is currently selling for Rs. 50. The company had earned Rs. 6 per share at the end of last year. Dividend Payout Ratio is 60%,. Dividend per share is expected to grow at the rate of 8% p.a.

Answer. 15.78%

Question 18.

An equity share of company is currently selling for Rs. 50. The company expects to earn Rs. 6 per share at the end of current year. Dividend Payout Ratio is 60%. The company reinvests the retained earnings at a rate of 20%.

Answer. 15.2%

Question 19.
An equity share of company is currently selling for Rs. 50. The company had earned to earn Rs. 6 per share at the end of last year. Dividend Payout ratio is 60%. The company reinvests the retained earnings at a rate of 20%.

Answer. 15.78%

Question 20.
The price earning ratio is 5 times. The company has an earning per share of Rs. 10 per share. Dividend Payout Ratio is 60% Dividend per share is expected to grow at the rate of 8% p.a.

Answer. 20.96%

Question 21.
The price earning ratio is 5 times. The company has an earning per share of Rs. 10 per share. Dividend Payout ratio is 60%

Answer. 20.96%

Question 22.
[Calculation of DPS Paid Last year if Dividends are Growing]
Mr. Dalal is planning to purchase the shares of X Ltd. His required rate of return is 20%. Dividends are growing at a rate of 10%. What dividend had X Ltd. paid last year if he is willing to pay Rs. 27.50 for X Ltd.'s Share ?

Answer. 2.5

Question 23.
Mr. Factor purchases and equity share of X Ltd. X Ltd. has paid dividend of Rs. 2 per share last year. Dividends are growing at a rate of 10%. What is the required rate of return of Mr. X on his equity investment if he purchases an equity share for Rs. 22

Answer. 20%

Question 24.
An equity share of the company is currently selling for Rs. 60. The earning per share Rs. 7.50. The company reinvests the retained earnings at a rate of 10%. Calculate the cost of equity share if the company's dividend payout ratio is 60%

Answer. 11.8%

TYPE 3 EARNING MODEL

$$K_e = \frac{E}{P_o} \times 100$$

Where, **E = EPS**

P_o = Net proceed/current M.P

Question 25.
If EPS of X limited is Rs. 10 and current market price is Rs. 100 , find out opportunity cost of investor ?

Answer. **10%**

Question 26.
X Ltd. has an annual profit of Rs 50,000 No. of shares outstanding 10,000. If current market price of share is Rs 100 find cost of equity.

Answer. 5%

TYPE 4 REALISED YIELD APPROACH METHOD

Question 27.
[Cost of Equity – Realised Yield Approach]

An individual wishes to purchase the Share of a Company for Rs. 500. At present the company is expected to pay a dividend of Rs. 40 on this share at the end of the year and its

Market Price after the payment of the dividend is expected to be Rs. 520. What is the cost of Equity in this case, using Realised Yield Approach ?

Answer. 12.00%

Question 28.

[Cost of Equity – Realised Yield Approach]

Jet Ltd. is a large Company with several thousand shareholders. An investor buys 100 shares of the Company at the beginning of the year at a Market price of Rs. 225. The Par Value of each share is Rs. 10. During the year, the company pays a dividend at 25%. The price of the share at the end of the year is Rs. 267.50. Calculate the total return on the investment. Suppose the investor sells the shares at the end of the year, what would be the cash inflows at the end of the year ?

Answer. Total Return = 20% Cash Inflows = Rs. 27,000

Question 29.

[Cost of Equity – CAPM Approach)

Compute cost of Equity if interest on Government Bonds is 6%, Market Return is 18%, Beta Factor for Company K is 1.10

Answer. 19.2%

Question 30.

[Computation of Cost of Equity using CAPM and Product wise Beta]

You are analyzing the Beta for ABC Computers Ltd. and have divided the Company into four broad business groups, with Market Values and Betas for each group.

Business Group	Market value of Equity	Unleveraged Beta
Mainframes	Rs. 100 Billion	1.10
Personal Computers	Rs. 100 Billion	1.50
Software	Rs. 50 Billion	2.00
Printers	Rs. 150 Billion	1.00

Required :-

1. If the Treasury Bond Rate is 7.5% estimate the Cost of Equity of ABC Computers Ltd. Estimate the Cost of Equity for each division. Which cost of equity would you use to value the Printer Division ? The average Market Risk Premium is 8.5%

Answer. Weighted BETA = 1.275, $K_{e(Group)}$ = 18.3375

Question 31.
Calculate the Value of Beta (β) in the following cases :-

Case (a)	Standard Deviation of Security	3
	Standard Deviation of Market Portfolio	2
	Correlation Coefficient of Portfolio with market	0.8
Case (b)	Correlation Coefficient of Portfolio with market	0.8
	Variance of Market Portfolio is $4/9^{th}$ of Variance of Security	
Case (c)	Risk Free Rate of Interest on Govt. Treasury Bonds	5%
	Average Return on Market Portfolio	17.5%
	Cost of Equity (k_e)	20%
Case (d)	Cost of Equity (k_e)	20%
	Average Market Risk Premium	10%
	Risk Free Rate of Interest	5%

Answer. **(a)** 1.2 **(b)** 1.2 **(c)** 1.2 **(d)** 1.5

Question 32.
From the following data information, calculate the Cost of Equity (K_e)

Risk Free rate of interest	8%
Expected return of market portfolio	18%
Standard deviation of an asset	2.8%
Market Standard deviation	2.3%
Correlation coefficient of portfolio with market	0.8

Answer. 17.74%

Question 33.

The market is giving an average return of 18%. The risk free return is 11%

Required :

(i) What return would be expected from an investment having a Beta factor of 0.9

(ii) Beta Factor which would be necessary for an investment to yield a return of 21.6%

Answer. K_e = 18.9%, Beta = 1.514

(D) COST OF RETAINED EARNING (Kre)

Kre = Ke or Kre = Ke (i-Pt) (1 - brokerage)

Question 34.

XYZ Ltd. has an annual profit of Rs. 50,000 and the required rate of return of the shareholder is 10%. It is further expected that the shareholders will have to incur 3% brokerage cost of the dividends received and invested by them for making new investments. Find out the cost of retained earnings to the firm given that the tax rate applicable to shareholders is 30%.

Answer. $\mathbf{k_r}$ = 6.79%

Question 35.

Calculate the cost of retained earnings from the following information:-

Current market price of a share Rs. 140
Cost of brokerage per share 3%
Growth in expected dividend 5%
Expected dividend per share on new shares Rs. 14
Shareholders marginal / personal income tax 22%

Answer. 11.35%

(E) COST OF TERM LOAN

K_{TL} = CR (I – tax rate)

Question 36.

X Ltd raised Rs 100 L term Loan @ 12% P.A. if tax rate is 30% find cost of term loan.

Answer. 8.4%

OVERALL COST OF CAPITAL

(A) WACC (Weighted Avg. Cost of capital)

WACC→ $\mathbf{K_d W_d + K_e W_e + Kp\ W_p}$

Question 37.

[Computation of WACC]

The Capital Structure of a Company as on 31st March is as follows :-

Equity Capital : 6,00,000 Equity Shares of Rs. 100 each	Rs. 6.00 Crores
Reserves and Surplus	Rs. 1.20 Crores
12% Debenture of Rs. 100 each	Rs. 1.80 Crores

For the year ended 31st March, the company has paid Equity Dividend at 24% Dividend is likely to grow by 5% every year. Market Price of Equity Share is Rs. 600 per Share. Income Tax Rate applicable to the company is 30%

Required :-

1. Compute the current Weighted Average Cost of Capital
2. The company has a plan to raise a further Rs. 3 crores by way of Long-Term Loan at 18% interest. If the Loan is raised, the Market Price of Equity share is expected to fall to Rs. 500 per share. What will be the new Weighted Average Cost of Capital of the Company?

Answer. WACC: 9.04%, 10.43%

Question 38.

The following is the capital structure of Simons Company Ltd as on 31.12.1998.

	Rs.
Equity shares : 10,000 shares of Rs. 100 each	10,00,000
10% Preference Shares (of Rs. 100 each)	4,00,000
12% Debentures	6,00,000

20,00,000

The market price of the company's share is Rs. 110 and it is expected that a dividend of Rs. 10 per share would be declared for the year 1998. The dividend growth rate is 6%.

(i) If the company is in the 50% tax bracket, compute the weighted average cost of capital.

(ii) Assuming that in order to finance an expansion plan, the company intends to borrow a fund of Rs. 10 lakh bearing 14% rate of interest, what will be the company's revised weighted average cost of capital ? This financing decision is expected to increase dividends from Rs. 10 to 12 per share. However, the market price of equity share is expected to decline from Rs. 110 to Rs. 105 per share.

Answer. **(i)** W.A.C.C. 11.34 **(ii)** R.W.A.C.C. 10.66

Question 39.

2010 - Dec [6] (a) Sushant Ltd. has the following capital structure:

	Rs.
Equity shares	50,00,000
10% Preference shares	10,00,000
14% Debentures	20,00,000
	80,00,000

Equity shares of the company are sold of Rs. 25 per share in the market. It is expected that the company will pay next year a divided of Rs. 4 per share which will grow at 8% forever, Assume a tax- rate of 30%.

(i) Compute weighted average cost of capital based on the existing capital structure.

(ii) Compute the new weighted average cost of capital, if the company raise an additional Rs. 20,00,000 debt by issuing 15% debentures. This would increase the expected dividend to Rs. 5 per share with divided growth rate unchanged, but the price of share will fall to Rs. 20 per share

Answer. **(i)** WACC = 18.7% **(ii)** RWACC = 21.56%

Question 40.

JKL Ltd. has the following book-value capital structure as on March 31, 2003.

	Rs.
Equity Share Capital (2,00,000 shares)	40,00,000
11.5% Preference Shares	10,00,000
10% debentures	30,00,000
	80,00,000

The equity share of the company sells for Rs. 20. It is expected that the company will pay next year a dividend of Rs. 2 per equity share, which is expected to grow at 5% p.a. forever. Assume a 35% corporate tax rate.

Required :-

(i) Compute weighted average cost of capital (WACC) of the company based on the existing capital structure.

(ii) Compute the new WACC, if the company raises an additional Rs. 20 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to Rs. 2.40and leave the growth rate unchanged, but the price of equity share will fall to Rs. 16 per share.

Comment on the use of weights in the computation of weighted average cost of capital.

Question 41.
[Computation of K_e using WACC – Reverse Working]
Backwork ltd. has a Debt Equity Ratio of 2:1 and a WACC of 12%, Its debentures, bear interest of 15%, Find out the cost of Equity Capital (Assume Tax = 35%)

Answer. Ke = 16.5%

(B) WACC AT MV Weights)

Question 42.

2003 - June [5] (b) Determine the weighted average cost of capital using (i) book value weights; and (ii) market value weights based on the following information:

Book value structure:

	Rs.
Debentures (Rs. 100 per debenture)	8,00,000

Preference shares (Rs. 100 per share)	2,00,000
Equity shares (Rs. 10 per share)	10,00,000
	20,00,000

Resent market prices of all these securities are:

Debentures: Rs. 110 per debenture;
Preference shares: Rs. 120 per share; and
Equity shares: Rs. 22 per share.

External financing opportunity are-

(i) Rs. 100 per debenture redeemable at par, 10 year maturity, 13% coupon rate, 4% flotation cost and sale price Rs. 100;

(ii) Rs. 100 per preference share redeemable at par, 10 year maturity, 14% dividend rate, 5% flotation cost and sale price Rs. 100; and

(iii) Equity shares-Rs. 2 per share flotation costs and sale price Rs. 22.

Dividend expected on equity share at the end of the year is Rs. 2 per share; anticipated growth rate in dividends is 7% Company pays all its earnings in the form of dividends. Corporate tax rate is 50%.

Answer. $k_e = 17\%, k_p = 14.87\%, k_d = 7.04\%, k_o = 12.8$
$K_o = 14.2066$

(C) WMCC (Weighted Marginal Cost of capital)

Question 43.
[Marginal Cost of Capital]
An entity has Rs. 50 lakhs existing funds financed Rs. 20 lakhs from equity share capital Rs. 15 lakhs from retained earnings and Rs. 15 lakhs from 12% debentures. It requires additional funds of Rs. 20 lakhs. These can be financed Rs. 10 lakhs from 14% Debentures and Rs. 10 lakhs from new issue of equity shares. Tax rate applicable to the company is 35%. The company is expecting to pay Rs. 4 per share at the end of the year. The company is growth rate of dividends is expected to be 8% perpetually. Market price per equity share is Rs. 40 per share. Issue price of the new equity shares is expected to be Rs. 35 per share. Flotation cost to the issue is Rs. 3 per share. Compute weighted marginal cost of capital

Answer. WMCC = 14.80%

(D) Economic Value Added

Question 44.

[Economic Value Added]
A company has 12.5% Debt Capital of Rs. 2,000 crores (redeemable in 10 years), Equity Capital of Rs. 500 crores, Reserves and Surplus of Rs. 7,500 crores. The return on Tax Free Government Bonds is 11%. Beta is 1.06, Market rate is 18% and corporate tax rate is 30%. Net operating Profit After tax of the company is Rs. 2,000 crores. Compute EVA.

Answer. Kd = 8.75%, Ko =16.486%, EVA = 351.4 crore

Question 45.
Calculate economic value added (EVA) with the help of the following information of Hypothetical Limited

Financial Leverage	:	1.4 Times
Capital Structure	:	Equity Capital Rs. 170 lakhs
		Reserve and Surplus Rs. 130 lakhs
		10% Debentures Rs. 400 lakhs
Cost of Equity	:	17.5%
Income Tax Rate	:	30%

Answer. 17.5 Lakhs

CHAPTER 4
LEVERAGE ANALYSIS

Learning Objectives

After studying this chapter you will be able to:

- *Define, discuss, and quantify "business risk" and "financial risk".*
- *Explain in detail operating and financial leverage and identify causes of both.*
- *Understand how to calculated and interpret a firm leverage.*
- *Calculated a firm's operating break-even (quantity) point break-even (sales) point*
- *Understand what is involved in determining the appropriate amount of financial leverage for a firm.*

⇒ CONCEPT 1

INTRODUCTION

A firm can finance its operations through common and preference shares, with retained earnings, or with debt. Usually a firm uses a combination of these financing instruments.

Capital structure refers to a firm's debt-to-equity ratio, which provides insight into how risky a company is. Capital structure decisions by firms will have an effect on the expected profitability of the firm, the risks facing debt holders and shareholders, the probability of failure, the cost of capital and the market value of the firm.

Risk facing the common shareholders is of two types, namely business risk and financial risk. Therefore risk facing Common Shareholders is function of these two risks, i.e. (Business Risk, Financing Risk)

⇒ CONCEPT 2

Business Risk and Financial Risk

Business Risk:- It refers to the risk associated with the firm's operations. It is the uncertainty about the future operating income (EBIT), i.e. how well can the operating income be predicted?

Business risk can be measured by the standard deviation of the Basic Earning Power ratio.

Financial Risk:- It refers to the additional risk placed on the firm's shareholders as a result of debt use i.e. the additional risk a shareholder bears when a company uses debt in addition to equity financing. Companies that issue more debt instruments would have higher financial risk than companies financed mostly or entirely by equity. Leverage refers to the ability of a firm in employing long term funds having a fixed cost, to enhance returns to the owners. In other words, leverage is the amount of debt that a firm uses to finance its assets. A firm with a lot of debt in its capital structure is said to be highly levered. A firm with no debt is said to be unlevered.

⇒ CONCEPT 3

Debt Versus Equity Financing

Financing a business through borrowing is cheaper than equity. This is because:

- Lenders require a lower rate of return than ordinary shareholders. Debt financial securities present a lower risk than shares for the finance providers because they have prior claims on annual income and liquidation.

- A profitable business effectively pays less for debt capital than equity for another reason: the debt interest can be offset against pre-tax profits before the calculation of the corporate tax, thus reducing the tax paid.

- Issuing and transaction costs associated with raising and serving debt are generally less than for ordinary shares.

These are some benefits from financing a firm with debt. Still firms tend to avoid very high gearing levels.

One reason is financial distress risk. This could be induced by the requirement to pay interest regardless of the cash flow of the business. If the firm goes through a rough

period in its business activities it may have trouble paying its bondholders, bankers and the other creditors their entitlement.

⇒ CONCEPT 4
RELATIONSHIP BETWEEN LEVERAGE AND RISK

Leverage can occur in either the operating or financing portions of the income statement. The effect of leverage is to magnify the effects of changes in sales volume on earnings.
Let's now discuss in detail Operating, Financing and Combined Leverages.

⇒ CONCEPT 5
TYPES OF LEVERAGE

The term Leverage in general refers to a relationship between two interrelated variables. In financial analysis it represents the influence of one financial variable over some other related financial variable. These financial variables may be costs, output, sales revenue, Earnings Before interest and Tax (EBIT), Earning per share (EPS) etc.
There are three commonly measures of leverage in financial analysis. These are:

(i) Operating Leverage
(ii) Financial Leverage
(iii) Combined Leverage

⇒ CONCEPT 6
OPERATING LEVERAGE

Operating leverage (OL) maybe defined as the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all the fixed and variable costs.
The use of assets for which a company pays a fixed cost is called operating leverage.

With fixed costs the percentage change in profits accompanying a change in volume is greater than the percentage change in volume. The higher the turnover operating assets, the greater will be the revenue to the fixed charge on those assets.

Operating leverage is a function of three factors:

(i) Rupee amount of fixed cost,
(ii) Variable contribution margin, and
(iii) Volume of sales.

Operating leverage is the ratio of net operating income before fixed charges to net operating income after fixed charges. Degree of operating leverage is equal to the percentage increase in the net operating income to the percentage increase in the Sales.

$$OL = \left(\frac{Contribution}{EBIT}\right)$$

Where,

OL = Operating leverage
N = Number of units sold
P = Selling price per unit
V = Variable cost per unit
F = Fixed cost

$$\text{Degree of operating leverage} = \frac{\text{Percentage increase in net operating income}}{\text{Percentage increase in sales}}$$

Operating leverage is directly proportion to business risk. More operating leverage leads to more business risk, for then a small sales decline causes a big profit.

⇒ CONCEPT 6

FINANCIAL LEVERAGE

Financial leverage (FL) maybe defined as 'the use of funds with a fixed cost in order to increase earnings per share'. In other words, it is the use of company funds on which it pays a limited return. Financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to common stockholders.

Degree of financial leverage is the ratio of the percentage increase in earning per share (EPS) to the percentage increase in earnings before interest and taxes (EBIT).

$$\text{Degree of financial leverage} = \frac{\text{Percentage increase in Earning per share}}{\text{Percentage increase in earnings before interest and tax (EBIT)}}$$

Or,

$$FL = \frac{EBIT}{EBIT - Interest - \frac{PD}{1-t}}$$

⇒ CONCEPT 7

DEGREE OF COMBINED LEVERAGE

Combined leverage maybe defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the earning per share of the firm.

Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. It indicates the effect the sales changes will have on EPS.

Degree of combined leverage

= Degree of operating leverage x Degree of financial leverage

DCL = DOL x DFL

Where,

DCL = Degree of combined leverage
DOL = Degree of operating leverage
DFL = Degree of financial leverage

$$\text{Degree of combined leverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in sale}}$$

Illustration-1

A firm's details are as under:

Sales @ 100 per unit)	Rs. 24,00,000
Variable Cost	50%
Fixe Cost	Rs. 10,00,000

It has borrowed Rs. 10,00,000 @ 10% p.a. and its equity share capital is Rs. 10,00,000 (Rs. 100 each)

Calculate:

- **a)** Operating Leverage
- **b)** Financial Leverage
- **c)** Combined Leverage
- **d)** Return on Investment
- **e)** If the sales increased by Rs. 6,00,000; what will the new EBIT?

Answer.

	Rs.
Sales	24,00,000
Less: Variable cost	12,00,000
Contribution	12,00,000
Less: Fixed cost	10,00,000
EBIT	2,00,000
Less: Interest	1,00,000
EBT	1,00,000
Less: Tax (50%)	50,000
EAT	50,000
No. of equity share	10,000
EPS	5

(a) Operating Leverage = $\frac{12,00,000}{2,00,000} = \ 6\ times$

(b) Financial Leverage = $\frac{2,00,000}{1,00,000} = \ 2\ times$

(c) Combined Leverage = OL x FL = 6 x 2 = 12 times

(d) R.O.I. = $\frac{50,000}{10,00,000} \times 100 = \ 5\%$

(e) Operating Leverage = 6

$$6 = \frac{\%\ change\ in\ EBIT}{0.25}$$

1.5 = % change in EBIT

Increase in EBIT = Rs. 2,00,000 x 1.5 = Rs. 3,00,000

New EBIT = 5,00,000

Illustration-2

Betatronics Ltd. has the following balance sheet and income statement information:

Balance Sheet as on March 31st

Liabilities	(Rs.)	Assets	(Rs.)
Equity capital (Rs. 10 per share)	8,00,000	Net fixed assets	10,00,000
10% Debt	6,00,000	Current	9,00,000
Retained earnings	3,50,000		
Current liabilities	1,50,000		
	19,00,000		19,00,000

Income Statement for year ending March 31

	(Rs.)
Sales	3,40,000
Operating expenses (including Rs. 60,000 depreciation)	1,20,000
EBIT	2,20,000
Less: Interest	60,000
Earnings before tax	1,60,000
Less: Taxes	56,000
Net Earnings (EAT)	1,04,000

a) Determine the degree of operating, financing and combined leverages at the current sales level, if all operating expenses, other than depreciation, are variable costs.

b) If total assets remain at the same level, but sales (i) increase by 20 percent and (ii) decrease by 20 percent, what will be the earnings per share at the new sales level?

Answer.

(a)

Calculation of Degree of Operating (DOL), Financial (DFL) and Combined leverage (DCL).

$$DOL = \frac{\text{Rs. 3,40,000 - Rs. 60,000}}{\text{Rs. 2,20,000}} = 1.27$$

$$DFL = \frac{\text{Rs. 2,20,000}}{\text{Rs. 1,60,000}} = 1.37$$

$$DCL = DOL \times DFL = 1.27 \times 1.37 = 1.75$$

(b) *Earnings per share at the new sales level*

	Increase by 20% (Rs.)	**Decrease by 20% (Rs.)**
Sales level	4,08,000	2,72,000
Less: Variable expenses	72,000	48,000
Less: Fixed cost	60,000	60,000
Earnings before interest and taxes	2,76,000	1,64,000
Less: Interest	60,000	60,000
Earnings before taxes	2,16,000	1,04,000
Less: Taxes	75,600	36,400
Earnings after taxes (EAT)	1,40,400	67,600
Number of equity shares	80,000	80,000
EPS	1.75	0.84

IIlustration-3

Calculate the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and Financial Plan A and B:

Installed Capacity	4,000 units
Actual Production and Sales	75% of the Capacity

Selling Price	Rs. 30 Per Unit
Variable Cost	Rs. 15 Per Unit

Fixed Cost:

Under Situation I	Rs. 15,000
Under Situation-II	Rs. 20,000

Capital Structure:

	Financial Plan	
	A	**B**
	Rs.	**Rs.**
Equity	10,000	15,000
Debt (Rate of Interest at 20%)	10,000	5,000
	20,000	20,000

Answer.

Operating Leverage:	**Situation-I**	**Situation-II**
	Rs.	**Rs.**
Sales (s)	90,000	90,000
3000 units @ Rs. 30/- per unit		
Less: Variable Cost (VC) @ Rs. 15 per unit	45,000	45,000
Contribution (c)	45,000	45,000
Less: Fixed Cost (FC)	15,000	20,000
Operating Profit (OP)	30,000	25,000
(EBIT)		

(i) Operating Leverage

$$\frac{\text{Contribution}}{OP}\ (1) = \frac{45{,}000}{30{,}000} = 1.5$$

$$\frac{\text{Contribution}}{OP}\ (2) = \frac{45{,}000}{25{,}000} = 1.8$$

(ii) Financial Leverages

	A **(Rs.)**	**B** **(Rs.)**
Situation 1		
Operating Profit (EBIT)	30,000	30,000
Less: Interest on debt	2,000	1,000
PBT	28,000	29,000

$$\text{Financial Leverage} = \frac{\text{OP}}{PBT}\ (1) = \frac{30{,}000}{28{,}000} = 1.07$$

$$\text{Financial Leverage} = \frac{\text{OP}}{PBT}\ (1) = \frac{30{,}000}{29{,}000} = 1.03$$

	A **(Rs.)**	**B** **(Rs.)**
Situation II		
Operating Profit (OP) (EBIT)	25,000	25,000
Less: Interest on debt	2,000	1,000
PBT	23,000	24,000

$$\text{Financial Leverage} = \frac{\text{OP}}{PBT}\ (\text{II}) = \frac{25{,}000}{23{,}000} = 1.09$$

$$\text{Financial Leverage} = \frac{\text{OP}}{\text{PBT}}\ (\text{II}) = \frac{25{,}000}{24{,}000} = 1.04$$

(iii) Combined Leverages

	A (Rs.)	**B** (Rs.)
(a) Situation I	1.5 x 1.07 = 1.6	1.5 x 1.04 = 1.56
(b) Situation II	1.8 X 1.09 = 1.96	1.8 X 1.04 = 1.87

IIlustration 4

The data relating to two Companies are as given below:

	Company A	**Company B**
Equity Capital	Rs. 6,00,000	Rs. 3,50,000
12% Debentures	Rs. 4,00,000	Rs. 6,50,000
Output (units) per annum	60,000	15,000
Selling price/unit	Rs. 30	Rs. 250
Fixed Costs per annum	Rs. 7,00,000	Rs. 14,00,000
Variable cost per unit	Rs. 10	Rs. 75

You are required to calculate the Operating leverage, Financial leverage and Combined leverage of the two companies.

Answer. Computation of Degree of Operating leverage, Financial leverage and Combined leverage of two companies

	Company A	**Company B**
Output units per annum	60,000	15,000
	(Rs.)	(Rs.)
Selling price/unit	30	250
Sales revenue	18,00,000	37,50,000
	(60,000 units x Rs.30)	(15,000 units x Rs. 250)
Less: Variable costs	6,00,000	11,25,000
	(60,0000 x Rs.10)	(15,000 units x Rs.75)
Contribution (c)	12,00,000	26,25,000
Less: Fixed Costs	7,00,000	14,00,000
EBIT	5,00,000	12,25,000
Less: Interest @ 12%	48,000	78,000
On debentures		
PBT	4,52,000	11,47,000

$\text{DOL} = \frac{C}{EBIT}$ $\frac{Rs.12,00,000}{Rs.5,00,000} = 2.4$ $\frac{Rs.26,25,000}{Rs.12,25,000} = 2.14$

$$\text{DFL} = \frac{EBIT}{PBT} \qquad \frac{(Rs.5{,}00{,}000)}{(Rs.4{,}52{,}000)} = 1.11 \qquad \frac{(Rs.12{,}25{,}000)}{(Rs.11{,}47{,}000)} = 1.07$$

IIlustration-5 The net sales of Carlton Limited is Rs. 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises Rs. 10 crores of equity, Rs. 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of Rs. 6 crores. Income-tax rate is 40%.

(i) Calculate the Return-on-equity for the company.
(ii) Calculate the Operating Leverage of the Company given that combined leverage is 3.

Answer: (i) Net Sales : Rs. 30 crores

EBIT Rs. 3.6 crores @ 12% on sales

$$\text{ROI} = \frac{EBIT}{\text{Capital Employed}} \qquad \frac{3.6}{10+2+6} \times 100 = 20\%$$

	Rs. in crores
EBIT	3.6
Interest on Debt	0.9
EBT	2.7
Less: Tax @ 40%	1.08
EBT	1.62
Less: Preference dividend	0.26
Earnings available for Equity Shareholders	1.36

Return on Equity = 1.36/10 x 100 = 13.6%

(ii) *Degree of Operating Leverage*

$$\text{Degree of Financing Leverage} = \frac{EBIT}{\text{EBIT} - \text{Interest} - \dfrac{Preference\ dividend}{1-TR}}$$

$$= \frac{3.6}{3.6 - 0.9 - \frac{0.26}{0.60}} = 1.5880$$

Degree of Combined Leverage = DFL x DOL

3 = 1.5880 x DOL

$$\text{DOL} = \frac{3}{1.5880}$$

Degree of Operating Leverage = 1.8892

CHAPTER 5
CAPITAL STRUCTURE

⇒ **CONCEPT 1**

MEANING OF CAPITAL STRUCTURE

Capital structure means the structure or constitution or break-up of the capital employed by a firm. The capital employed consists of both the owners' capital and the debt capital provided by the lenders. Debt capital is understood here to mean the long term debt which has been deployed to build long term assets. Apart from the elements of equity and debt in the capital structure, a firm could have quasi equity in the form of convertible debt.

The Financing or Capital Structure decision is a significant managerial decision as it influences the shareholder's return and risk. Consequently the market value of the share may be affected by the capital structure decision.

⇒ **CONCEPT 2**

DESIGNING OF CAPITAL STRUCTURE

After planning the capital structure, we are faced with the issue of its design. Design takes off from where the plan ends. Planning establishes the broad parameters of the structure. It is left for the design to fill in the minor details. While designing a capital structure, following points need to be kept in view:

1. ***Design should be functional:*** The design should create synergy with the long term strategy of the firm and should not be dysfunctional. It should facilitate the day to day working of the firm rather than create systematic bottlenecks.

2. ***Design should be flexible:*** The capital structure should be designed to incorporate a reasonable amount of flexibility in order to allow for temporary expansion or contraction of the share of each component.

3. ***Design should be conforming statutory guidelines:*** The design should conform to the statutory guidelines, if any, regarding the proportion and amount of each component. The limits imposed by lenders regarding the minimum level of owners' equity required in the firm should be complied with.

⇒ **CONCEPT 3**

TYPES OF CAPITAL STRUCTURE

Capital Structure of a firm is a reflection of the overall investment and financing strategy of the firm. It shows how much reliance is being placed by the firm on external sources of finance and how much internal accruals are being used to finance expansions etc. Capital structure can be of various kinds as described below:

1. Horizontal Capital Structure

In a Horizontal capital structure, the firm has zero debt components in the structure mix. The structure is quite stable. Expansion of the firm takes in a lateral manner, i.e. through equity or retained earning only. The absence of debt results in the lack of financial leverage. Probability of disturbance of the structure is remote.

2. Vertical Capital Structure

In a vertical capital structure, the base of the structure is formed by a small amount of equity share capital. This base serves as the foundation on which the super structure of preference share capital and debt is built. The incremental addition in the capital structure is almost entirely in the form of debt. Quantum of retained earnings is low and the dividend pay-out ratio is quite high. In such a structure, the cost of equity capital is usually higher than the cost of debt. The high component of debt in the capital structure increases the financial risk of the firm and renders the structure unstable. The firm, because of the relatively lesser component of equity capital, is vulnerable to hostile takeovers.

3. Pyramid shaped Capital structure

A pyramid shaped capital structure has a large proportion consisting of equity capital and retained earnings which have been ploughed back into the firm over a considerably large period of time. The cost of share capital and the retained earnings of the firm is usually lower than the cost of debt. This structure is indicative of risk averse conservative firms.

4. Inverted Pyramid shaped Capital Structure

Such a capital structure has a small component of equity capital, reasonable level of retained earnings but an ever increasing component of debt. All the increases in the capital structure in the recent past have been made through debt only. Chances are that the retained earnings of the firm are shrinking due to accumulating losses. Such a capital structure is highly vulnerable to collapse.

⇒ **CONCEPT 4**

SIGNIFICANCE OF CAPITAL STRUCTURE

Capital structure is significant for a firm because the long term profitability and solvency of the firm is sustained by an optimal capital structure consisting of an appropriate mix of debt and equity. The capital structure also is significant for the overall ranking of the firm in the industry group. The significance of the capital structure is discussed below:

1. It reflects the firm's strategy

The capital structure reflects the overall strategy of the firm. The strategy includes the pace of growth of the firm. In case the firm wants to grow at a faster pace, it would be required to incorporate debt in its capital structure to a greater extent.

2. It is an indicator of the risk profile of the firm

One can get a reasonably accurate broad idea about the risk profile of the firm from its capital structure. If the debt component in the capital structure is predominant, the fixed interest cost of the firm increases thereby increasing its risk. If the firm has no long term debt in its capital structure, it means that either it is risk averse or it has cost of equity capital or cost of retained earnings less than the cost of debt.

3. It acts as a tax management tool

The capital structure acts as a tax management tool also. Since the interest on borrowings is tax deductible, a firm having healthy growth in operating profits would find it worthwhile to incorporate debt in the capital structure in a greater measure.

⇒ **CONCEPT 5**

ATTRIBUTES OF A WELL PLANNED CAPITAL STRUCTURE

A well-planned capital structure should have the following attributes:

1. Long Tenure: The plan should be for a fairly long tenure and should cover the working of at least five to seven years of the project. Expansion of the capacity, addition of product lines etc. should be accounted for in the plan.

2. Consistency: The planned capital structure should be consistent with the overall financing philosophy of the firm. If the firm has a risk averse philosophy, then the plan should have minimum component of debt.

3. Feasibility: The planned capital structure should have feasibility, i.e. it should not be impractical. Feasibility also means that it should be workable within the amount of share capital, debt and retained earnings expected to be available to the firm.

⇒ CONCEPT 6

THE FACTORS WHICH DETERMINE THE FORMATION OF THE CAPITAL STRUCTURE:

1. Minimisation of risk: The capital structure should aim at minimisation of risk of the firm. The term risk here means financial risk. The term excludes the normal financial risk and concentrates on the abnormal financial risk that might arise from a particular capital structure decision. The normal risk has already been factored in the projections while matching with the expected returns. It is the abnormal financial risk which should be minimised.

2. Maximisation of profit: The capital structure is formulated with a view to achieve the goal of maximization of firm's profits. These profits are after tax profits which add to shareholder wealth. Thus if the debt obligations of the firm entail tax breaks, it would be advisable for the firm to enlarge the debt component of the structure.

3. Nature of the project: Formulation of the structure is also determined by the nature of the investment project. If the project is a capital intensive, long gestation project then it should be financed by debt of matching maturity.

4. Control of the firm: This aspect of the firm also plays a part in the determination of the capital structure. Since the key to control of the firm is ownership of the equity capital, the promoters would like to part with only that proportion of equity capital as is necessary for execution of the project. Spreading of equity among the public investors exposes the firm to risk of take over. Hence a capital structure which makes the firm vulnerable in this respect is discouraged.

⇒ CONCEPT 7

OPTIMAL CAPITAL STRUCTURE

By the term optimal capital structure we mean a particular arrangement of various components of the structure which is just in tune with the both the long term and short

term objectives of the firm. A combination less or more than the optimal combination would be less than satisfying.
Hence a sub-optimal combination would affect the achievement of the goal of maximisation of the shareholders' wealth.

But can we plan and design an optimal capital structure? For designing such a structure, one would need the following information:

- The requirement of capital of the firm
- Availability of different components
- Cost of these components
- Rate of return from investment

It has to be further kept in mind that the above information should be exact information. In reality it is not possible to have the exact information on all the above four parameters. Secondly whatever information is available is for a particular period. Thus we have to design the structure in a static set-up which makes the design devoid of all flexibility.

The real world of business, however, is a dynamic world with ever changing demand and supply of various components of the capital structure. Hence we cannot formulate the optimal capital structure in a static framework.

We can, therefore, say that the optimal capital structure is an ideal situation which can function as the benchmark of performance for a firm. But this benchmark is invincible and the firm can expect to achieve moderated or toned down versions of this benchmark depending upon dynamics of each project.

⇒ CONCEPT 8

EBITDA ANALYSIS (EARNINGS BEFORE INTEREST, TAX, DEPRECIATION, AMORTIZATION),

EBITDA, an acronym for "earnings before interest, taxes, depreciation and amortization," is an often-used measure of the value of a business. EBITDA is calculated by taking net income and adding interest, taxes, depreciation and amortization expenses back to it. EBITDA is used to analyze a company's operating profitability before non operating expenses (such as interest and "other" non-core expenses) and non-cash charges (depreciation and amortization).

Analysis with EBITDA

EBIDTA enables analysts to exclude the impacts of non-operating activities and focus on the outcome of operating decisions. Non-operating activities include interest expenses, tax rates, and large non-cash items such as depreciation and amortization.

By removing the non-operating effects, EBITDA gives investors the ability to focus on the profitability of their operations. This type of analysis is particularly important when comparing similar companies across a single industry for example.

Limitations of EBITDA

Factoring out interest, taxes, depreciation and amortization can make even completely unprofitable firms appear to be fiscally healthy. The use of EBITDA as measure of financial health made these firms look attractive.

EBITDA numbers are easy to manipulate. If fraudulent accounting techniques are used to inflate revenues and interest, taxes, depreciation and amortization are factored out of the equation, almost any company may appears to be profitable and great.

Operating cash flow is a better measure of how much cash a company is generating because it adds non-cash charges (depreciation and amortization) back to net income and includes the changes in working capital that also use or provide cash (such as changes in receivables, payables and inventories). These working capital factors are the key to determining how much cash a company is generating.

⇒ **CONCEPT 9**

KEY CONCEPTS FOR DESIGNING OPTIMAL STRUCTURE

The capital structure decisions are so significant in financial management, as they influence debt - equity mix which ultimately affects shareholders return and risk.

Since cost of debt is cheaper, firm prefers to borrow rather than to raise form equity. So long as return on investment is more than the cost of borrowing, extra borrowing increases the earnings per share. However, beyond a limit, it increases the risk and share price may fall because shareholders may assume that their investment is associated with more risk.
For an appropriate debt-equity mix, lets some discuss key concepts:-

LEVERAGES

There are two leverages associated with the study of capital structure, namely operating leverage and financial leverage.

Operating leverage:- Operating leverage exists when a firm has a fixed cost that must be defrayed regardless of volume of business. If can be defined as the firms ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. In simple words, the percentage change in profits accompanying a change in volume is greater than the percentage change in volume.

Operating leverage can also be defined in terms of Degree of Operating Leverage (DOL). When proportionate change in EBIT as of results change in sales is more than the proportionate change in sales, operating leverage exits. The greater the DOL, the higher is the operating leverage.

Therefore DOL exists when Percentage change in EBIT? Percentage change is Sales is > 1

Financial leverage:- Financial leverage involves the use fixed cost of financing and refers to mix of debt and equity in the capitalisation of a firm. Financial leverage is a superstructure built on the operating leverage. It results from the presence of fixed financial charges in the firm's income stream. They are to be paid regardless of the amount of EBIT available to pay them. After paying them, the operating profits (EBIT) belong to the ordinary shareholders.

In simple words, financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders.

Positive Financial Leverage occurs when the firm earns more on the assets purchased with the funds, than the fixed cost of their use. Financial Leverage is also called as "Trading on Equity".

The degree of financing leverage can be found out as:

$$\frac{\text{Percentage change in Earnings per share (EPS)}}{\text{Percentage change in Earnings before interest and tax (EBIT)}}$$

Positive Financial Leverage occurs when the when the result of above is greater than 1.

Operating Leverage vis-à-vis Financial Leverage:- A company having higher operating leverage should be accompanied by a low financial leverage and vice versa, otherwise it will face problems of insolvency and inadequate liquidity. Thus a combination of both the leverage is a challenging task.

However, the determination of optimal level of debt is a formidable task and is a major policy decision. Determination of optimal level of debt involves equalizing between return and risk. EBIT-EPS analysis is a widely used tool to determine level of debt in a firm.

Through this analysis, a comparison can be drawn for various methods of financing by obtaining indifferent point. It is a point to the EBIT level at which EPS remain unchanged irrespective of debt level equity mix. The concepts of leverages and EBIT-EPS analysis would be dealt in detail separately for better understanding.

⇒ CONCEPT 10

EBIT-EPS ANALYSIS

The basic objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the firm's expected range of earnings before interest and taxes (EBIT).

EPS measures a firm's performance for the investors. The level of EBIT varies from year to year and represents the success of a firm's operations. EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm.

The objective of this analysis is to find the EBIT level will equate EPS regardless of the financing plan chosen.

⇒ CONCEPT 11

FINANCING BREAK-EVEN AND INDIFFERENCE ANALYSIS

Financing break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charge i.e. interest and preference dividends. It denotes the level of EBIT for which the firm's EPS equals zero.

If the EBIT is less than the financing breakeven point, then EPS will be negative but if the expected level of EBIT is more than the breakeven point, then more fixed costs financing instruments can be taken in the capital structure, otherwise, equity would be preferred.

EBIT-EPS breakeven analysis is used for determining the appropriate amount of debt a firm might carry.

Another method of considering the impact of various financing alternatives on earnings per share is to prepare the EBIT chart or the range of Earnings Chart. This chart shows the likely EPS at various probable EBIT levels. Thus, under one particular alternative, EPS may be Rs. 2 at a given EBIT level. However, the EPS may go down if another alternative of financing is chosen even though the EBIT remains at the same level. At a given EBIT, earnings per share under various alternatives of financing may be plotted. A straight line representing the EPS at various levels of EBIT under the alternative of may be drawn. Whether this line interests, it is known as break-even point. This point is a useful guide in formulating the capital structure. This is known as EPS equivalency point or indifference point since this shows that, between the two given alternatives of financing (i.e. regardless of leverage in the financial plans), EPS would be the same at the given level of EBIT.

The equivalency or indifference point can also be calculated algebraically in the following manner.

$$\frac{(\text{EBIT} - \text{I}_1)\ (1 - \text{T})}{\text{E}_1} = \frac{(\text{EBIT} - \text{I}_2)\ (1 - \text{T})}{\text{E}_2}$$

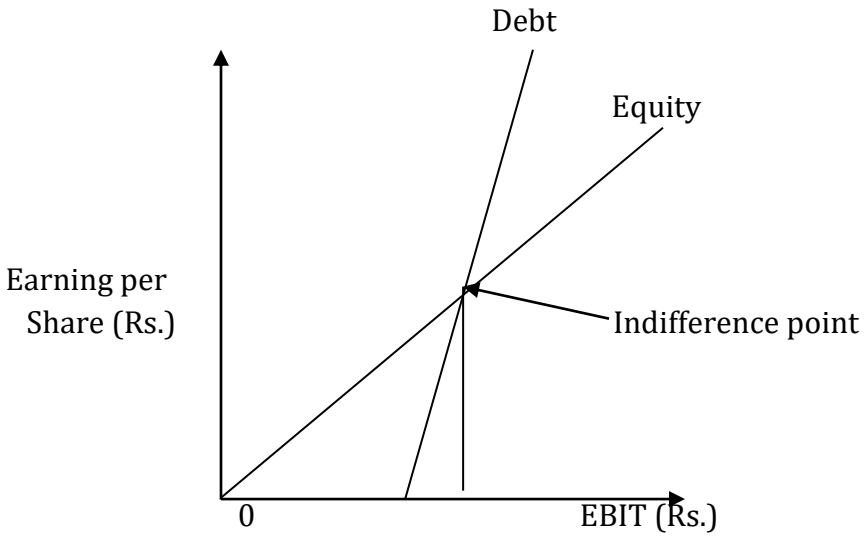
Where,

EBIT = Indifference point
E1 = Number of equity shares in Alternative 1
E2 = Number of equity shares in Alternative 2
I1 = Interest charges in Alternative 1
I2 = Interest charge in Alternative 2
T = Tax-rate

Alternative 1 = All equity finance

Alternative 2 = Debt-equity finance.

The indifference point can also be depicted graphically as:



Debt-Equity Indifference Point

Illustration 1 Best of luck Ltd., a profit making company has a paid-up capital of Rs. 100 lakhs consisting of 10 lakhs ordinary shares of Rs. 10 each. Currently, it is earning an annual pre-tax profit of Rs. 60 lakhs. The company's shares are listed and are quoted in the range of Rs. 50 to Rs. 80. The management wants to diversify production and has approved a project which will cost Rs. 50 lakhs and which is expected to yield a pre-tax income of Rs. 40 lakhs per annum. To raise this additional capital, the following options are under consideration of the management.

a) To issue equity capital for the entire additional amount. It is expected that the new shares (face value of Rs. 10) can be sold at a premium of Rs. 15.

b) To issue 16% non-convertible debentures of Rs. 100 each for the entire amount.

c) To issue equity capital for Rs. 25 lakhs (face value of Rs. 10) and 16% non-convertible debentures for the balance amount. In this case, the company can issue shares at a premium of Rs. 40 each.

You are required to advise the management as to how the additional capital can be raised, keeping in mind that the management wants to maximize the earnings per share to maintain its goodwill. The company is paying income tax at 50%.

Ans.

Calculation of Earnings per share under the three options:

Particulars	**Option I (Issue of equity Only) (Rs. in lakhs)**	**Option II (Issue of debentures only) (Rs in lakhs)**	**Option III (Issue of equity & debentures Equally) (Rs in lakhs)**
Number of equity Shares (Lakhs):			
Existing	10	10	10
Now issued	2	-	0.5
Total	12	10	10.5
16% debentures	Nil	Rs. 50 lakhs	Rs. 25 lakhs
Estimated total income:			
From current operations	60	60	60
From new projects	40	40	40
	100	100	100
Less: Interest on 16% Debentures	-	8	4
Profit before tax	100	92	96
Tax at 50%	50	46	48
Profit after tax	50	46	48
EPS	Rs. 4.17	Rs. 4.60	Rs. 4.57

Advise:
Option II i.e. issue of 16% debentures is most suitable to maximize the earnings per share.

Illustration 2 Shahji Steels Limited requires Rs. 25,00,000 for a new plant. This plant is expected to yield earnings interest and taxes of Rs. 5,00,000. While deciding about the financial plan, the company considers the objective of maximizing earnings per share. It has three alternatives to finance the project - by raising debt of R. 250,000 or Rs. 10,00,000 or Rs. 15,00,000 and the balance, in each case, by issuing equity shares. The company's share is currently selling at Rs. 150, but is expected to decline to Rs. 125 in case the funds are borrowed in excess of Rs. 10,00,000. The funds can be borrowed at the rate of 10 percent upto Rs. 2,50,000, at 15 percent over Rs. 2,50,000 and upto Rs. 10,00,000 and at 20 percent over Rs. 10,00,000. The tax rate applicable to the company is 50 percent. Which form of financing should the company choose?

Ans.

Plan I = Raising debt of Rs. 2.5 lakhs + Equity of Rs. 22.5 lakhs.
Plan II = Raising debt of Rs. 10 lakhs + Equity of Rs. 15 lakhs.
Plan III = Raising debt of Rs. 15 lakhs + Equity of Rs. 10 lakhs.

Earnings per share (EPS) under proposed financial alternatives are:

Particulars	**Financing Alternatives to Raise Rs. 25 Lakhs**		
	PLAN I	**Plan II**	**Plan III**
	(Rs.)	**(Rs.)**	**(Rs.)**
Expected EBIT	5,00,000	5,00,000	5,00,000
Less: Interest (a)	25,000	1,37,500	2,37,500
Earnings before taxes	4,75,000	3,62,500	2,62,500
Less: Taxes	2,37,500	1,81,250	1,31,250
Earnings after taxes (EAT)	2,37,500	1,81,250	1,31,250
Number of shares (b)	15,000	10,000	8,000
Earnings per share (EPS)	15.83	18.13	16.41

Recommendation: Financing Option II (i.e. Raising debt of Rs. 10 lakhs and issue of equity share capital of Rs. 15 lakhs) is the best option as it maximizes earnings per share.

Illustration 3 Venus Limited is setting up a project with a capital outlay of Rs. 60,00,000. It has two alternatives in financing the project cost.

Alternative (I): 100% equity finance
Alternative (II): Debt-equity ratio 2:1

The rate of interest payable on the debts is 18% p.a. The corporate tax rate is 40%. Calculate the indifference point between the two alternative methods of financing.

Ans. Alternatives in Financing and its Financial Charges

a) By issue of 6,00,000 equity shares of Rs. 10 each amounting to Rs. 60 lakhs. No financial charges are involved.

b) By raising the funds in the following way:

Debt = Rs. 40 lakhs

Equity = Rs. 20 lakhs (2,00,000 equity shares of Rs. 10 each)

Interest payable on debt = $\frac{40,00,000}{100} \times 18$

= Rs. 7,20,000

The difference point between the two alternatives is calculated by:

$$\frac{(EBIT - I_1)\ (1 - T)}{E_1} = \frac{(EBIT - I_2)\ (1 - T)}{E_2}$$

Where,

EBIT	= Earning before interest and taxes
I_1	= Interest charges in Alternative (I)
I_2	= Interest charges in Alternative (II)
T	= Tax rate
E1	= Equity shares in Alternative (I)
E2	= Equity shares in Alternative (II)

Putting the value, the break-even point would be as follows:

$$\frac{(EBIT\ -\ 0)(1\ -\ 0.40)}{6,00,000} = \frac{(EBIT\ -\ 7,20,000)(1\ -\ 0.40)}{2,00,000}$$

$$\frac{(EBIT)\ (0.60)}{6,00,000} = \frac{(EBIT\ -\ 7,20,000)(0.60)}{2,00,000}$$

$$\frac{EBIT\ (0.60)}{3} = \frac{0.60\ (EBIT\ -\ 7,20,000)}{1}$$

EBIT = 3EBIT - 21,60,000

-2 EBIT = -21,60,000

$$EBIT = \frac{21,60,000}{2}$$

EBIT = 10,80,000

Therefore, it can be seen that the EBIT at indifference point explains that the earnings per share for the two alternatives is equal.

UNSOLVED QUESTION

TYPE I OPTIMUM CAPITAL STRUCTURE IN CASE OF NEW FIRMS

Que 1. X Ltd. is considering 3 financing plans to raise Rs. 200 Lakhs

Financial Plan	Equity	12% Debt.	9% Pref.
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

→ Face value of equity shares Rs. 10 each.
→ Expected EBIT → 80 Lakhs
→ Corporate tax rate = 40%

Determine

1. **EPS**
2. **Suggest which optimum financing plan.**

Ans.

(i) EPS → A = 2.4, Financial Plan B = 4.2, Financial Plan C = 3.9
(ii) Suggest which optimum financing plan → Plan B is optimum

Que 2. **X Ltd. intends to raise Rs 100 lakhs to finance a project. It has 3 choices.**

Plan	Equity	12% Debt.	14% Pref.
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

Face value of equity share is Rs 10 each, issued at premium of Rs 10, Expected EBIT = 30, Tax rate = 30%

Determine

(i) EPS
(ii) Suggest which is optimum choice.

Ans.

EPS = Plan A = 4.2 **(ii) Plan B is optimum**

Plan B = 6.72

Plan C = 5.60

Que 3. **ASC Ltd. desires to raise Rs. 500 Lakhs to finance a new project and it has 3 choices.**

Plan	Equity	16% Debt.	7% Pref.
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

Tax rate = 50%

Expected EBIT = Rs. 100 Lakhs

Face value of equity hare = Rs. 50

Find out EPS and suggest which is optimal plan.

TYPE II OPTIMUM CAPITAL STRUCTURE IN CASE OF EXISTING FIRMS

Que 4. **2002 - Dec [3]** (b) Govinda Entertainers Ltd. has 10,00,000 shares of Rs. 10 each with market price of Rs. 50 per share. It has also issued bonds for Rs. 4 crore @ 12% per annum. It is considering an expansion plan and needs to mobiles Rs. 5 crore.

The alternatives being considered are-

(i) Issue equity at Rs. 40 per share.
(ii) Issue straight bonds at 10% per annum.
(iii) Issue preference shares @ 12% per annum.
(iv) Finance 50% with equity at Rs. 40 per share and 50% with bonds @ 10% per annum.

The company is in tax bracket of 35%. If the company is hopeful of generation an EBIT of Rs. 2.50 crore after expansion, which method of financing is the best form shareholders' view point? What more information is required if the market price of equity shares is the criterion for decision making?

EPS : Option I = 5.835 Option II = 9.88
Option III = 7.13 Option IV = 7.08

Que 5 **2004 - June [2]** (a) The capital structure of Asha Ltd. is as under:

	Rs.
Equity shares of Rs. 100 each.	40,00,000
Retained earnings	20,00,000
8% Preference shares	24,00,000
7% Debentures	16,00,000
	1,00,00,000

The company earns 12% on its capital.

The tax rate applicable is 35%. The company required a sum of Rs. 50,00,000 for which following options are available to it:

(i) Issue of 40,000 equity shares at a premium of Rs. 25 per share.
(ii) Issue of 9% preference shares
(iii) Issue of 8% debentures

(iv) It is estimated that the P/E ratio in the cases of equity share, preference share and debenture financing would be 22.5, 18.5 and 15.2 respectively. Which of the three financing alternatives would you recommend and why?

Ans. **(254.6,210.53,245.176)**

Que 6. **2004 - Dec [6]** (a) A company's structure consists of the following :

	Rs.
Equity shares of Rs. 100 each	20,00,000
Retained earnings	10,00,000
9% Preference shares	12,00,000
7% Debentures	8,00,000
	50,00,000

The company ears 12% on its employed capital. The tax rate is 50%. The company requires a sum of Rs. 25 lakh to finance its expansion programme for which following alternatives are available to it:

(i) Issue 20,000 equity shares at a premium of Rs. 25 per share, or
(ii) Issue 10% preference shares, or
(iii) Issue 8% debentures.

It is estimated that the price-earnings ratio in case of equity shares, preference shares and debentures financing would be 21.4,17.0 and 15.7 respectively.

You are required to evaluate each proposal and recommend the best alternative.

TYPE III INDIFFERENCE POINT

Que 7. **2009 - Dec [2]** (c) Monark Ltd. is considering two alternative financial plans to start a new project. In Plan-I, it is likely to issue equity shares of Rs. 16 lakh and 13% preference capital of Rs. 4 lakh. In Plan-II, the company will equity shares of Rs. 8 lakh, 13% preference capital of Rs. 4 lakh, and 15% debentures of Rs. 8 lakh. The face value of equity shares in both plans is Rs. 10. Tax rate is 30%.

You are required to determine level of EBIT at which the EPS would be same under both the plan

Ans. **Rs. 314286**

Que 8. X Ltd. is considering to raise Rs 10 lakhs and it has 2 choices.

Choice I 100% from equity (Rs. 100 each)

Choice II 50% from equity & 50% by issuing 9% Debt.

Find indifference point if tax rate = 40%

Ans. Rs. 90,000

Que 9. Super Ltd. is considering 3 financial plans

Financial Plan	Equity	9% Debt.	12% Pref.
A	100%	-	-
B	50%	50%	-
C	50%	-	50%

Total funds to be raised Rs. 200 crore

Tax rate = 35%

Face value of equity share Rs. 10 each, these shares will be issued at a premium of Rs. 10 each

(i) Find indifference point b/w A&B, B&C, A&C

Ans. (i) A & B = 18 Cr (ii) B & C = N.A (iii) A & C = 36.923 Cr

TYPE IV FINANCIAL BREAK-EVEN POINT

Que 10. Given the capital structure of X Ltd. Find out financial Break-even point.

Equity share capital (Rs. 100 E)	→	10 Lakhs
9% Debenture	→	5 Lakhs
11% Preference	→	5 Lakhs
		20 Lakhs

Tax rate = 30%

Que 11. Compute financial Break-Even Point given that capital structure of X Ltd. consist of

Equity share capital (Rs. 100 E)	→	10 Lakhs
9% Debenture	→	10 Lakhs
11% Preference	→	5 Lakhs
		25 Lakhs

Tax rate = 35%

CHAPTER 6
CAPITAL STRUCTURE THEORIES

⇒ **CONCEPT 1**

LEARNING OBJECTIVES

To find relation between capital structure, value of firm and cost of capital

⇒ **CONCEPT 2**

NET INCOME (NI) APPROACH

According to this approach, a firm can increase its value, i.e., it can lower its overall cost of capital by increasing the proportion of debt in the capital structure. A higher debt content in the capital structure will result in decline in overall or weighted average cost of capital. This will cause increase in the value of firm. Reverse will happen in the converse situation.

The value of the firm on the basis of NI Approach can be ascertained as follows:

V = E + D

Where V = Value of Equity
E = Market Value of equity.
D = Market Value of Debt.

Market value of equity can be ascertained as follows:

E = NI / *ke*

Where
E = Market Value of equity
NI = Earnings available for equity shareholders.
ke = Equity Capitalization Rate.

ASSUMPTIONS OF NI APPROACH

1. ***Kd < Ke*** **-** The debt capitalization rate (Kd) is less than the equity capitalization rate (Ke).

2. ***No change in risk*** **-** The use of debt content does not change the risk perception of investors. As a result, both debt capitalization rate (Kd) and equity capitalization rate (Ke) remains constant.

3. ***No Taxes*** **-** There are no corporate taxes.

QUESTION ON NI APPROACH

Type 1 NI Approach

Que 1. The expected EBIT of a firm is **Rs.2,00,000.** It has issued Equity Share capital with ke @ **10%** and **6%** Debt of **Rs.5,00,000.** Find out the value of the firm and the overall cost of capital, WACC.

Ans. V_f = 22L, K_o = 9.09%

Que 2. RST Ltd. belongs to a risk class where the appropriate equity capitalization rate is **20%.** It has annual operating profit of **Rs.12,00,000** and has issued **12.5%** Debentures of **Rs.35,00,000.** Find out the value of the firm and overall capitalization rate. What would be the position if the debt is raised to **Rs.50,00,000**?

Ans. V_f = 73,12500, (ii) 7875000
K_o = 16.41% (ii) 15.24%

Que 3. The expected EBIT of a firm is Rs 2,50000 it has equity capitalization rate of 10% and 6% debt. Find out value of firm and overall cost of capital, (WACC) if amount of Debt is Rs 5 Lakh or Rs 10 Lakh.

Ans. V_f = 27L, (ii) 29L
K_o = 9.26% (ii) K_o = 8.62%

Que 4. ABC Ltd. and PQR Ltd. belong to the risk class where the equity capitalization of **10%** is considered appropriate. ABC Ltd. has raised **Rs.50,00,000** while PQR Ltd. has raised **Rs.70,00,000** by issue of **9%** Debt. Find out the value of these **two** firms applying the NI Approach given that both firms expect an operating profit of **Rs.12,00,000.** Also find out their overall capitalization rate.

ABC Ltd. → Vf = 12500000 K_o = 9.6%
PQR Ltd. → Vf = 12700,000 K_o = 9.45%

⇒ **CONCEPT 3**

NET OPERATING INCOME (NOI) APPROACH

According to this approach the market value of the firm is not at all affected by the capital structure changes. The market value of the firm is ascertained by capitalizing the net operating income at the overall cost of capital (***k***)m which is considered to be constant. The market value of equity is ascertained by deducting the market value of the debt from the market value of the firm.

According to the NOI Approach, the value of a firm

$$V = EBIT / k$$

Where :

V = Value of firm;
K = Overall cost of capital
EBIT = Earnings before interest and tax.

The value of equity (S) is a residual value, which is determined by deducting the total value of debt (B) from the total value of the firm (V). Thus, the value of equity (S) can be determined by the following equation:

$$E = V - D$$

Where :

E = Value of equity;
V = Value of firm;
D = Value of debt.

ASSUMPTIONS OF NOI APPROACH

1. ***Constant Kd*** **-** The debt capitalization rate (Kd) is constant.

2. ***Constant Ko*** **-** The weighted average cost of capital (Ko) is constant for all degree of debt equity mix since business risk on which (Ko) depends is assumed to remain constant.

3. **No Split -** The market capitalizes value of firm as a whole. Thus, the split between debt and equity is not important.

4. ***Neutralisation*** **-** The increase in the proportion of debt in the Capital structure would lead to increase in the financial risk of equity shareholders. The advantage associated

with the use of the relatively less expensive debt in terms of explicit cost is exactly neutralized by the implicit cost of debt represented by the increase in the cost of equity capital.

5. ***No Taxes*** **-** There are no corporate capital.

QUESTION ON NOI APPROACH

Type 2 NOI Approach

Que 5. A firm has an EBIT of **Rs.2,00,000** and belongs to a risk class of **10%.** Find cost of equity capital if it employees **6%** Debt to the extent of **30%, 40% or 50%** of the total capital fund of **Rs.10,00,000**

Ans. Ke = 10.71%, 11% , 11.33%

Que 6. XYZ Ltd. has issued **8%** Debentures of **Rs.3,00,00,000.** It has operating profits of **Rs.50,00,000.** It belongs to a risk class where the appropriate capitalization rate is 10% Applying the Net Operating Income Approach. What would happen if the firm increases the debt to **Rs.4,00,00,000**?

Ans. Ke = 13%, Ke = 18%,

⇒ **CONCEPT 4**

TRADITIONAL APPROACH

The traditional approach is also called an intermediate approach as it takes a midway between NI Approach (that the value of the firm can be increased by increasing financial leverage) and NOI approach (that the value of firm is constant irrespective of the degree of financial leverage). According to this approach the firm should strive to reach the optimal capital structure and its total valuation through a judicious use of the both debt and equity in capital structure. At the optimal capital structure the overall cost of capital will be minimum and the value of the firm is maximum. It further states that the value of the firm increases with financial leverage upto a certain point. Beyond this point the increase in financial leverage will increase its overall cost of capital and hence the value of firm will decline. This is because the benefits of use of debt may be so large that even after off setting the effect of increase in cost of equity, the overall cost of capital may still go down. However, if financial leverage increases beyond a acceptable limit the risk of debt investor may also increase, consequently cost of debt also starts increasing. The increasing cost of

equity owing to increased financial risk and increasing cost of debt makes the overall cost of capital to increase.

QUESTION BASED ON TRADITIONAL

Type 3 Traditional Theory

Que 7. ABC Ltd. having an EBIT of **Rs.1,50,000** is contemplating to redeem a part of the capital by introducing debt financing.

Presently, it is a **100%** equity firm with equity capitalization rate, ke, of **16%.** The firm is to redeem the capital by introducing debt financing upto **Rs.3,00,000** i.e., **30%** of total funds or up to **Rs.5,00,000** i.e., **50%** of total funds. It is expected that for the debt financing up to **30%,** the rate of interest will be **10%** and the ke will increase to **17%.** However, if the firm opts for **50%** debt financing, then interest will be payable at the rate of **12%** and the ke will be **20%.** Find out the value of the firm and its WACC under different levels of debt financing.

Ans.

	Present	**Proposal 1**	**Proposal 1**
EBIT (-) Interest	150000 Nil	150000 30,000	150000 60000
EBIT ÷ k_e	150,000 .16	120,000 .17	90,000 .20
V_E V_D	937500 -	705882 3Lakhs	450000 5 Lakhs
V_F $K_D = \frac{EBIT}{V_f}$	937500 16%	1005882 14.91%	950,000 15.79%

Que 8. The following estimates of the cost of debt and cost of equity capital have been made at various level of the debt-equity mix for ABC Ltd.

% of Debt	**Cost of Debt**	**Cost of Equity**
0	5.0%	12.0%
10	5.0%	12.0%
20	5.0%	12.5%
30	5.5%	13.0%
40	6.0%	14.0%

50	6.5%	16.0%
60	7.0%	20.0%

Assuming no tax, determine the optimal debt equity ratio for the company on the basis of the overall cost of capital, WACC.

Optimal debt equity ratio = **3:7**

Ans.

W_e	W_d	K_d	K_e	W_o
1	0	5	12	12%
.90	.10	5	12	10.8+.5=11.3%
.80	.20	5	12	10+1 = 11%
.70	.30	5.5	13	9.1 + 1.65 =10.75 %
.60	.40	6	14	8.4 + 2.4 = 10.8%
.50	.50	6.5	16	8+3.25 = 11.25%
.40	.60	7.0	20.	8+4.2 = 12.2

Que 9. XYZ Manufacturing Co., has a total capitalization of **Rs.10,00,000** and normally earns **Rs.1,00,000** (before interest and taxes). The financial manager of the firm wants to take a decision regarding the capital structure. After a study of the capital market, he gathers the following data:

Amount of Debt	**Interest Rate**	***Ke %***
0	-	10.00
1,00,000	4.0	10.50
2,00,000	4.0	11.00
3,00,000	4.5	11.60
4,00,000	5.0	12.40
5,00,000	5.5	13.50
6,00,000	6.0	16.50
7,00,000	8.0	20.00

What amount of debt should be employed by the firm if the Traditional Approach is held valid? Assume that corporate taxes do not exist, and that the firm always maintains its capital structure at book values.

Optimal debt equity Ratio= 4:6

Ans.

W_d	W_e	K_d	K_e	W_o
0	1	-	10	10%
.10	.90	4	10.50	.4+9.45 = 9.85
.20	.80	4	11	.8+8.8=9.60
.30	.70	4.5	11.60	1.35+8.12=9.47
.40	.60	5.0	12.40	2+7.44=9.44
.50	.50	5.5	13.50	2.75+6.75=9.5
.60	.40	6.0	16.50	3.6+6.6=10.2
.70	.30	8.0	20.00	5.6+6=11.6

Que 10. A Company's current operating income is **Rs.4 lacs.** The firm has **Rs.10 lacs of 10%** Debt outstanding. Its cost of equity capital is estimated to be **15%.**

(i) Determine the current value of the firm, using Traditional valuation approach.

Ans. V_f = 30L

(ii) Calculate the firm's overall capitalization rate.

Ans. K_o = 13.33%

(iii) The firm is considering increasing its leverage by raising an additional **Rs.5,00,000** debt and using the proceeds to reduce the amount of equity. As a result of increased financial risk, the rate of interest is likely to go up to **12%** and ***ke*** to **18%.** Would you recommend the plan?

Hint for part II

EBIT	400000
(-) Interest	100,000
EBT	300,000
÷ Ke	0.15
Ve	20 Lakh
VD	10 Lakh
Vf	30 Lakh

$$K_o = \left(\frac{4\ Lkah}{30 Lakh} \times 100\right)$$
$$= 13.3\%$$

⇒ **CONCEPT 5**

MODIGLIANI - MILLER APPROACH

The ***Modigliani - Miller*** *(MM)* approach is similar to the Net Operating Income (NOI) approach. However, there is a basic difference between the **two.** The NOI approach is purely definitional or conceptual. It does not provide operational justification for irrelevance of the capital structure in the valuation of the firm. While MM approach supports the NOI approach providing behavioural justification for the independence of the total valuation and the cost of capital of the firm from its capital structure.

The following are the three basic propositions of the MM approach:

1. The overall cost of capital (k) and the value of the firm (V) are independent of the capital structure. In other words k and V are constant for all levels of debt-equity mix. The total market value of the firm is given by capitalizing the expected net operating income (NOI) by the rate appropriate for that risk class.

2. The cost of equity (ke) is equal to capitalization rate of a pure equity stream plus a premium for the financial risk. The financial risk increases with more debt content in the capital structure. As a result, ke increases in a manner to off set exactly the use of a less expensive source of funds represented by debt.

3. The cut-off rate for investment purposes is completely independent of the way in which an investment is financed.

Assumptions

The MM approach is subject to the following assumptions:

1. Capital markets are perfect. This means-

   (a) Investors are free to buy and sell securities;

   (b) The investors can borrow without restriction on the same terms on which the firm can borrow;

   (c) The investors are well informed;

   (d) The investors behave rationally; and

(e) There are no transaction costs.

2. The firms can be classified into homogenous risk classes. All firms within the same class will have the same degree of business risk.

3. All investors have the same expectation of a firm's net operating income (EBIT) with which to evaluate the value of any firm.

4. The dividend pay-out ratio is **100%.** In other words, there are no retained earnings.

Type 4 Modigliani Miller Approach

Que 11. There are 2 firms identical in all respect with only one difference the firm A is levered & that of firm B is unlevered. If EBIT of firm B is Rs 2 Lakh & opportunity cost of equity (Ke) is 10% (Given that firm A contain 9% debt for 10 lakh)

find out Value of firm A & B

(i) If there is no taxes
(ii) If tax rate = 40%

Firm A	**Firm A**
$V_U = \frac{2\ Lakh}{.10} = 20\ Lakh$	$V_U = 20\ Lakh$
$V_U = 20 Lakh + 10\ Lakh\ (.40)$	$V_L = 20\ Lakh$
= 24 Lakh	

Que 12. Two companies, X and Y, belong to the equivalent risk group. The two companies are identical in every respect except that company Y is levered, while X is unlevered. The outstanding amount of debt of the levered company is **Rs.6,00,000** in **10%** Debentures. The information for the two companies is as follows:

	X	**Y**
Net operating income (EBIT)	Rs. 1,50,000	Rs. 1,50,000
-Interest	-	60,000
Earnings to Equity holders	1,50,000	90,000

Equity Capitalization rate, ***ke***	0.15	0.20
Market value of Equity	10,00,000	4,50,000
Market value of Debt	-	6,00,000
Total Value of firm, V,	10,00,000	10,50,000
Overall capitalization rate, ***k0*** = EBIT/V	15.0%	14.3%

An investor owns **5%** equity shares of company Y. show the process and the amount by which he could reduce his outlay through use of the arbitrage process. Is there any limit to the 'process'?

Que 13. **2005 - June [3]** (b) Following is the data relation to Azad Ltd. and Bharat Ltd. belongs to the same risk class :

	Azad Ltd.	**Bharat Ltd.**
No. of equity shares	90,000	1,50,000
Market price per share (Rs.)	15	9
6% Debentures (Rs.)	8,00,000	-
Profit before interest (Rs.)	2,00,000	2,00,000
Divided payout ratio	100%	

Explain how under the MM approach, an investor holding 10% shares in Azad Ltd. will be better off in switching his holding to Bharat Ltd.

CHAPTER 7
DIVIDEND POLICY

⇒ **CONCEPT 1**

SIGNIFICANCE OF DIVIDEND DECISION

The dividend decision is one of the three basic decisions which a financial manager may be required to take, the other two being the investment decisions and the financing decisions. In each period any earning that remains after satisfying obligations to the creditors, the Government, and the preference shareholders can either be retained, or paid out as dividends or bifurcated between retained earnings and as dividends. The retained earnings can then be invested in assets which will help the firm to increase or at least maintain its present rate of growth. The dividend decision requires a financial manager to decide about the distribution of profits as dividends. The profit may be distributed either in the form of cash dividends to shareholders or in the form from of stock dividends (also known as bonus shares). In dividend decision, a financial manager is concerned to decide one or more of the following:

> Should the profits be ploughed back to finance the investment decisions?
> Whether any dividend be paid ? If yes, how much dividends be paid?

All these decisions are inter-related and have bearing on the future growth plans of the firm. If a firm dividends, it affects flow position of the firm but earns goodwill among the investors who therefore, may be willing to provide additional funds for the financing of investment plans of the firm. On the other hand, the profits which are not distributed as dividends become an easily available source of funds at no explicit costs. However, in the case of ploughing back of profits, the firm may lose the goodwill and confidence of the investors and may also defy the standards set by other firms. Therefore, in taking the dividend decision, the financial manager has to consider and analyze various factors. Every aspects of dividend decision is to be critically evaluated. The most important of these considerations is to decide as to what portion of profit should be distributed. This is also known as the dividend payout ratio.

⇒ **CONCEPT 2**

DIVIDEND POLICY AND VALUE OF THE FIRM

Dividend policy is basically concerned with deciding whether to pay dividend in cash now, or to pay increased dividends at a later stage or distribution of profits in the form of bonus shares. The current dividend provides liquidity to the investors but the bonus share will bring capital gains to the shareholders. The investor's preferences between the current cash dividend and the future capital gain have been viewed differently. Some are of the opinion that the future capital gain are more risky than the current dividends while others argue that the investors are indifferent between the current dividend and the future capital gains.

Different models have been proposed to evaluate the dividend policy decision in relation to value of the firm. While agreement is not found among the models as to the precise relationship, it is still worthwhile to examine some of these models to gain insight into the effect which the dividend policy might have on the market price of the share and hence on the wealth of the shareholders. Two schools of thoughts have emerged on the relationship between the dividend policy and value of the firm.

One school associated with Walter, Gordon, etc., holds that the future capital gains (expected to result from lower current dividend payout) are more risky and the investors have preference for current dividends. The investors do have a tilt towards those firms which pay regular dividend. So, the dividend payment affects the market value of share and as a result the dividend policy is relevant for the overall value of the firm. On the other hand, the other school of thought associated with Modigliani and Miler holds that the investors are basically indifferent between current cash dividends and future capital gains.

⇒ **CONCEPT 3**

TYPES OF DIVIDEND POLICY

There are basically 4 types of dividend policy. Let us discuss them on by one:

(1) Regular dividend policy: in this type of dividend policy the investors get dividend at usual rate. Here the investors are generally retired persons or weaker section of the society who want to get regular income. This type of dividend payment can be maintained only if the company has regular earning.

Merits of Regular Dividend Policy:

- It helps in creating confidence among the shareholders.
- It stabilizes the market value of shares.
- It helps in marinating the goodwill of the company.
- It helps in giving regular income to the shareholders.

(**2) Stable dividend policy:** here the payment of certain sum of money is regularly paid to the shareholders. It is of three types:

- **Constant dividend per share:** here reserve fund is created to pay fixed amount of dividend in the year when the earning of the company is not enough. It is suitable for the firms having stable earning.

- **Constant payout ratio:** it means the payment of fixed percentage of earning as dividend every year.

- **Stable rupee dividend + extra dividend:** it means the payment of low dividend per share constantly + extra dividend in the year when the company earns high profit.

Merits of stable dividend policy:

- It helps in creating confidence among the shareholders.
- It stabilizes the market value of shares.
- It helps in marinating the goodwill of the company.
- It helps in giving regular income to the shareholders.

(3) Irregular dividend: as the name suggests here the company does not pay regular dividend to the shareholders.

The company uses this practice due to following reasons:

- Due to uncertain earning of the company.
- Due to lack of liquid resources.
- The company sometime afraid of giving regular dividend.
- Due to not so much successful business.

(**4) No dividend:** the company may use this type of dividend policy due to requirement of funds for the growth of the company or for the working capital requirement.

⇒ **CONCEPT 4**

DETERMINANTS/CONSTRAINTS OF DIVIDEND POLICY

In the company organisation, dividend policy is determined by the Board of directors having taken into consideration a number of factors which include legal restrictions imposed by the Government to safeguard the interests of various parties or the constituents of the company.

The main considerations are as follows:

1) **Legal:** As regards cash dividend policy several legal constraints bear upon it – a firm may not pay a dividend which will impair capital. Dividend must be paid out of firm's earnings/current earnings. Contract/ Agreements for bonds/loans may restrict dividend payments. The purpose of legal restriction is to ensure that the payment of dividend may not cause insolvency.

2) **Financial:** There are financial constraints to Dividend Policy. A firm can pay dividend only to the extent that it has cash to disburse; a firm can't pay dividend when its earnings are in accounts receivables or firm does not have adequate liquidity.

3) **Economic Constraints:** Besides, there are economic constraints also. The question arise, does the value of dividend affects the value of the firm. If the answer to it is yes then there must be some optimum level of dividend, which maximises the market price of the firm's stock.

4) **Nature of Business Conducted by a Company:** A company having a business of the nature which gives regular earnings may like to have a stable and consistent dividend policy. Industries manufacturing consumer/consumer durable items have a stable dividend policy.

5) **Existence of the Company:** The length of existence of the company affects dividend policy. With their long standing experience, the company may have a better dividend policy than the new companies.

6) **Type of Company Organisation:** The type of company organisation whether a private limited company or a public limited company affects dividend decisions. In a closely held company, a view may be taken for acquiescence and conservative policy may be followed but for a public limited company with wide spread of shareholder, a more progressive and promising dividend policy will be the better decision.

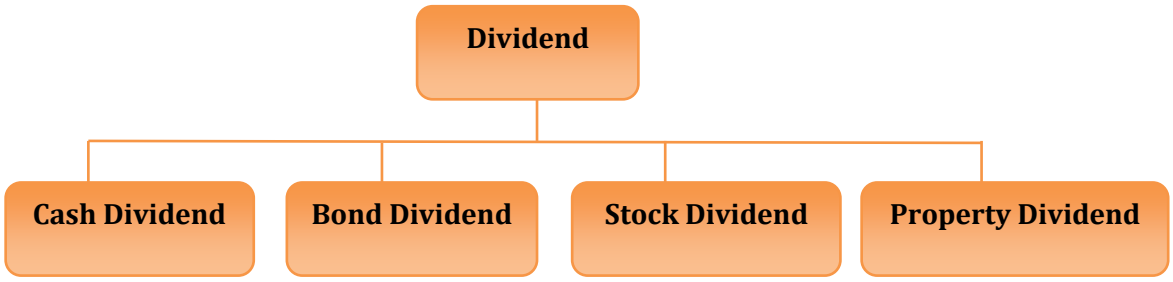
7) **Market Conditions:** Business cycles, boom and depression, affects dividend decisions. In a depressed market, higher dividend declarations are used to market securities for creating a better image of the company. During the boom the company may like to save more, create reserves for growth and expansion or meeting its working capital requirements.

8) **Financial Arrangement:** In case of financial arrangements being entered into or being planned like merger or amalgamation with another company, liberal policy of dividend distribution is followed to make the share stock more attractive.

⇒ **CONCEPT 5**

TYPES OF DIVIDEND/FORM OF DIVIDENDS

Dividend may be distributed among the shareholders in the form of cash or stock. Hence, Dividends are classified into:



(1) Cash Dividend

If the dividend is paid in the form of cash to the shareholders, it is called cash dividend. It is paid periodically out the business concerns EAIT (Earnings after interest and tax). Cash dividends are common and popular types followed by majority of the business concerns.

(2) Stock Dividend

Stock dividend is paid in the form of the company stock due to raising of more finance. Under this type, cash is retained by the business concern. Stock dividend may be bonus issue. This issue is given only to the existing shareholders of the business concern.

(3) Bond Dividend

Bond dividend is also known as script dividend. If the company does not have sufficient funds to pay cash dividend, the company promises to pay the shareholder at a future specific date with the help of issue of bond or notes.

(4) Property Dividend

Property dividends are paid in the form of some assets other than cash. It will distribute under the exceptional circumstance. This type of dividend is not published in India.

⇒ **CONCEPT 6**

WALTER'S MODEL

Walter J.E. supports the view that the dividend policy has a bearing on the market price of the share and has presented a model to explain the relevance of dividend policy for valuation of the firm based on the following assumptions:

(i) All investment proposals of firm are to be financed through retained earnings only and no external finance is available to the firm.

(ii) The business-risk complexion of the firm remains same even after investment decisions are taken. In other words, the rate of return on investment i.e., 'r' and the cost of capital of the firm i.e., k_e, are constant.

(iii) The firm has an infinite life.

This model considers that the investment decision and dividend decision of a firm are inter-related. A firm should or should not pay dividends depend upon whether it has got the suitable investment opportunities to invest the retained earnings or not. A firm pays dividends to shareholders, they in turn, will invest this income to get future returns. This expected return to shareholders is the opportunity cost of the firm and hence the cost of capital, k_e, to the firm. On the other hand, if the firm does not pay dividends, and instead retains, then these retained earnings will be reinvested by the firm to get return on these in investment. This rate of return on the investment, r, of the firm must be at least equal to the cost of investment, r, of the firm must be at least equal to the cost of capital, k_e. If $r = k_e$, the firm is earning a return just equal to what the shareholders could have earned, had the dividends been paid to them.

However, what happen if the rate of return, r, is more than the cost of capital, k_e ? In such a case, the firm can earn more by retaining the profits, than the shareholders can earn by investing their dividend income. The Walter's model, thus, says that if $r > k_e$, the firm should

refrain from dividends and should reinvest the retained earnings and thereby increase the wealth of the shareholders. However, if the investment opportunity before the firm to reinvest the retain earnings are expected to give a rate of return which is less than the opportunity cost of the shareholders of the firms, then the firm should better distribute the entire profits. This will give opportunity to the shareholders to reinvest this dividend income and get higher returns.

According to Walter a firm can maximize the market value of its share and the value the firm by adopting dividend policy as follows:

(i) If r > k_e, the payout ratio should be zero (i.e., retention of 100% profit).
(ii) If r < k_e, the payout ratio be 100% and the firm should not retain any profit, and
(iii) If r = k_e, the dividend is irrelevant and the dividend policy is not expected to affect the market value of the share.

In order to testify the above, Walter has suggested a mathematical model i.e.,

$$P_0 = \frac{D}{k_e} + \left(\frac{\frac{r}{k_e}(E - D)}{k_e} \right)$$

Where,

P = Market price of Equity share.
D = Dividend per share paid by the Firm.
r = Rate of return on Investment of the Firm.
K_e = Cost of Equity share capital, and
E = Earnings per share of the Firm.

As per the above formula, the market price of a share is the sum of two components i.e.,
(i) The present value of an infinite stream of dividends, and
(ii) The present value of an infinite stream of return from retained earnings.

Thus, the Walter's formula shows that the market value of a share is the present value of the expect stream of dividends and capital gains.

TYPE 1 QUESTION BASED ON WALTER'S MODEL

Que 1. ABC Ltd. was started a year back with a paid-up equity capital of Rs.40,00,000. The other details are as under:

Earnings of the company	Rs.4,00,000

Dividend paid	Rs.3,20,000
Price-earnings ratio	12.5
Number of shares	40,000

You are required to find out whether the company's dividend payout ratio is optimal, using Walter's formula.

Hint:-

$$Earning\ per\ share\ (E) = \frac{Total\ earnings\ of\ firm}{Number\ of\ shares}$$

$$Dividend\ per\ share\ (D) = \frac{Amount\ of\ Dividend\ paid}{Number\ of\ shares}$$

$$Internal\ rate\ of\ return\ on\ investment\ (r) = \frac{Total\ earnings\ of\ the\ firm}{Total\ equity\ capital\ of\ firm}$$

Ans. Present + P_0 = 131.25 & optimum P_0 = 156.25

Que 2. **(a)** The EPS of a company is Rs.16. The market capitalization rate applicable to the company is 12.5%. Retained earnings can be employed to yield a return of 10%. The company is considering a payout of 25%, 50% and 75%. Which of these, if any, would maximize the wealth of shareholders as per the Walter's Model?

Ans. At 25% D/p ratio Rs.108.80; At 50% D/P ratio Rs.115.20; At 75% D/P ratio Rs.121.60;

Que 3. The earnings per share (EPS) of a company is Rs.10. It has an internal rate of return of 15% and the capitalization rate of its risk class is 12.5%. If Walter's Model is used-

(i) What should be the optimum payout ratio of the company?
(ii) What would be the price of the share at this payout?
(iii) How shall the price of the share be affected, if a payout ratio is 100%

Ans.

(i) Po = 0%
(ii) Po = 96
(iii) Po = Rs. 80

Que 4. From the following information, ascertain whether the firm is following an optional dividend policy as per Walter's Model:

Total earnings (Rs.)	600,000
Number of equity shares of Rs.100 each	40,000
Dividend paid (Rs.)	1,60,000
Prices-Earnings (P/E) ratio	10

The firm is expected to maintain its rate of return on fresh investment. Will your decision change if the P/E ratio is 5 instead of 10?

Ans. Market price can be increased by following a zero payout. Under the situation, when P/E is 5, the optimum dividend policy for the company would be to payout 100% dividend at which the value of the firm will be maximum.

Que 5. A closely-held toys manufacturing company has been following a dividend policy, which can maximize the market value of the company as per Walter's Model. Accordingly, each year at dividend time, the capital budget is reviewed in conjunction with the earnings for the period and alternative investment opportunities for the shareholders. In the current year, the company reports net profits of Rs.10,00,000. It is estimated that the company can earn Rs.2,50,000 if such profits are retained. The investors have alternative investment opportunities that will yield them 12%. The company has 1,00,000 shares outstanding. What would be the dividend payout ratio of the company, if it wishes to maximize the wealth of the shareholders?

Ans. DP ratio of the company should be Zero. Price = Rs.173.58.

⇒ **CONCEPT 7**

GORDON'S MODEL

Myron Gordon has also proposed a model suggesting that the dividend policy is relevant and can affect the value of the share and that of the firm. This model is also based on the assumptions similar to that made in Walter's model. However, two additional assumptions made by this model are as follows:

(i) The growth rate of the firm 'g', is the product of its retention ratio, b, and its rate of return, r, i.e., g = br, and

(ii) The cost of capital besides being constant is more than the growth rate i.e., >g.

Gordon argues that the investor do have a preference for current dividends and there is a direct relationship between the dividend policy and the market value of the share. He has built the model on the basic premise that the investors are basically risk averse and they evaluate the future dividends/capital gains as a risky and uncertain proposition. Dividends are more predictable than capital gains; management can control dividends but it cannot dictate the market price of the share. Investors are certain of receiving incomes from dividends than from future capital gains. The incremental risk associated with capital gains implies a higher required rate of return for discounting the capital gains than for discounting the current dividends. In other words, an investor values, current dividends more highly than an expected future capital gains.

Thus, Gordon's model is a share valuation model (like that of Walter's). Under this model, the market price of a share can be calculated as follows:

$$P - \frac{E(I - b)}{Ke - br}$$

Where, P = Market price of Equity share.
E = Earnings per share of the Firm.
b = Retention Ratio (1 - Payout ratio).
r = Rate of return on Investment of the Firm.
Ke = Cost of Equity share capital, and
br = g. i.e., Growth rate of the firm.

This model shows that there is a relationship between payout ratio (i.e., 1 -b), cost of capital ke, rate of return, r, and the market value of the share.

Que 6. **2002 - June [4]** (b) The MNC Ltd.'s available information is:
Ke = 15%
E = Rs. 30
R = (i) 14%; (ii) 15% and (iii) 16%.

Your are required to calculate market price of a share of the MNC Ltd. as per Gordon Model it-

(i) b = 40%;
(ii) b = 60%; and
(iii) b=80%.

Que 7. Find out value of share according to Gorden's Model from given information

EPS	=10
Payout ratio	=40%
Rate of return on invest	=10%
Opportunity cost of equity	=12%

Ans. P_0 = 66.66

⇒ **CONCEPT 8**

DIVIDEND AND UNCERTAINTY: THE BIRD-IN-HAND ARGUMENT

Gordon revised this basic model later to consider risk and uncertainty. Gordon's model, like Walter's model, contends that dividend policy is relevant. According to Walter, dividend policy will not affect the price of the share when r = k. But Gordon goes one step ahead and argues that dividend policy affects the value of shares even when r = k. The crux of Gordon's argument is based on the following two assumptions :

1. Investors are risk averse and
2. They put a premium on a certain return and discount (penalise) uncertain return.

The investors are rational. Accordingly they want to avoid risk. The term risk refers to the possibility of not getting the return on investment. The payment of dividends now completely removes any chance of risk. But if the firm retains the earnings the investors can expect to get a dividend in the future. But the future dividend is uncertain both with respect to the amount as well as the timing. The rational investors, therefore prefer current or near dividend to future dividend. Retained earnings are considered as risky by the investors. In case earnings are retained, therefore the price per share would be adversely affected. This behaviour of investor is described as "Bird in Hand Argument". A bird in hand is worth two in bush. What is available today is more important than what may be available in the future. So the rational investors are willing to pay a higher price for shares on which more current dividends are paid, all other things held constant. Therefore the discount rate (K) increases

with retention rate. Thus, distant dividends would be discounted at a higher rate than the near dividends.

⇒ **CONCEPT 9**

IRRELEVANCE OF DIVIDEND POLICY

Residuals Theory of Dividends

This theory is based on the assumption on that either the external financing is not available to the firm or if available, cannot be used due to its excessive costs for financing the profitable investment opportunities of the firm. Therefore, the firm finances its investment decisions by retaining profits. The quantum of profits to be distributed is a balancing opportunities. If a firm has sufficient profitable investment opportunities, then the wealth of the shareholders will be maximized by retaining profits and reinvesting them in the financing of investment opportunities, then the profits may be distributed among the shareholders.

Thus, a firm does not decide as to how much dividends be paid rather it decides as to how much profits should be retained. The profits not required to be retained may be distributed as dividends. Therefore, dividend decision is a passive decision. The dividends are a distribution of residual profits after retaining sufficient profits for financing the available opportunities. Under the Residents **Theory, the firm would treat the dividend decision in three steps:**

(i) Determining the level of capital expenditures which is determined by the investment opportunities.

(ii) Using the optimal financing mix, find out the amount of equity financing mix, find out the amount of equity financing needed to support the capital expenditure in step (i) above,

(iii) As the cost of retained, kr' is less than the cost of new equity capital, the retained earnings would be used to meet the equity portions financing in step (ii) above. If the available profits are more than the this need, then the surplus may be distributed as dividends to shareholders. As far as the required equity financing is in excess of the amount of profits available, no dividends would be paid to the shareholders.

In the Residuals Theory, the dividends policy is influenced by (i) the company's investment opportunities, and (ii) the availability of internally generated funds, where dividends are paid only after all acceptable investment proposals have been financed. The dividend policy

is totally passive in nature and has no direct influence on the market price of the share. So, the Residuals Theory treats the dividend as a passive decision determined by the dividends availability of profitable investments. Consequently, the dividends may fluctuate from one year to an other depending upon the investment opportunity. But the shareholders do not compensated for reduction in dividends or no dividends at all by future capital gains. The market price of the share is still taken as the present value of all future dividends and the pattern of these dividends does not matter.

⇒ **CONCEPT 10**

MODIGLIANI AND MILLER APPROACH

The irrelevance of dividend policy for valuation of the firm has been most comprehensively presented by Modigliani and Miller (MM). They have argued that the market price of a share is affected by the earnings of the firm and is not influenced by the pattern of income distribution. The dividend policy is immaterial and is of no consequence to the value of the firm. What matters, on the other hand, it the investment decisions which determine the earnings of the firm and thus affect the value of the firm. They argue that subject to a number of assumptions, the way a firm splits its earnings between dividends and retained earnings has no effect on the value of the firm.

Assumption of the MM Approach(important)

The MM approach to irrelevance of dividend is based on the following assumption:

(i) The capital markets are perfect and the investors behave rationally.
(ii) All information are freely available to all the investors.
(iii) There is no transaction cost and no time lag.
(iv) Securities are divisible and can be split into any fraction.
(v) There are no taxes and no flotation cost.
(vi) The firm has a defined investment policy and the future profits are known with certainly. The implication is that the investment decisions are unaffected by the dividend decision and operating cash flows are same no matter which dividend policy is adopted.

$$P_o - \frac{1 \times (D1 + P1)}{(1 + Ke)}$$

Where, P_0 = Present market price of the share
K_e = Cost of equity share capital
D_1 = Expected dividend at the end of year 1
P_1 = Expected market price of the share at the End of year 1

Que 8. D Ltd. has 10 lakhs equity shares outstanding at the beginning of the accounting year 1997. The current market price of the shares is Rs.150 each. The Board of directors of the company has recommended Rs.8 per share as dividend. The rate of capitalization, appropriate to the risk-class to which the company belongs, is 12%.

(i) Based on M-M Approach, calculate the market price of the share of the company when the recommended dividend is (a) declared; and (b) not declared.

(ii) How many new shares are to be issued by the company at the end of the accounting year on the assumption that the net income for the year is Rs.2 crores and the investment budget is Rs.4 crores when (a) the above dividends are distributed; and (b) dividends are not declared.

(iii) Show that the market value of the shares at the end of accounting year will remain the same whether dividends are distributed or not declared.

Ans. (i) (a) Rs.160, (b) Rs.168; (ii) (a) 1.75 lakhs, (b) 1.1905 lakhs.

Que 9. HPA Ltd. has a capital of Rs.10,00,000 in equity shares of Rs.100 each. The shares are currently quoted at par. The company proposes declaration of a dividend of Rs.10 per share. The capitalization rate for the risk class to which the company belongs is 12%. What will be the market price of the share at the end of the year, if- (i) no dividend is declared; and (ii) 10% dividend is declared?

Assuming that the company pays the dividend and has net profits of Rs.5,00,000 and makes new investments of Rs.10,00,000 during the period, how many new shares must be issued? Use the M.M. Model.

Ans. Market price (i) when dividend s not declared Rs.112, (ii) when dividend is declared Rs.102; Total number of new shares to be issued 5,882 shares.

Que 10. Costal Chemicals Ltd. Belongs to a risk class of which the appropriate capitalization rate is 10%. It currently has 1,00,000 shares selling at Rs 100 each. The firm is contemplating declaration of a dividend of Rs 6 per share at the end of the current fiscal year which has begun.

Answer the following question based on Modigliani and Miller Model and assumption of no taxes;

(i) What will be the price of the shares at the end of the year if a dividend is not declared?

(ii) What will be the price if dividend is declared?

(iii) Assuming that the firm pays dividend, has net income of Rs 10 lakhs and makes new investments of Rs 20 lakhs during the period, how many new shares must be issued?

Calculation market Price of share under MM- Dividend Irrelevancy Model

Que 11. Best buy Auto Ltd. has outstanding 1,20,000 shares selling at Rs.20 per share. The company hopes to make a net income of Rs.3,50,000 during the year ended 31st March, 2003. The company is considering to pay a dividend of Rs.2 per share at the end of current year. The capitalization rate for risk class of this company has been estimated to be 15%.

Assuming no taxes, answer the questions listed below on the basis of the Modigliani Miller Dividend Valuation Model:

(i) What will be the price of a share at the end of 31st March, 2003-
- If the dividend is paid; and
- If the dividend is not paid?

(ii) How many new shares must the company issue if the dividend is paid and company needs Rs.7,40,000 for an approved investment expenditure during the year?

Ans.

(i) P1= 21; p1 = 23

(ii) 30,000

Que 12. Nishi Ltd. had 1,00,000 equity shares of Rs.10 each outstanding on 1st January,2007. The shares are currently being quoted at par in the market. In the wake of the removal of the dividend restraint, the company now intends to pay a dividend of Rs.2 per share for the current financial year. It belongs to

a risk class whose appropriate capitalization rate is 15%. Using Modigliani-Miller Model and assuming no taxes, ascertain the price of the company's shares as it is likely to prevail at the end of the year-

(i) When dividend is declared; and
(ii) When no dividend is declared.

Also find out the number of new equity shares that company must issue to meet its investment needs of Rs.4 lakh assuming that the dividend is paid and the earnings per share works out @ Rs.2.20.

Ans. (i) P1 = Rs.11.5- Rs.2 = Rs.9.5; (ii) P1 = Rs.11.50; (iii) No. of Equity Shares = 40,000 [3,80,000 / 9.5].

Que 13. Leena Chemicals Ltd. has outstanding 1,20,000 shares selling at Rs.20 per share. The company hopes to make a net income of Rs.3,50,000 during the year ending 31st March, 2009. The company is thinking of paying a dividend of Rs.2 per share at the end of current year. The capitalization rate for risk class of this firm has been estimated to be 15%. Assuming no taxes, answer the questions listed below on the basis of the Modigliani Miller dividend valuation model:

(i) What will be the price of share at the end of 31st March, 2009, if- (a) the dividend is paid; and (b) the dividend is not paid?

(ii) How many new shares the company must issue if the dividend is paid and company needs Rs.9,50,000 for an approved investment expenditure during the year?

Ans. (a) P_1 = 21 (b) P_1 = 23, (ii) (a) 40000

CHAPTER 8
CAPITAL BUDGETING

- **CAPITAL BUDGETING – A CONCEPT**
- **IMPORTANCE OF CAPITAL BUDGETING**
- **RATIONALE OF CAPITAL BUDGETING DECISIONS**
- **KINDS OF CAPITAL BUDGETING DECESIONS**

⇒ **CONCEPT 1**

CAPITAL BUDGETING

Capital budgeting refers to long-term planning for proposed capital outlays and their financing. Thus, it includes both raising of long-term funds as well as their utilisation. It may, thus, be defined as the "firm's formal process for acquisition and investment of capital." To be more precise, capital budgeting decision may be defined as "the firms' decision to invest its current fund more efficiently in long-term activities in anticipation of an expected flow of future benefit over a series of years." The long-term activities are those activities which affect firms operation beyond the one year period. The basic feature of capital budgeting decisions are:

(1) current funds are exchanged for future benefits;

(2) there is an investment in long-term activities; and

(3) the future benefits will occur to the firm over series of years.

⇒ **CONCEPT 2**

IMPORTANCE OF CAPITAL BUDGETING

Capital budgeting decisions are of paramount importance in financial decision. So it needs special care on account of the following reasons:

(1) ***Long-term Implications****:* A Capital budgeting decision has its effect over a long time span and inevitably affects the company's future cost structure and growth. A wrong decision can prove disastrous for the long-term survival of firm. It leads unwanted expansion of assets, which results in heavy operating cost to the firm. On the other hand, lack of

investment in asset would influence the competitive position of the firm. So the capital budgeting decisions determine the future destiny of the company.

(2) ***Involvement of large amount of funds****:* Capital budgeting decisions need substantial amount of capital outlay. This underlines the need for thoughtful, wise and correct decisions as an incorrect decision would not only result in losses but also prevent the firm from earning profit from other investments which could not be undertaken.

(3) ***Irreversible decisions:*** Capital budgeting decisions in most of the cases are irreversible because it is difficult to find a market for such assets. The only way out will be to scrap the capital assets so acquired and incur heavy losses.

(4) Risk and uncertainty: Capital budgeting decision is surrounded by great number of uncertainties. Investment is present and investment is future. The future is uncertain and full of risks. Longer the period of project, greater may be the risk and uncertainty. The estimates about cost, revenues and profits may not come true.

(5) Difficult to make*:* Capital budgeting decision making is a difficult and complicated exercise for the management. These decisions require an overall assessment of future events which are uncertain. It is really a marathon job to estimate the future benefits and cost correctly in quantitative terms subject to the uncertainties caused by economic-political social and technological factors.

⇒ **CONCEPT 3**

RATIONALE OF CAPITAL BUDGETING DECISIONS

The rationale behind the capital budgeting decisions is efficiency. A firm has to continuously invest in new plant or machinery for expansion of its operations or replace worn out machinery for maintaining and improving efficiency. The 4 main objective of the firm is to maximize profit either by way of increased revenue or by cost reduction. Broadly, there are two types of capital budgeting decisions which expand revenue or reduce cost.

1) ***Investment decisions affecting revenue****:* It includes all those investment decisions which are expected to bring an additional revenue by raising the size of firm's total revenue. It is possible either by expansion of present operations or the development of new product in line. In both the cases fixed assets are required.

2) ***Investment decisions reducing costs****:* It includes all those decisions of the firms which reduces the total costs and leads to increase in its total earnings i.e. when an asset is worn out or becomes outdated, the firm has to decide whether to continue with it or replace it by new machine. For this, the firm evaluates the benefit in the form of reduction in operating costs and outlays that would be needed to replace old machine by new one. A firm will replace an asset only when it finds it beneficial to do so. The above decision could be followed decisions following alternative courses: i.e. Tactical investment decisions to strategic investment decisions, as briefly defined below.

3) ***Tactical investment decisions****:* It includes those investment decisions which generally involves a relatively small amount of funds and does not constitute a major departure from what the firm has been doing in the past.

4) ***Strategic investment decisions****:* Such decisions involve large sum of money and envisage major departure from what the company has been doing in the past. Acceptance of strategic investment will involve significant change in the company's expected profits and the risk to which these profits will be subject. These changes are Hkely to lead stock-holders and creditors to revise their evaluation of the company.

⇒ **CONCEPT 4**

KINDS OF CAPITAL BUDGETING DECISIONS

Generally the business firms are confronted with three types of capital budgeting decisions (i) the accept-reject decisions; (ii) mutually exclusive decisions; and (iii) capital rationing decisions.

Accept-reject decisions*:* Business firm is confronted with alternative investment proposals. If the proposal is accepted, the firm incur the investment and not otherwise. Broadly, all those investment proposals which yield a rate of return greater than cost of capital are accepted and the others are rejected. Under this criterion, all the independent prospects are accepted.

Mutually exclusive decisions*:* It includes all those projects which compete with each other in a way that acceptance of one precludes the acceptance of other or others. Thus, some technique has to be used for selecting the best among all and eliminates other alternatives.

***Capital rationing decisions**:* Capital budgeting decision is a simple process in those firms where fund is not the constraint, but in majority of the cases, firms have fixed capital budget. So large number of projects compete for these limited budget. So the firm ration them in a manner so as to maximise the long run returns. Thus, capital rationing refers to the situations where the firm have more acceptable investments requiring greater amount of finance than is available with the firm. It is concerned with the selection of a group of investment out of many investment proposals ranked in the descending order of the rate of return.

PRACTICAL QUESTIONS

TYPE – I (FORMATION PROBLEM)

Question – 1 ABC Co. is considering a proposal to replace one of its plants costing Rs. 60,000 and having a written down value of Rs. 24,000. The remaining economic life of the plant is 4 years after which it will have no salvage value. However, if sold today, it has a salvage value of Rs. 20,000. The new machine costing Rs. 1,30,000 is also expected to have a life of 4 years with a scrap value of Rs. 18,000. The new machine, due to its technological superiority, is expected to contribute additional annual benefit (before depreciation and tax) of Rs. 60,000. Find out the cash flows associated with this decision given that the tax rate applicable to the firm is 40%. (The capital gain or loss may be taken as not subject to tax.)

*[**Ans:** Initial – 1,10,000, Subsequent – 44,800 Terminal – Rs.62,800**]***

Question 2 ABC Instruments Ltd. is considering the purchase of a /machine to replace an existing machine that has a book value of Rs. 24,000, and can be sold for Rs. 12,000. The salvage value or the old machine in four years is zero, and it is depreciated on a straight-line basis. The proposed machine will perform the same function the old machine is performing; however improvements in technology will enable the firm to reap cash benefits (before depreciation and taxes) of Rs. 56,000 per year in materials, labour, and overhead. The new machine has a four year life, costs Rs. 1,12,000 and can be sold for an expected Rs. 16,000 at the end of the fourth year. Assuming straight-line depreciation and a 40% tax rate, compute cash flows associated with this replacement.

[Ans:** Initial Outlay : Rs. 95,200; Yearly incremental inflows are Rs. 40,800 per annum; The terminal cost inflow is Rs. 16,000.**]

Question 3 A cosmetic company is considering to introduce a new lotion. The manufacturing equipment will cost Rs. 5,60,000. The expected life of the equipment is 8 years. The company is thinking of selling the lotion in a single standard pack of 50 grams at Rs. 12 each pack. It is estimated that variable cost per pack would be Rs. 6 and annual fixed cost Rs. 4,50,000. Fixed cost includes (straight-line) depreciation of Rs. 70,000 and allocated overheads of Rs. 30,000. The company expects to sell 1,00,000 packs of the lotion each year. Assume that tax is 45% and straight-line depreciation is allowed for tax purpose. Calculate the cash flows.

***[Ans:** Annual cash inflows are Rs.1,69,000 and Initial cash outflow is Rs.5,60,000.]*

Question -4 XYZ is interested in assessing the cash flows associated with the replacement of an old machine by a new machine. The old machine bought a few years ago has a book value of Rs. 90,000 and it can be sold for Rs. 90,000. It has a remaining life of five years after which its salvage value is expected to be *nil* It is being depreciated annually at the rate of 20 per cent (written down value method.)

The new machine costs Rs. 4,00,000. It is expected to fetch Rs. 2,50,000 after five years when it will no longer be required. It will be depreciated annually at the rate of $33^1/3$ per cent (written down value method.) The new machine is expected to bring a saving of Rs. 1,00,000 in manufacturing costs. Investment in working capital would remain unaffected. The tax rate applicable to the firm is 50 per cent. Find out the relevant cash flow for this replacement decision. (Tax on capital gain/loss to be ignored).

*[**Ans:** Initial – 3,10,000, Subsequent – 1. 107.6, 2. 87.2, 3. 73.9, 4. 65.2, 5. 59.4 Terminal – Rs.3,09,400]*

⇒ **CONCEPT 5**

VARIOUS TECHNIQUES OF DECISION IN CAPITAL BUDGETING

A wide variety of techniques are used for evaluating investment proposals. The most commonly used techniques are as follows:

The Payback Method
The Average Rate of Return Method
Discount Cash Flow Method

Net Present Value Method (NPV)
Internal Rate of Return Method (IRR)
Profitability Index (PI) or Benefit Cost Ratio (BC).

Every method is designated with some purpose in view and as such different methods are not equally useful to every firm and under all circumstances. However, proper understanding of these techniques will help the management to determine the most suitable technique to be used and thus make better investment decisions keeping in view the business situation, particular requirements of the firm and nature of investment proposals}

1- The Payback Method

This technique estimates the time required by the project to recover, through cash inflows, the firms initial outlay. Beginning with the project with the shortest payout period, different projects are arranged in order of time required to recapture their respective estimated initial outlays. The payback period for each investment proposal is compared with the maximum period acceptable to management and proposals are then ranked and selected in order of those having minimum payout period.

Decision Rule:

Accept the project if the payback period calculated for it is less than the maximum set by the management. Reject the project if it is otherwise. In case of multiple projects, the project with shorter payback period will be selected. In essence, payback period shows break-even point where cash inflows are equal to cash out flows. Any inflows beyond this period are surplus inflows.

Advantages:

1. It is easy to calculate and investment proposals can be ranked quickly.

2. For a firm experiencing shortage of cash, the payback technique may be used with advantage to select investments involving minimum time to recapture the original investment.

3. The payout method permits the firm to determine the length of time required to recapture through cash flows, the capital expenditure incurred on a given project and thus helps it to determine the degree of risk involved in each investment proposal.

4. This is ideal in deciding cash investment in a foreign country with volatile political position and a long-term projection of political stability is difficult.

5. This is, likewise, more preferred in case of industries where technological obsolescence comes within short period; say electronic industries.

Disadvantages:

1. The payback method ignores the time value of money and treats all cash flows at par. Thus, projects A and B with the following cash flows are treated equally:

Years	***Cash Flows***	
	Project A	***Project B***
1.	5,000	2,000
2.	4,000	3,000
3.	3,000	4,000
4.	2,000	5,000
Investment	14,000	14,000

Although Pay Back period is 4 years for both the projects, project A is preferable since it recovers larger amount of money during the initial years.

The pay back method, therefore, ignores the fact that amount of cash received today is more important than the same amount received after say, 2 years.

2. The payback method does not consider cash flows and income that may be earned beyond the payout period.

3. Moreover, it does not take into account the salvage or residual value, if any, of the long-term asset.

4. The payback technique ignores the cost of capital as the cut-off factor affecting selection of investment proposals.

Suitability:

Payback period method may be successfully applied in the following circumstances:

(i) Where the firms suffers from liquidity problem and is interested in quick recovery of fund than profitability;

(ii) high external financing cost of the project;

(iii) for projects involving very uncertain return; and

(iv) political and economic pressures.

It may, therefore, be said that payback period is defined as the measure of projects liquidity and capital recovery rather than its profitability.

2- The Average Accounting Rate of Return Method

This method is designated to consider the relative profitability of different capital investment proposals as the basis for ranking them - the fact neglected by the payout period technique. Since this method uses accounting rate of return, it is sometimes described as the financial statement method. Rate of return is calculated by dividing earnings by capital invested. The numerator, i.e., earnings can be interpreted in a number of ways. It might mean income after taxes and depreciation, income before taxes and depreciation, or income after taxes but before depreciation. Since both numerator and denominator carry different meanings. It is not surprising if one comes across a number of variations of the average rate of return method. However, the two common variations are:

(a) Average Rate of Return in Original Investment:

$$= \frac{\text{Net earnings after Depreciation and Taxes}}{\text{No. of years project will last}} = \text{Original Investment}$$

(b) Average Rate of Return on Average Investment:

$$= \frac{\text{Net earnings after Depreciated and Taxes}}{\text{No. of years project will last}} = \text{Average Investment}$$

Average investment is estimated by dividing the total of original investment and investment in the project at the end of its economic life by 2. The approach of dividing average annual after-tax earnings of the project by its original investment makes no attempt to incorporate the fact of gradual recovery of investment over time, hence tends to undertake the average rate of return. The average investment approach on the other hand, gives best result when

original investment is evenly recovered over the economic life of the project which may not always be the case.

Decision Rule:

Normally business firm determine rate of return. So accept the proposal if

ARR > Minimum rate of return (cut off rate)

and Reject the project if

ARR < Minimum rate of return (cut off rate)

In case of more than one project, where a choice has to be made, the different projects may be ranked in descending or ascending order of their rate of return. Project below the minimum rate will be dropped. In case of project yielding rate of return higher than minimum rate, it is obvious that project yielding a higher rate of return will be preferred to all.

Advantages:

(i) Earnings over the entire life of the project are considered.

(ii) This method is easy to understand, simple to follow. Accounting concept of income after taxes is known to every student of accountancy.

Disadvantages:

(i) Like the payback technique, the average return on investment method also ignore the time value of funds. Consideration to distribution of earnings over time is important. It is to be accepted that current income is more valuable than income received at a later date.

(ii) The method ignores the shrinkage of original investment through the process of charging depreciation allowances against earnings. Even the assumption of regular recovery of capital over time as implied in average investment approach is not well founded. '

(iii) The average rate of return on original investment approach cannot be applied to a situation where part of the investment is to be made after the beginning of the project.

Suitability:

If the project life is not long, then the method can be used to have a rough assessment of the internal rate of return. The present method is generally used as supplementary tool only.

Comparison between Average Rate of Return and Payback Method:
The average rate of return method and its comparison with payback method may be illustrated as follows:

Suppose there are two investment proposals A and B each with capital investment of Rs. 20,000 and depreciable life of 4 years. Assume that following are the estimated profit and cash inflows when annual straight line depreciation charged is Rs. 5,000.

Period	Project A		Project B	
	Book Profits	Net Cash Inflows	Book Profits	Net Cash Inflows
1.	4,000	9,000	1,000	6,000
2.	3,000	8,000	2,000	7,000
3.	2,000	7,000	3,000	8,000
4.	1,000	6,000	4,000	9,000
Total	10,000	30,000	10,000	30,000
Average rate of return on original investment	12.5%		12.5%	

If evaluated in terms of average rate of return method, the two projects are equally favourable. However, project A is more favourable than project B since it provides larger cash inflows in the initial period (i.e. Quicker Payback).

3- Net Present Value Method

The net present value method is understood to be the best available method for evaluating the capital investment proposals. Under this method, the cash outflows and inflows associated with each project are ascertained first. Cash inflows are worked out by adding depreciation to profit after tax arising to each project*. Since the cash outflows and inflows arise at different point of time and cannot be compared, so both are reduced to the present values at the rate of return acceptable to the management. The rate of return is either cost of capital of the firm or the opportunity cost of capital to be invested in the project. The

assumption under this method remain that cash inflows are reinvested at the same discount rate.

Advantages:

(i) Income over the entire life of the project is considered.

(ii) The method takes into account time value of money.

(iii) The method provides clear acceptance so interpretation is easy.

(iv) When projects involves different amount of investment, the method may not provide satisfactory answers.

Disadvantages:

(i) As compared with the first two methods, the present value approach is certainly more difficult to understand and apply.

(ii) An additional difficulty in this approach is encountered when projects with unequal lives are to be evaluated.

(iii) It is difficult to determine the firm cost of capital or appropriate rate of discount.

Suitability:

Net present value is the most suitable method in those circumstances where availability of resources is not a constraint. The management authority can accept all those projects having Net Present Value either Zero or positive. This method shall maximise shareholders wealth and market value of share which is the sole aim of any business enterprise.

4- Rate of Return (IRR)

The internal rate of return refers to the rate which equates the present value of cash inflows and present value of cash outflows. In other words, it is the rate at which net present value of the investment is zero. If the Net Present Value is positive, a higher discount rate may be used to bring it down to equalise the discount cash inflows and vice versa. That is why. Internal Rate of Return is defined as the break even financing rate for the project.

⇒ **CONCEPT 6**

COMPUTATION OF INTERNAL RATE OF RETURN:

The computation of Internal Rate of Return is relatively complicated and difficult compared to Net Present Value. One has to follow trial and error exercise to ascertain Internal Rate of

Return (r) which equates the cash inflows and outflows of the investment proposals. Under net present value, k is known, but under this method it is worked out.

Initially the Internal rate of return (r) may give

NPV > 0	r > k (higher rate will be tried)
NPV = 0	r = k
NPV < 0	r < k (lower rate will be tried)

Advantages:

(i) The discounted cash flow (IRR) takes into account the time value of money.

(ii) It considers cash benefits, i.e. profitability of the project for the whole of its economic life.

(iii) The rate of discount at which the present value of cash flows is equated to capital outlay on a project is shown as a percentage figure. Evidently, this method provides for uniform ranking and quick comparison of relative efficiency of different projects.

(iv) This method is considered to be a sophisticated and more reliable technique of evaluating capital investment proposals.

(v) The objective of maximising of owner's welfare is met.

D*isadvantages:*

(i) The discounted cash flow is the most difficult of all the methods of project evaluation discussed above.

(ii) An important assumption implied in this method is that incomes are reinvested (compounding) over the project's economic life at the rate earned by the investment. This assumption is correct and justified only when the internal rate of return is very close to the average rate of return earned by the company on its total investments. To the extent internal rate of return departs from the typical rate of earnings of the company, results of this method, will be misleading. Thus, when the internal rate of return on a project is computed to be 30% while company's average rate of return is 15%, the assumption of earning income on income at the rate of 30% is highly unrealistic. From this point of view the assumption of the net present value method that incomes are reinvested at the rate of discount (cost of capital) seems to be more reasonable.

(iii) The rate may be negative or one or may be multiple rate as per calculations. When a project has a sequence of changes in sign of cash flow, there may be more than one internal rate of return.

5- Profitability Index (PI)

Profitability index is defined as the rate of present value of the future cash benefits at the required rate of return to the initial cash outflow of the investment. Symbolically, Profitability index is expressed as

$$PI = \frac{PV.of\ Inflow}{PV.of\ Flow}$$

The above ratio is an indicator of the profitability of the project. If the ratio is equal to or greater than one, it shows that project has an expected yield equal to or greater than the discount rate. If the index is less than one, it indicates that project has an expected yield less than the discount rate.

Decision Rule:

If PI > 1 Accept the Project, PI = 1 indifferent, PI < 1 Reject the project.

In the event of more than one alternatives, projects may be ranked according to their ratio - the project with the highest ratio should be ranked first and *vice versa.*

Advantages:

1) Profitability Index method gives due consideration to the time value of money.

2) Profitability Index method satisfies almost all the requirements of a sound investment criterion.

3) This method can be successfully employed to rank projects of varying cash and benefits in order of their profitability.

Disadvantages:

1) This method is more difficult to understand and compute.

2) This method does not take into account the size of investment.

3) When cash outflows occur beyond the cement period Profitability Index Ratio criterion is unsuitable as a selection criterion.

⇒ **CONCEPT 7**

COMPARISON OF NET PRESENT VALUE AND INTERNAL RATE OF RETURN APPROACH

The net present value and internal rate of return, two widely used methods are the species of the same genus i.e. Discount cash flow method, yet they are different from each other on various points.

The broad points of difference between the two are as follows:

Points of Differences

1. **Int*erest Rate:*** Under the net present value method rate of interest is assumed as the known factor whereas it is unknown in case of internal rate of return method.

2. **Reinvestment Axiom:** Under both the methods, it is assumed that cash inflows can be re-**invested at the** discount rate in the new projects. However, reinvestment of funds, at cut-off rate is more possible than internal rate of return. So net present value method is more reliable than internal rate of return method for ranking two or more projects.

3. ***Objective:*** The net present value method took to ascertain the amount which can be invested in a project so that its expected yields will exactly match to repay this amount with interest at the market rate. On the other hand, internal rate of return method attempts to find out the rate of interest which is maximum to repay the invested fund out of the cash inflows.

Points of Similarities

IRR will give the same results as NPV in terms of acceptance or rejection of investment proposals in the following circumstances:

1. Projects having conventional cash flows i.e. a situation where initial investment (outlay or cash outflow) is followed by series of cash inflows.

2. Independent Investment Proposals: Such proposal, the acceptance of which does not exclude the acceptance of others.

⇒ **CONCEPT 8**

CHOICE OF METHODS

The business enterprise is confronted with large number of investment criteria for selection of investment proposals. It should like to choose the best among all. Specially, it is the choice between Net Present Value and Internal Rate of Return Method because these are the two methods which are widely used by the firms. If a choice must be made, the Net Present Value Method generally is considered to be superior theoretically because:

(i) It is simple to operate as compared to internal rate of return method;

(ii) It does not suffer from the limitations of multiple rates;

(iii) The reinvestment assumption of the Net Present Value Method is more realistic than internal rate of return method.

On the other hand, some scholars have advocated for internal rate of return method on the following grounds:

1. It is easier to visualise and to interpret as compared to Net Present Value Method.

2. It suggests the maximum rate of return and even in the absence of cost of capital, it gives fairly good idea of the projects profitability. On the other hand, Net Present Value Method may yield incorrect results if the firm's cost of capital is not calculated with accuracy.

The internal rate of return method is preferable over Net Present Value Method in the evaluation of risky projects.

SOLVED ILLUSTRATIONS

Illustration-1

Machine A costs Rs.1,00,000 payable immediately. Machine B costs Rs. 1,20,000 half payable immediately and half payable in one year's time. The cash receipts expected are as follows:

Year (at end)	Machine (A)	Machine (B)
1	20,000	-60,000
2	60,000	60,000
3	40,000	60,000
4	30,000	80,000
5	20,000	—

At 7% opportunity cost, which machine should be selected on the basis of NPV?

Solution:

1. Calculation of NPV

Machine A			
Year	**Cash flows**	**PVF@ 7%**	**PVR (Rs)**
0	(1,00,000)	1	(1,00,000)
1	20,000	0.935	18700
2	60,000	0.873	52380
3	40,000	0.816	32640
4	30,000	0.763	22890
5	20,000	0.713	14260
		NPV	**40870**

Machine B			
Year	**Cash flows**	**PVF@ 7%**	**PVR (Rs)**
0	(60,000)	1	(60,000)
1	(60,000)	0.935	(56100)
2	60,000	0.873	52380
3	60,000	0.816	48960
4	80,000	0.763	61040
5	-	0.713	0
		-	**46280**

Machine B is having higher : NPV and may be selected.

Illustration-2

A company is considering a new project for which the investment data are as follows:

Capital outlay	Rs. 2,00,000
Depreciation	20% p.a.

Forecasted annual income before charging depreciation, but after all other charges are as follows:

Year 1	Rs. 1,00,000
2	1,00,000
3	80,000
4	80,000
5	40,000
	4,00,000

On the basis of the available data, set out calculations, illustrating and comparing the following methods of evaluating the return:

(a) Payback method.

(b) Rate of return on original investment.

Solution: Since there is no tax, the annual income before depreciation and after other charges is equivalent to Cash flow (CF).

(a) Capital outlay of Rs.2,00,000 is recovered in the first two years, (Rs. 1,00,000 (year 1) + Rs. 1,00,000 (year 2), therefore, the payback period is two years.

(b) Rate of return on original investment:

Year	Income (Rs.)	Depreciation (Rs.)	Net Income Rs.
1	1,00,000	40,000	60,000
2	1,00,000	40,000	60,000
3	80,000	40,000	40,000
4	80,000	40,000	40,000

5	40,000	40,000	–
			2,00,000

Average Income = Rs. 2,00,000/5 = Rs. 40,000

$$\text{Rate of Return} = \frac{\textit{Average income}}{\textit{Original investment}} \times 100$$

$$= \frac{\textit{Rs.}\,40,000}{\textit{Rs.}\,2,00,000} \times 100 = 20\%$$

BASED ON TECHNIQUES OF CAPITAL BUDETING

PROBLEMS

Problem.1

Machine A costs Rs.1,00,000, payable immediately. Machine B costs Rs.1,20,000, half payable immediately and half payable in one year's time. The cash receipts expected are as follows:

		Rs.
Year (at the end)	**A**	**B**
1	Rs. 20,000	—
2	60,000	Rs. 60,000
3	40,000	60,000
4	30,000	80,000
5	20,000	—

With 7% cost of capital, which machine should be selected?

[Answer : B is having higher NPV and hence acceptable.]

Problem.2

A machine costing Rs.110 lacs has a life of 10 years, at the end of which its scrap value is likely to be Rs.10 lacs. The firm's cut-off rate is 12%. The machine is expected to yield an annual profit after tax of Rs.10 lacs, depreciation being reckoned on straight line basis. Ascertain the net present value of the project.

[Answer: the NPV of the project is Rs.6,22,000]

Problem.3

XYZ co. is considering the purchase of one of the following machines, whose relevant data are as given below:-

			Rs.
		Machine X	**Machine Y**
Estimated life		3 years	3 years
Capital cost		90,000	90,000
Earnings (after tax):	Year 1	40,000	20,000
	Year 2	50,000	70,000
	Year 3	40,000	50,000

The company follows the straight-line method of deprecation; the estimated salvage value of both the types of machines is zero. Show the most profitable investment based on (i) Pay back period, (ii) Accounting rate of return, and (iii) Net present value assuming a 10% cost of capital.

[Answer: The PB are 1.25 and 1.4 years; ARR are 96.3% and 103.7% and NPV are Rs. 92,280 and Rs.98,130.]

Problem 4

A firm has the following two proposals before it.

	Proposal I		**Proposal II**	
Cost.	Rs.	11,000	Rs.	10,000

Cash Inflows:					
Years	1	Rs.	6,000	Rs.	1,000
	2		2,000		1,000
	3		1,000		2,000
	4		5,000		10,000

Find out IRR of both the proposals, which proposal is acceptable if the required rate of return of the firm is (i) 11% or (ii) 10%.

[Answer: IRR of Proposal I is 11.26% and Proposal II is 10.22%. If the required rate of return is 11%, only Proposal I is acceptable. However, if the required rate of return is 10%, then both proposals are acceptable.]

Problem 5

XYZ Ltd. has to replace one of its machine for which it has following options:

(a) Installation of equipment "Best" having cost of Rs. 75,000 which is expected to a generate a cash inflow of Rs. 20,000 per annum for next 6 years.

(b) Installation of equipment "Better" having cost of Rs. 50,000 which is expected to generate a cash inflow of Rs. 18,000 per annum for next 4 years.

(c) Which equipment should be preferred if the company adopts method of (i) Payback period *(ii)* Internal Rate of Return.

Answer*:* payback period = 3.75 year, 2.78 years
IRR = 15.34%, 16.36%

Problem 6

A company has to consider the following Project

Cost	Rs. 10,000
Cash inflows:	
Year 1	Rs. 1,000
2	1,000
3	2,000
4	10,000

Compute the internal rate of return and comment on the project if the opportunity cost is 14%.

Answer: 10.22%, company should reject project

Problem 7

A firm whose cost of capital is 10% is considering two mutually exclusive projects X and Y, the details of which are:

	Year	Project X	Project Y
Cost	0	Rs. 1,00,000	Rs. 1,00,000
Cash inflows	1	10,000	50,000
	2	20,000	40,000
	3	30,000	20,000
	4	45,000	10,000
	5	60,000	10,000

Compute the Net Present Value at 10%, Profitability Index and Internal Rate of Return for the two projects.

Answer: NPV (x)= 16135, NPV (y)= 6550, PI (y)= 1.065, IRR (x)= 14.71, IRR (y)=13.56%

Problem 8

2013-Dec [3] (a) Raghu electronic wants to take a new project involving manufacture of an electronic device which has good market prospects. Further details are given below:

		(Rs in lakh)
(i)	Cost of the project (as estimated):	
	- Land (to be incurred at the beginning of the year 1)	2.00
	- Buildings (to be incurred at the end of the year 1)	3.00
	- Machinery (to be incurred at the end of the year 2)	10.00
	- Working capital (margin money)	
	(to be incurred at the beginning of the year 3)	5.00
		20.00

(ii) The project will go into production from the beginning of year 3 and will be operational for a period of 5 years. The annual working results are estimated as follows:

	(Rs in lakh)
Sales	24
Variable cost	8
Fixed cost (excluding depreciation)	5
Depreciation of assets	2

(iii) at the end of the operational period, it is expected that the fixed assets can be sold for Rs 5 lakh (without any profit).

(iv) Cost of capital of the firm is 10%. Applicable tax rate is 33.33% inclusive of surcharge and education cess etc.

You are required to evaluate the proposal using the net present value approach and advise the firm. **(10 marks)**

⇒ **CONCEPT 11**

EAC & EAB APPROACHES

This concept is used when life of two projects under consideration is not same.

$$EAC = \frac{Present\ value\ of\ cash\ flow}{(PVAF)_{n,i}}$$

$$EAB = \frac{NPV}{(PVAF)_{n,i}}$$

Decision on Basis of EAB = Project with higher EAB will be selected

Decision on Basis of EAC = Project with Lower EAC will be selected

Illustration 3:

REPLACEMENT –MAY 2000 [1] (A)

Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs Rs. 1,50,000 and will last for 3 years. It costs Rs. 40,000 per year to run. Machine B is an economy model costing only Rs. 1,00,000, but will last only for 2 years, and costs Rs. 60,000 per year to run. These are real cash flows. The Costs are forecasted in rupees of constant purchasing power. Ignore Tax. Opportunity cost of capital is 10 per cent. Which machine should the company buy?

Solution:

Evaluation of machines (in Rs.)

The decision is to be based on Equated Annual Costs since the life is different.

	Particulars	Machine A	Machine B
a.	Purchase price of machinery	1,50,000	100,000
b.	(i) Running and maintenance cost per year	40,000	60,000
	(ii) Life (Years)	3	2
	(ii) PVAF @ 10%	2.486	1.735
	(iii) Present value of running and maintenance cost	99,440	1,04,100
c.	Cash outflow of the machine [(a)+(b)]	2,49,440	2,04,100
	Equated annual cost (EAC)		
d.	$\left[\frac{\text{PV of Outflow}}{\text{PVAF}_{\text{10\% life}}}\right]$ (c/b(ii))	1,00,338	1,17,637

Decision: Company X should purchase machine A because of its lower cost.

Illustration 4

Company ABC Ltd is forced to choose between 2 machines A & B, the two machines are designed differently but have identical capacity & do exactly same job. The information regarding 2 machines is given below:

	Machine A	**Machine B**
Cost	2 lakh	1 lakh
Life	6 Years	5 Years
Revenue P.A	60,000	40,000
Saving in Exp.	10,000	5000
discount Rate	12%	12%

Tax rate $\rightarrow$ 30%

Which machine should company buy

$\Rightarrow$ **CONCEPT 12**

CAPITAL BUDGETING UNDER INFLATION

1) When there is inflation, cash inflows/outflows will be inflation adjusted (i.e. in money term). The provider of fund will expects higher return for money provided & hence cost of capital will also be inflation adjusted (money term).

2) When there is no inflation then cash flows will be in real terms and cost of capital will also be in real terms.

a) Relationship between inflation adjusted cash flows and real cash flows.

Real cash cash flow (1 + inflation) = money cash flows

$$\text{Real cash flows} = \frac{\text{money cash flow}}{(1+\text{inflation})}$$

b) Relationship between money cost of capital real cost of capital.

(1+real rate) (1+inflation rate) = (1+money rate)

Illustration 5: INFLATION –MAY 2005

A firm has projected the following cash flows from a project under evaluation:

Year	Rs. lakhs
0	(70)
1	30
2	40
3	30

The above cash flows have been made at expected prices after recognizing inflation. The firm s cost of capital is 10%. The expected annual rate of inflation is 5%.

Show how the viability of the project is to be evaluated.

Solution:

Cash Flows: The cash flows have recognized inflation. Hence they are in money terms.

Discount Rate: The given discount rate of 10% is assumed to be in real terms. To compute Money Terms we need to use the following formula

$$(1+MDR) = (1+RDR) \times (1 + IR)$$
$$= 1.10 \times 1.05 = 1.155$$

NPV calculations

Year	Money Cash flow	DF @ 15.5%	PV of cash flows
0	(70)	1.000	(70)
1	30	0.866	25.98
2	40	0.749	29.96
3	30	0.649	19.47
		NPV	**5.41**

Decision : Since the NPV is positive the project should be accepted

QUESTIONS FOR PRACTICE

Question-1 If initial cash outflow - 500,000

Year Ended	**inflows (Inflation adjusted)**
1	200,000
2	300,000
3	350,000

If money discount rate = 11.3% p.a..
Inflation rate = 5% p.a.

(i) Find NPV with given information
(ii) Calculate real cash flow, real discount rate & NPV.

Note: Whenever question is silent, we get all cash flows inflation adjusted & use inflation adjusted discount rate (money term).

Question-2 Initial cash out flow - 800,000 Annual inflow (Real term)

Year Ended	Inflows
1	300,000
2	450,000
3	250,000

Real cost of capital = 5% inflation rate 10% find NPV using money cashflow & money discount rate.

Question-3 Initial outflow - 800,000 Annual inflows - 280,000 p.a. (Real term) Time - 4 year, money cost of cap - 9% Inflation rate = 3.2% p.a. Calculate NPV at real rate and at money rate.

⇒ **CONCEPT 13**

CAPITAL RATIONING

The firm may put a limit to the maximum amount that can be invested during a "given period of time, such as *a* year. Such a firm is then said to be resorting to capital rationing. A firm with capital rationing constraint attempts to select the combination of investment projects

that will be within the specified limits of investments to be made during a given period of time and at the same time provide greatest profitability.

Capital rationing may be effected through budget ceiling. A firm may resort to capital rationing when it follows the policy of financing investment proposals only by ploughing back its retained earnings. In that case, capital expenditure in a given period cannot exceed the amount of retained earnings available for reinvestment. Management may also introduce capital rationing when a department is authorised to make investments upto a limit beyond which investment decisions will be made by higher level management.

Capital rationing may result in accepting several small investment proposals then accepting a few large investment proposals so that there may be full utilisation of budget ceiling. This may result in accepting relatively less profitable investment proposals if full utilization of budget is a primary consideration. Similarly, capital rationing also means that the firm foregoes the next most profitable investment falling after the budget ceiling even though it is estimated to yield a rate of return much higher than the required rate of return. Thus, capital rationing does not lead optimum results.

ILLUSTRATION-6: CAPITAL RATIONING – INDIVISIBLE PROJECTS – NOV 1998 [1] (B)

S Ltd has Rs.10,00,000 allocated for capital budgeting purposes. The following proposals and associated profitability indexes have been determined.

Project	Amount Rs.	Profitability Index
1	3,00,000	1.22
2	1,50,000	0.95
3	3,50,000	1.20
4	4,50,000	1.18
5	2,00,000	1.20
6	4,00,000	1.05

Which of the above investments should be undertaken? Assume that projects are indivisible and there is no alternative use of money allocated for capital budgeting.

Solution:

Step 1: Identify projects with positive NPV

Project (a)	Outflow (b)	PI (c)	Cash inflow (d) = (b) × (c)	NPV of the project (d + b)
1	3,00,000	1.22	3,66,000	66,000
2	1,50,000	0.95	1,42,000	(7,500)
3	3,50,000	1.20	4,20,000	70,000
4	4,50,000	1.18	5,31,000	81,000
5	2,00,000	1.20	2,40,000	40,000
6	4,00,000	1.05	4,20,000	20,000

Project 2 has negative NPV and should be dropped

Step 2: Identify that capital rationing exists

a. Demand: Rs 17 lakhs (Exclude Project 2 which has been dropped)

b. Supply: Rs. 10 lakhs

Since supply is less than demand capital rationing exists.

Step 3: Rank projects in the order of PI

Project	1	3	4	5	6
PI	1.22	1.20	1.18	1.20	1.05
Rank	1	2	3	2	4

Step 4: Create basic feasible solutions and compute aggregate NPV

Projects	1	3	5	4	6	Surplus cash	NPV
Outlay	3,00,000	3,50,000	2,00,000	4,50,000	4,00,000	NA	
NPV	66,000	70,000	40,000	81,000	20,000	0	
Combination							
1	✓	✓	✓			1,50,000	1,76,000

2	✓		✓	✓		50,000	1,87,000
3	✓		✓		✓	1,00,000	1,26,000
4		✓	✓	✓		Nil	1,91,000

It is assumed that NPV of surplus Cash is zero.

Combination 4 having projects 3, 4, 5 with NPV of Rs.1,91,000 and no surplus cash should be undertaken.

IIUSTRATION 7: CAPITAL RATIONING – DIVISIBLE PROJECTS – NOV 1998 [1] (B

Project	A	B	C	D	E	F
Initial outlay	50	80	60	30	25	40
Annual receipts to perpetuity	15	20	18	10	8	10

C Ltd. is experiencing a shortage of funds for investment in the current year, when only Rs. 100,000 is available for investment. No shortages are foreseen thereafter. The cost of investment funds is 20%. The following projects are available.

Advise management which projects to accept.

Solution:-

Step 1: Computation of NPV (Capitalize annuity at 20%) (Rs. thousands)

	A	**B**	**C**	**D**	**E**	**F**
Perpetual inflow	15	20	18	10	8	10
Present value	75	100	90	50	40	50
Outlay	50	80	60	30	25	40
NPV	**25**	**20**	**30**	**20**	**15**	**10**

All the six are acceptable projects since they have positive NPV.

Step 2: Identify if capital rationing exists

(a) Money required = 285 (Sum of outflows of all projects)

(b) Money available = 100

(c) Since money available is less than money required, money is in short supply.

Step 3: Rank in the order of NPV/Outlay (Rs. thousand)

		A	**B**	**C**	**D**	**E**	**F**
a)	NPV	25	20	30	20	15	10
b)	Outlay	50	80	60	30	25	40
c)	Index	0.5	0.25	0.50	0.67	0.60	0.25
d)	Rank	III	IV	III	I	II	**IV**

Step 4: A lot money to project in the order of rank and compute NPV (Rs. thousands)

Project	**Allotted**	**Money Remaining**	**NPV**
Available Money		100	
D	30	70	20
E	25	45	15
0.9A	45	Nil	22.5

Step 5: Computing aggregate NPV

Aggregate NPV for projects D, E and A is Rs.57,500. Projects D, E and A should be accepted.

⇒ **CONCEPT 14**

RISK ANALYSIS IN CAPITAL BUDGETING

A: RISK AND UNCERTAINTY

A decision to take up or leave out a project depends on expectations of future cash flows from the project. Such expectations are based on information that is currently available. The 'future' by definition, is uncertain. Therefore, cash flows when they occur are likely to differ from what were expected. This uncertainty about a project's future cash flows gives rise to risk. But risk is not the same as uncertainty!

Meaning of Risk

Risk is a situation where

- Several outcomes (a k a range of outcomes), are possible
- Within this range, any one outcome can occur
- Each possible outcome has a known probability
- Such probabilities are assessed by reference to past information about relative frequencies of outcome

'Risk' therefore refers to "the possibility that the actual outcome will differ from expected outcome".

Meaning of Uncertainty

Uncertainty is a situation where

- the range of outcomes is unknown
- the probability of outcomes is unknown
- or, both are unknown

Let us explain with an example. You come out of an examination hall saying, "There is a 60% chance that I will get 80 marks and a 40% chance that I will score 50 marks." Your friend, Anne comes out of the hall saying, "God only knows how I have done." Yours is a case of risk. Anne's is a case of uncertainty.

⇒ **CONCEPT 15**

STANDARED DEVIATION

Meaning of Standard Deviation

Project cash flows are forecasts. A forecast cannot be accurate and there can be a margin of error. The risk associated with a project can be expressed, as the extent to which the actual value of outcome will differ from the expected value. This risk is measured with the help of a statistical tool known as Standard Deviation.

By definition, Standard Deviation is a standardized unit of deviation from mean. This measure is denoted by the symbol σ. The square of Standard Deviation (σ^2) is known as variance of distribution. Higher the Standard Deviation, higher is the risk associated with a project.

Method of computing Standard Deviation

There are three steps involved in this computation.

Step 1: Compute expected value.

Step 2: Compute deviation from expected value.

Step 3: Apply formula, $\sigma = \sqrt{\sum_{i=1}^{n} Pi\, d_i^2}$ where 'P' is probability of occurrence 'd' is deviation from mean, 'n' is number of observations.

For Example

Consider the data given in the following table. The information covers probability distribution of five possible outcomes of a project. Compute standard deviation.

Obsvn	Likely outcome (Amt/Rs.)	Probability
1	25,000	0.15
2	36,000	0.20

3	74,000	030
4	92,000	0.20
5	1,00,000	0.15

Solution:

			Step 1:	**Step 2:**		**Step 3:**
Obs	**Likely Outcome (Rs.)**	**Probability**	**Expected value (Rs.)**	**Deviation = d**		**Probability × d^2**
1	25,000	0.15	3,750	-41,550		258,960,375
2	36,000	0.2	7,200	-30,550		186,660,500
3	74,000	0.3	22,200	7,450		16,650,750
4	92,000	0.2	18,400	25,450		129,540,500
5	1,00,000	0.15	15,000	33,450		167,835,375
		Total	**66,550**		**Total**	**759,647,500**

Step 3: Apply formula, $\sigma = \sqrt{\sum_{i=1}^{n} Pi\, d_i^2} = \sqrt{759,647,500} = 27,562$

⇒ **CONCEPT 16**

STANDARD DEVIATION σ : A UNIT OF MEASURE

Standard Deviation is a measure of risk. It is expressed in the same units as the range of probable outcomes is expressed. That is, if you are applying the σ to evaluating % returns in a security, σ is expressed in % age terms. If it computed for outputs in tonnes, σ is expressed in tonnes, etc.

⇒ **CONCEPT 17**

STANDARD DEVIATION σ : WHAT IT MEANS

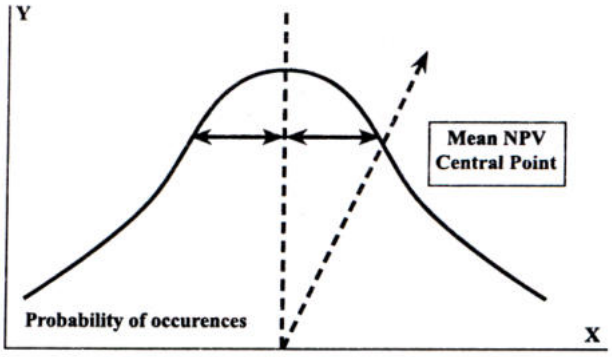
Probabilities of different outcomes in a project may be normally distributed or it may be skewed consider the following two cases.

Probability Set I	Probability Set II
0.15	0.03
0.20	0.27
0.30	0.40
0.20	0.18
0.15	0.12
1.00	1.00

If ER is 15% and SD is 2% this means that there is 95% probability that actual will be within 2 times SD i.e., it will range between 11% and 19%

The first set is known as normal probability distribution, in as much as the distribution on either side of mid-point (0.30) is even. In the second set the probability distribution is said to be skewed.

Statistics tells us that when the density function of probabilities which are normally distributed, is presented graphically, it will look like in a bell-shaped curve. The expected or estimated NPV of a project, which is the mean value, will occupy the central point. The normal distribution curve will appear as:



In this normal distribution, roughly 68% of probability distribution falls within one unit of standardised deviation and 95% falls within two units of deviation. An analysis of this nature helps us assess the probability of actual returns being greater or less than a given level of outcome. We shall see more about this in a later part of this Chapter.

⇒ **CONCEPT 18**

STANDARD DEVIATION σ - DECISION

Now that we know how Expected Value (a k a return) and how Standard Deviation (a k a Risk) are computed, we must learn how to put them to use in decision-making. The following decision rules will be helpful.

- Between two projects, which have the same return, the one with the lower risk will be preferred.
- Between two projects, which have the same risk, the one with the higher return will be preferred.
- Between two projects, which have different levels of risk and return, the choice would depend on the risk preferences of the investor.

The aggressive investor will prefer the one, which gives higher return, whereas the conservative investor will prefer the one, which involves lower risk. [You will read more about this in the chapter on Capital Asset Pricing Model]

⇒ **CONCEPT 19**

WHAT STANDARD DEVIATION DOES NOT MEAN

Project NPVs are derived using the best-suited discount rate for a given level of risk. The discount rate reflects the investor's assessment of risk-return trade off.

Standard deviation is merely a unit of measure with which we can assess the extent to which the possible outcomes can deviate from the expected mean value of outcome. It is true that higher the standard deviation of possible outcomes in a project, higher is the risk associated with a project. Nevertheless, this criterion does not lead us to conclude that greater is the standard deviation, greater should necessarily be the discount rate used for evaluating the project, or that the investor should realign his perception of risk-return trade off in that project.

Let us consider two projects each with a mean NPV of Rs. 10 lacs. The standard deviation of possible NPVs in the first project is Rs. 8 lacs, while that in the second is Rs.9 lacs. It does not follow that the investor should evaluate the second project once again with a higher discount rate. The rationale lies in the fact that the NPV of Rs.10 lacs in these two projects stands derived using a discount rate that takes care of risk-return trade off.

ILLUSTRATION 8

A Company is evaluating two projects. The probability distribution as also the likely NPVs for each of these projects is furnished below.

PROJECT A		PROJECT B	
NPV	Probability	NPV	Probability
4,000	0.2	4,000	0.15
8,000	0.3	8,000	0.35
11,000	0.3	11,000	0.35
14,250	0.2	14,000	0.15

Determine:

(i) Expected NPV of the two projects.

(ii) Risk attached to each of these projects.

(iii) Which project would you prefer and why?

Solution:

Compute Expected NPV

PROJECT A			PROJECT B		
4,000	0.2	800	4,000	0.15	600
8,000	0.3	2,400	8,000	0.35	2,800
11,000	0.3	3,300	11,000	0.35	3,850
14,250	0.2	2,850	14,000	0.15	2,100
Expected NPV		**9,350**	**Expected NPV**		**9,350**

Risk : Compute Standard Deviation

Evaluation of Project A

	STEP 1			STEP 2	
X	Prob	P x R	d = X – X̄	d²	P x d²
4,000	0.2	800	(5,350)	2,86,22,500	57,24,5
8,000	0.3	2,400	(1,350)	18,22,500	5,46,7
11,000	0.3	3,300	1,650	27,22,500	8,16,7
14,250	0.2	2,850	4,900	2,40,10,000	48,02,0
	$\bar{X}=\sum PR$	**9,350**		$\sigma^2 = \Sigma Pd^2 =$	**1,18,90,0**
				Std. Deviation $= \sigma = \sqrt{11890000} = 3,4$	

Risk in project A, measured in terms of σ is 3,448

Evaluation of Project B

	STEP 1			STEP 2	
X	Prob	P x R	d = X – X̄	d²	P x d²
4,000	0.15	600	(5,350)	2,86,22,500	42,93,375
8,000	0.35	2,800	(1,350)	18,22,500	6.37,875
11,000	0.35	3,850	1,650	27,22,500	9,52,875
14,000	0.15	2,100	4,650	2,16,22,500	32,43,375
	$\bar{X}=\sum PR$	**9,350**		$\sigma^2 = \Sigma Pd^2 =$	**91,27,500**
				Std. Deviation $= \sigma = \sqrt{91,27,500} = 3,021$	

Conclusion:

(i) NPV in both the projects is Rs. 9,350.

(ii) Risk in Project A is Rs. 3,448; while that in Project B is Rs. 3,021.

(iii) Project A is riskier than Project B because it has a higher Standard deviation.

Decision: The expected NPV of both the projects is identical. However Project B has a lower risk. Hence project B will be selected.

ILLUSTRATION 9: PROBABILITY

Ajay and Sanjay Ltd., propose installing a new machine at a cost of Rs.400,000. Concerned about *X* the uncertainty about the life of machine, enquiries were made with other units in the same line of business, which revealed that:

(a) The total number of machines operating in all these units is 375

(b) The lives as also the NPV of machines varied from place to place

A summary of results is given below

Machine life in years	Corresponding Number of machines	NPV of these machines (Rs.)
3	30	(1,15,500)
4	75	(49,500)
5	150	43,500
6	105	1,29,000
7	15	2,05,500
	Total : 375	

Advise whether the company should acquire the machine

Solution :

Step 1 : Based on the number of machines and their lives, the probability of life is as under:

Life	Machine	Calculation	Probability
3	30	30/375	0.08
4	75	75/375	0.20
5	150	150/375	0.40
6	105	105/375	0.28
7	15	15/375	0.04

Step 2 : Statement showing the predicted NPV of machines

Machine Life	NPV (Rs.)	Probability	Expected NPV (Rs.)
3	(1,51,500)	0.08	(12,120)
4	(49,500)	0.20	(9,900)
5	43,500	0.40	17,400
6	1,29,000	0.28	36,120
7	2,05,500	0.04	8,220
			Predicted NPV 39,720

ILLUSTRATION 10: PROBABILITY

Based on the data given below, estimate the NPV of the projects and recommend one for adoption, based on your assessment of the risk involved.

Project A		**Project B**	
NPV (Rs.)	**Probability**	**NPV (Rs.)**	**Probability**
3,000	0.05	3,000	0.15
5,000	0.30	5,000	0.25
6,000	0.30	6,000	0.25
12,000	0.30	-12,000	0.25
15,000	0.05	16,000	0.10

Solution:

NPV of the projects, and risk involved measured in terms of Standard Deviation of the projects are furnished in the following Table.

Project A

NPV X (Rs.)	Prob	Exp. NPV (Rs.)	$d = (X - \bar{X})$	d^2	$d^2 \times$ Prob
3,000	0.05	150	–4,800	2,30,40,000	11,52,000
5,000	0.30	1,500	–2,800	78,40,000	23,52,000
6,000	0.30	1,800	–1,800	32,40,000	9,72,000
12,000	0.30	3,600	4,200	1,76,40,000	52,92,000
15,000	0.05	750	7,200	5,18,40,000	25,92,000
	Mean NPV – $\bar{X}$	7,800		σ^2	1,23,60,000
				σ	**3515.68**

Project B

NPV X (Rs.)	Prob	Exp. NPV (Rs.)	$d = (X - \bar{X})$	d^2	$d^2 \times$ Prob
3,000	0.15	450	–4,800	2,30,40,000	34,56,000
5,000	0.25	1,250	–2,800	78,40,000	19,60,000
6,000	0.25	1,500	–1,800	32,40,000	8,10,000
12,000	0.25	3,000	4,200	1,76,40,000	44,10,000
16,000	0.10	1,600	8,200	6,72,40,000	67,24,000
	Mean NPV – $\bar{X}$	7,800		σ^2	1,73,60,000
				σ	**4,166.53**

Since expected NPV of both project is same, so we should select project A with lower standard deviation.

ILLUSTRATION 11:

PROBABILITY AND EXPECTED VALUE – MAY 1999 [1] (A)

A company is considering two mutually exclusive projects X and Y. Project X costs Rs. 30,000 and Project Y Rs. 36,000. You have been given below the net present value probability distribution for, each project.

Project X		**Project Y**	
NPV (Rs.)	**Probability**	**NPV Estimate(Rs.)**	**Probability**
3,000	0.1	3,000	0.2
6,000	0.4	6,000	0.3
12,000	0.4	12,000	0.3
15,000	0.1	15,000	0.2

(a) Compute the expected net present value of projects X and Y.

(b) Compute the risk attached to each project i.e. Standard Deviation of each probability distribution.

(c) Which project do you consider more risky and why?

(d) Compute the probability index of each project.

Solution :

Project X				
NPV	**Probability**	**NPV × P**	**d**	**Pd^2**
3,000	0.1	300	6,000	36,00,000
6,000	0.4	2,400	3,000	36,00,000
12,000	0.4	4,800	(3,000)	36,00,000
15,000	0.1	1,500	(6,000)	36,00,000
		9,000		**1,44,00,000**

Project Y				
NPV	**Probability**	**NPV × P**	**d**	**Pd^2**
3,000	0.2	600	6,000	72,00,000
6,000	0.3	1,800	3,000	27,00,000
12,000	0.3	3,600	(3,000)	27,00,000
15,000	0.2	3,000	(6,000)	72,00,000
		9,000		**1,98,00,000**

a. Expected NPV of Projects X and Y is Rs. 9,000

b. Risk attached at each project $\sqrt{\sum pd^2}$

Project X : $\sqrt{\sum pd^2} = \sqrt{144,00,000}$ = Rs. 3795

Project Y : $\sqrt{\sum pd^2} = \sqrt{1,98,00,000}$ = Rs. 4450

c. since standard deviation of project Y is more so project Y is more riskier

d. Profitability Index of each project

Profitability Index = $\frac{Discounted\ Cash\ inflow}{Discounted\ Cash\ outflow}$

Project X : $\frac{9.000+30,000}{30,000}=1.30$ Project Y : $\frac{9,000+36000}{36,000}=1.25$

ILLUSTRATION 12

PROBABILITY AND EXPECTED VALUE –MAY 2003[1](C)

A company is considering Projects X and Y with following information:

Project	Expected NPV Rs.	Standard Deviation
X	1,22,000	90,000
Y	2,25,000	1,20,000

(a) Which project will you recommend based on the above data?

(b) Explain whether your opinion will change, if you use coefficient of variation as a measure of risk.

(c) Which measure is more appropriate in this situation and why.

Solution:

(i) Based on the standard deviation project X can be chosen because it is less risky than project Y.

(ii) Coefficient of Variation = $\frac{Standard\ deviation}{Expected\ Net\ Present\ Value}$

$$\mathbf{CoV_x =} \frac{90,000}{122,000}=0.738 \qquad \mathbf{CoV_y =} \frac{120,000}{225,000}=0.533$$

Coefficient of variation as a measure of risk indicated, project X to be more risky than project Y.

Therefore Project Y can be selected.

(iii) Since expected NPV is not same, hence coefficient of variation is more appropriate

ILLUSTRATION 13

RISK ADJUSTED DISCOUNT RATE –MAY 1999[1](B) & 2005

Determine the risk adjusted net present value of the following projects.

	A	B	C
Net cash outlays (Rs.)	1,00,000	1,20,000	2,10,000
Project Life	5 years	5 years	5 years
Annual Cash inflow (Rs.)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

The company selects the risk adjusted rate of discount on the basis of the coefficient of variation.

Coefficient of Variation	Risk adjusted rate of discount	Present value factor 1 to 5 at risk adjusted rate of discount
0.0	10%	3.791
0.4	12%	3.605
0.8	14%	3.433
1.2	16%	3.274
1.6	18%	3.127
2.0	22%	2.864
More than 2.0	25%	2.689

Solution :

Determine of discount factor and the present value

	Particular	**A**	**B**	**C**
(i)	Coefficient of variation	0.4	0.8	1.2
(ii)	Relevant risk adjusted rate of discount	12%	14%	16%
(iii)	Present value annuity for 5 years	3.605	3.433	3.274

Computation of risk adjusted Net present value

	Particular	A	B	C
(a)	Net cash outlays	1,00,000	1,20,000	2,10,000
(b)	Annual cash inflows	30,000	42,000	70,000
(c)	Present value annuity factor for 5 years (as per the above table)	3.605	3.433	3.274
(d)	Discounted cash inflows	1,08,150	1,44,186	2,29,180
(e)	**Risk adjusted factor NPV (d-a)**	**8,150**	**24,186**	**19,180**

ILLUSTRATION 14

RISK ADJUSTED DISCOUNT RATE

Fast Track Co. Ltd. is undertaking a project at a cost of Rs. 1,14,000. Estimated net cash flow after tax, during the life of the project is as under:

	Year1	Year 2	Year 3	Year 4	Year 5
Rs.	25,000	28,000	31,000	33,000	34,000

RADR = 16% can the company go ahead?

Solution :

Step 1: Compute expected cash flows. (Given)

Step 2: Compute RADR = 16%

Step 3: Compute NPV.

Year	Cash flow (Rs.)	DF (a) 16%	PV/ Rs.
0	(1,14,000)	1.000	(1,14,000)
1	25,000	0.862	21,550
2	28,000	0.743	20,804
3	31,000	0.641	19,871
4	33,000	0.552	18,216
5	34,000	0.476	16,184
		NPV	**(17,375)**

NPV, of the project is negative. Hence, the project should be rejected.

ILLUSTRATION 15

CERTAINTY EQUIVALENT FACTOR – NOV 1999[1](B)

The Globe manufacturing Co. Ltd., is considering an investment in one of the two mutually exclusive proposals, project X and project Y, which require cash outlays o/Rs. 3,40,000 and Rs. 3,30.000 respectively. The CE approach is used in incorporating risks in capital budgeting decisions. Risk free rate is 8%, and risk-adjusted rate is 10%. The expected net cash flows and their certainty equivalents are as follows:

				Amount / Rs.
Project X		**Project Y**		
Year end	**Cash flow (Rs.)**	**CE**	**Cash flow (Rs.)**	**CE**
1	1,80,000	0.8	1,80,000	0.9
2	2,00,000	0.7	1,80,000	0.8
3	2,00,000	0.5	2,00,000	0.7

Required:

(i) Which project should be accepted under CE approach?

(ii) For which of the two projects, would you use higher RADR & why

Solution: ***Part*** *(i)*

Step *1:* *Ascertain the discount rate,*

When CE approach is adopted, risk-free rate (i.e., 8% in this case) is relevant.

Step 2: *Compute NPV of the project X*

Year	**Cash flow (Rs.)**	**Certainty factor**	**Certain cash flows (Rs.)**	**DF @ (8%)**	**PV of Cash flows (Rs.)**
0	(3,40,000)	1.0	(3,40,000)	1.000	(3,40,000)
1	1,80,000	0.8	1,44,000	0.926	1,33,344
2	2,00,000	0.7	1,40,000	0.857	1,19,980
3	2,00,000	0.5	1,00,000	0.794	79,400
					NPV (7,276)

Year	Cash flow (Rs.)	Certainty factor	Certain cash flow (Rs.)	DF @ (8%)	PV of cash flows (Rs.)
0	(3,30,000)	1.0	(3,30,000)	1.000	(3,30,000)
1	1,80,000	0.9	1,62,000	0.926	1,50,012
2	1,80,000	0.8	1,44,000	0.857	1,23,408
3	2,00,000	0.7	1,40,000	0.794	1,11,160
					NPV 54,580

Statement showing NPV of Project Y

Step 3: *Decision*

Since the NPV of Project X is negative it should be rejected. Since the NPV of project Y is positive, it should be accepted.

Part** (ii): **Project for which RADR will be applied

Since the CE coefficient is lower in project X, it is deemed to be riskier than project Y. Project X should, therefore, be evaluated by using RADR of 10%.

ILLUSTRATION 16

CERTAINTY EQUIVALENT FACTOR – NOV 2003

The Textile Manufacturing Company Ltd., is considering one of two mutually exclusive proposals, Projects M and N, which require cash outlays ofRs. 8,50,000 and Rs. 8,25,000 respectively. The certaintv-equivalent (C. E) approach is used in incorporating risk in capital budgeting decisions. The current yield on government bonds is 6% and this is used as the risk free rate. The expected net cash flows and their certaintv equivalents are as follows:

	Project M		Project N	
Year-end	Cash Flow Rs.	C.E.	Cash Flow Rs.	C.E.
1	4,50,000	0.8	4,50,000	0.9
2	5,00,000	0.7	4,50,000	0.8
3	5,00,000	0.5	5,00,000	0.7

Present value factors of Re. 1 discounted at 6% at the end of year I, *2* and 3 are 0.943, 0.890 and 0.840 respectively.

Required:

(i) Which project should be accepted?

(ii) If risk adjusted discount rate method is used, which project would be appraised with a higher rate and why?

Solution:

Net Present Value of Project M

Year end	Cash Flow (Rs.) (a)	C.E. (b)	Adjusted Cash Flow (Rs.) (c) = (a) × (b)	Present value factor at 6% (d)	NPV (Rs.) (e) = (c) × (d)
0	(8,50,000)	1.0	8,50,000	1.000	(8,50,000)
1	4,50,000	0.8	3,60,000	0.943	3,39,480
2	5,00,000	0.7	3,50,000	0.890	3,11,500
3	5,00,000	0.5	2,50,000	0.840	2,10,000
				NPV	**10,980**

Net Present Value of Project N

Year end	Cash Flow (Rs.) (a)	C.E. (b)	Adjusted Cash Flow (Rs.) (c) = (a) × (b)	Present value factor (d)	NPV (Rs.) (e) = (c) × (d)
0	(8,25,000)	1.0	(8,25,000)	1.000	(8,25 ,000)
1	4,50,000	0.9	4,05,000	0.943	3,81,915
2	4,50,000	0.8	3,60,000	0.890	3,20,400
3	5,00,000	0.7	3,50,000	0.840	2,94,000
				NPV	**1,71,315**

Decision: Since the net present value of Project N is higher, so the project N should be accepted.

ILLUSTRATION 17

JOINT PROBABILITY

Albatross Ltd., are purchasing a machine at a cost of Rs.3,000. Life is two years. The CFAT for two years is as follows:

Year 1		**Year 2**	
Cash Flow (Rs.)	**Initial Probability**	**Cash flow (Rs.)**	**Conditional Probability**
1,500	0.4	2,200	0.5
		1,800	0.5
2,500	0.6	1,800	0.7
		2,000	0.3

(i) What are the various joint probabilities of occurrences of various branches?

(ii) If the risk free rate is 12%, what are the mean and Standard deviation of the probability distribution of possible NPVs?

Solution:

Step 1: *There are four branches. There will be four joint probabilities.*

Probability	**Probability**	**Joint Probability**
Year 1	**Year 1**	**Year 1 × Year 2**
0.40	0.50	0.20
0.40	0.50	0.20
0.60	0.70	0.42
0.60	0.30	0.18

***Step** 2: Computation of present values of cash flows (Rs.)*

Year 1			**Year 2**			
CF (Rs.)	**Discount Fact @ 12%**	**PV (Rs.)**	**CF (Rs.)**	**Discount Factor @ 12%**	**PV (Rs.)**	**Total PV (Rs.)**
1,500	0.893	1,339.50	2,200	0.797	1,753.40	3,092.90
1,500	0.893	1,339.50	1,800	0.797	1,434.60	2,774.10

2,500	0.893	2,232.50	1,800	0.797	1,434.60	3,667.10
2,500	0.893	2,232.50	2,000	0.797	1,594.00	3,826.50
		7,144.00			**6,216.60**	**13,360.60**

Computing mean NPV of the project

Total PV (Rs.)	**Jt. Prob**	**Product**
3092.90	0.20	618.58
2774.10	0.20	554.82
3667.10	0.42	1540.18
3826.50	0.18	688.77
13360.60		3402.35
	Less : Cost	(3000.00)
	NPV	**402.35**

Step 3: Computing standard deviation of probability distribution of possible NPVs.

Total PV (Rs.)	**Cost (Rs.)**	**NPV (X) (Rs.)**	$d = (X - \overline{X})$	**d^2**	**J.P**	**Prod**
3,092.90	3,000	92.90	-309.45	9,5759.30	0.20	19,151.9
2,774.10	3,000	-225.90	-628.25	3,94,698.1	0.20	78,939.6
3,667.10	3,000	667.10	264.75	70,092.6	0.42	29,438.9
3,826.50	3,000	826.50	424.15	1,79,903	0.18	32,382.6
		402.35			$\sigma 2$	15,9913.0
					σ	399.891

Conclusion: Mean NPV is Rs.402.35. Project has a positive NPV. Project can be accepted. The standard deviation of probability distribution of possible NPVs is Rs.399.891, or say Rs.400.00.

⇒ **CONCEPT 20**

SENSITIVITY ANALYSIS

The five important determinants of NPV, besides some others, are:

(i) selling price

(ii) sales quantity

(iii) cash cost

(iv) cost of capital, and

(v) amount of investment.

Sensitivity analysis is a tool to measure the risk surrounding a capital expenditure project. The analysis measures how responsive/ sensitive the project's NPV is to change in the variables that determine NPV.

This analysis is carried on the projects reporting positive Net Present Values. It requires the calculation of % change in value of each determinant of the NPV that may reduce the NPV to zero. These percentages are put in an ascending order. The item corresponding to minimum change is considered to be most sensitive/ risky. The concept of the sensitivity suggests that management should pay maxim um attention to this item as small adverse change in this item may result in big unfavourable results. Sensitivity analysis therefore provides an indication of why a project might fail.

Critics of this concept opine that the management should not pay maximum attention towards most sensitive item; rather they should pay maximum attention towards the item where there is highest probability of adverse change.

ILLUSTRATION- 18

Vanshu Ltd. is considering a project, the details are as follows. Cost of project: Rs. 2, 00,000. Life of the project years. Scrap value is expected to be Rs. 5000. Annual expected sale 1000 units @ Rs. 300. Unit variable costs. 200. Cost of capital 16%. Ignore tax. Perform sensitivity Analysis.

ANSWER

(i) Cost of project: Let cost of project = X

- X + 1,00,000 (2.246) + 5,000 (0.641) = 0

X = 2,27,805

% sensitivity: (27805/ 2,00,000) X 100 = 13.90%

(ii) Sales volume :

Let sales volume = X

-2,00,000 + 100X(2.246) + 5000 (0,641) = 0

X= 876

% Sensitivity = (124 / 1000) X 100 = 12.40%

(iii) Unit cost

Let unit cost = x

-2,00,000 + (300 -x)(l 000)(2.246) + 5000(0.641)

x= 212.38

% sensitivity = (12.38 / 200) X 100 = 6.1996

(iv) Selling price

Let selling price = x

– 2,00,000 + 1,000(x-200)(2.246) + 5,000(0.641) = 0

X = 287.62

% Sensitivity = (12.38 / 300) X 100 = 4.1296

(v) Discounting rate :

Average cash flow = (1,00,000 + 1,00,000 + 1,05,000)/ 3 = 1,01,667

Fake payback period
=2,00,000/1,01,667 =
1.97

Approximate IRR = 2496

NPV at 2496 = -2,00,000 + 1,00,000 X 1.981 + 5,000 X 0.524 = +720

NPV at 2596 = -2,00,000 + 1 ,00,000 X 1.952 + 5,000 X 0.512 = -2,240

$$IRR = 24 + \frac{720}{720 - (-2240)} \times 1 = 24.24\%$$

% Sensitivity = (8.24/ 16) X 100 = 51.50 96

ILLUSTRATION 19

SENSITIVITY ANALYSIS –MAY 2007

Type I

XYZ Ltd is considering a project for which the following estimates are avaibale

Initial Cost	Rs 10,00,000
Sales price	Rs 60 P.U.
Cost	Rs 40 P.U.
No. of units	50000 Per Year
Life	3 Years
Discount rate	10%

(i) Find out sensitivity analysis of initial outflow if initial outflow is increased upto Rs 20 lakh

(ii) Find out sensitivity analysis of Discount rate if discount rate is increased to 15%

(iii) Find out sensitivity Analysis of life of project if life is reduced to 2 years.

ANSWER.

OPTION I

NPV) Present ➔ CFAT $(PVAF)_{\substack{n=3 \\ r=15\%}}$ - Initial cost

➔ 20 x 50000 (2.486) – 10 Lakh

➔ 14,86000

NPV) When initial out flow = 20 Lakh

➔ 20 x 50000 (2.486) – 20 Lakh

➔ 486000

SENSITIVITY

$$\frac{1486000 - 486000}{1486000} \times 100 = 67.29\%$$

OPTION II

NPV when discount rate increased to 15%

CFAT $(PVAF)_{\substack{n=3 \\ r=15\%}}$ - initial outflow

➔ 20 x 50000 (2.283) – 10 Lakh

➔ 1283000

SENSITIVITY

$$\frac{1486000 - 1283000}{1486000} \times 100 = 13.66\%$$

OPTION III

NPV when project life is reduced to 2 year

CFAT $(PVAF)_{\substack{n=3 \\ r=10\%}}$ - initial outflow

➔ 20 x 50000 (1.735) – 10 Lakh

➔ 735000

SENSITIVITY

$$\frac{1486000 - 735000}{1486000} \times 100 = 50.53\%$$

Type II

ILLUSTRATION- 20

ABC Ltd is considering a project for which the following estimates are available

Initial Cost	Rs 15 lakh
Sales price	Rs 50 P.U.
Cost	Rs 20 P.U.
No. of units	10000
Life	10 Years
Discount rate	10%

Find out sensitivity analysis for

(i) Initial outflow

(ii) Discount rate

(iii) Life

ANSWER

NPV using Existing information

CFAT $(PVAF)_{\substack{n=3 \\ r=10\%}}$ - initial outflow

➔ 30 x 10000 (6.144) – 15 Lakh

➔ 343200

Case I : for sensitivity analysis of initial outflow let initial outflow be x

NPV = o

30 x 10000 (6.144) - x = o

x = 18,43,200

Sensitivity in initial outflow = $\left(\frac{343200}{15\ Lakh} \times 100\right) = 22.88\%$

⇨ If initial outflow increase by 22.88% NPV = o

Case II For sensitivity analysis of discount rate we will calculate IRR.

Trail & error method.

NPV) r = 10 % = 343200.

NPV) r = 15 % = 30 x 10000$(PVAF)_{\substack{n=3 \\ r=10\%}}$ - 15 Lakh

= 3 Lakh x 5.018 – 15 Lakh

= 5400.

NPV) r = 15 % = 30 x 10000$(PVAF)_{\substack{n=3 \\ r=10\%}}$ - 15 Lakh

= 3 Lakh x 5.018 – 15 Lakh

= 5400.

NPV) r = 16 % = 30 x 10000$(PVAF)_{\substack{n=3 \\ r=10\%}}$ - 15 Lakh

= 3 Lakh x 4.833 – 15 Lakh

= - 50100

$$IRR = 15\% + \left(\frac{1\%}{55{,}500}\right) \times 5400$$

= 15.097%

Sensitivity Analysis for discount rate $= \frac{5.097}{10} \times 100$

= 50.97%

Case III – If Discount rate increase by 50.97% NPV =o

For sensitivity analysis of life we will calculate discounted payback period.

Life	**Cash flow**	**Disc. Rate 10%**	**PV**	**Cum. PV**
1.	3 Lakh	.909	272700	272700
2.	3 Lakh	.826	247800	520500
3.	3 Lakh	.751	225300	745800
4.	3 Lakh	.683	204900	950700
5.	3 Lakh	.621	186300	1137000
6.	3 Lakh	.564	169200	1306200
7.	3 Lakh	.513	153900	1460100
8.	3 Lakh	.466	139800	1599900
9.	3 Lakh	.424	127200	1727100
10	3 Lakh	.385	115500	1842600

$$payback = 7\ year + \left(\frac{1\ Year}{139800} \times 39900\right)$$

= 7.285 year

$$Sensitivity\ analysis = \left(\frac{2.71}{10\ year} \times 100\right) = 27.1\%$$

⇨ If Life reduce by 27.1% then NPV will reduce to zero

⇒ **CONCEPT 21**

SIMULATION / HERTZ MODEL

Simulation is a mathematical technique which is used to predict the expected outcome when several outcomes are possible.

The technique is based on random number. (A set of numbers is said to be random number when the probability of its selection is equal to the probability of selection of any other number *i.e* .the set of number is said to be random when the probability of selection of all members is equal).

For business applications, Monte Carlo simulation is which is based on probabilities. Hertz used it for evaluation of risky investment decisions by calculating average of various possible returns. (Hertz's capital budgeting model). Hertz suggested that simulation can be used to estimate return on capital employed on a proposed project facing various uncertainties.

There are three steps in his model (i) Estimate various possible factors affecting the return on CE, also estimate the in probabilities (ii) Calculate ROCE on the basis of various factors using random numbers. Taking the help of computer this trial may be repeated a number of times. (iii)The average return obtained for all these trials is considered as possible ROCE under his mode.

ILLUSTRATION 21

Frontier Bakery keeps stock of a particular brand of cake. Daily demand based on past experience is as given below

Experience indicates:

Daily	0	15	25	35	45	50
Probability	0.01	0.15	0.20	0.50	0.12	.02

Consider the sequence of random number:

48, 78, 09, 51, 56, 77, 15, 14, 68, 09

Using the sequence, simulate the demand for the next 10 days.

ANSWER.

Daily demand	***Probability***	***Cum. Probability***	***Cumulative probability range***	***Random no. adjusted cumulative probability range***
0	0.01	0.01	0-0.01	0-0
15	0.15	0.16	0.01-0.16	0.01-0.15
25	0.20	0.36	0.16-0.36	0.16-0.35
35	0.50	0.86	0.36-0.86	I
45	0.12	0.98	0.86-0.98	0/86-0.97
50	0.02	1.00	0.98-1.00	0.98-0.99

Simulation of demand for next 10 days

	Demand
1	35
2	35
3	15
4	35
5	35
6	35
7	15
8	15
9	35
10	15

ILLUSTRATION 22

A company manufactures around 200 mopeds. Depending upon the availab1hty of raw materials and other conditions, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is as given below

Production per	***Probability***
196	0.05
197	0.09
198	0.12
199	0.14
200	0.20
201	0.15
202	0.11
203	0.08
204	0.06

The finished mopeds are transported in a specially designed three storey lorry that can accommodate only 200 mopeds. Using the following 15 random numbers 82, 89, 78, 24, 53, 61, 12, 45, 04, 23, 50, 77, 27, 54, 10, simulate the process to find out: what will be average number of mopeds waiting in the factory?

ANSWER.

Production per day	***Probability***	***Cum. Probabilit y***	***Cumulative probability range***	***Random no. adjusted cumulative***
196	0.05	0.05	0-0.05	0 - 0.04
197	0.09	0.14	0.05-0.1 4	0.05-0.13
198	0.12	0.26	0.14-0.26	0.14-0.25
199	0.14	0.40	0.26-0.40	0.26-0.39
200	0.20	0.60	0.40-0.60	0.40-0.59
201	0.15	0.75	0.60-0.75	0.60-0.74

202	0.11	0.86	0.75-0.86	0.75-0.85
203	0.08	0.94	0.86-0.94	0.86-0.93
204	0.06	1.00	0.94-1.00	0.94- 0.99

Day	***Production***	***Dispatch***	***Stock***
1	202	200	2
2	203	200	5
3	202	200	7
4	198	200	5
5	200	200	5
6	201	200	6
7	197	200	3
8	200	200	3
9	196	199	0
10	198	198	0
11	200	200	0
12	202	200	2
13	199	200	1
14	200	200	1
15	197	198	0
Total	40		

Average No. of moped waiting for transportation: 2.67

CHAPTER 9
INTRODUCTION OF WORKING CAPITAL

⇒ **CONCEPT 1**

MEANING OF WORKING CAPITAL

The capital which is required to finance current assets is called working capital. It is the capital of a business which is used to carry out day-to-day business operations of a firm.

Current Assets: An asset is classified as current when:

- **(i)** It is expected to be realised or intends to be sold or consumed in normal operating cycle of the entity;
- **(ii)** The asset is held primarily for the purpose of trading;
- **(iii)** It is expected to be realised within twelve months after the reporting period;
- **(iv)** It is non- restricted cash or cash equivalent.

Generally current assets of an entity, for the purpose of working capital management can be grouped into the following main heads:

- **a)** Inventory (raw material, work in process and finished goods)
- **b)** Receivables (trade receivables and bills receivables)
- **c)** Cash or cash equivalents (short-term marketable securities)
- **d)** Prepaid expenses.

⇒ **CONCEPT 2**

SIGNIFICANCE OF WORKING CAPITAL MANAGEMENT

➢ **Importance of Adequate Working Capital**

Management of working capital is an essential task of the finance manager. He has to ensure that the amount of working capital available with his concern is neither too large nor too small for its requirements. A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds. If the firm has inadequate working capital, such firm runs the risk of insolvency. Paucity of working capital may lead to a situation where the firm may not be able to meet its liabilities.

The various studies conducted by the Bureau of Public Enterprises have shown that one of the reasons for the poor performance of public sector undertakings in our country has been the large amount of funds locked up in working capital. This results in over capitalization. Over capitalization implies that a company has too large funds for its requirements, resulting in a low rate

of return, a situation which implies a less than optimal use of resources. A firm, therefore, has to be very careful in estimating its working capital requirements. Maintaining adequate working capital is not just important in the short-term. Sufficient liquidity must be maintained in order to ensure the survival of the business in the long- term as well. When businesses make investment decisions they must not only consider the financial outlay involved with acquiring the new machine or the new building, etc., but must also take account of the additional current assets that are usually required with any expansion of activity.

For e.g.:-Increased production leads to holding of additional stocks of raw materials and work-in-progress. An increased sale usually means that the level of debtors will increase. A general increase in the firm's scale of operations tends to imply a need for greater levels of working capital. A question then arises what is an optimum amount of working capital for a firm? We can say that a firm should neither have too high an amount of working capital nor should the same be too low. It is the job of the finance manager to estimate the requirements of working capital carefully and determine the optimum level of investment in working capital.

⇒ **CONCEPT 3**

OPTIMUM WORKING CAPITAL

If a company's current assets do not exceed its current liabilities, then it may run into trouble with creditors that want their money quickly. Current ratio along with acid test ratio has traditionally been considered the best indicator of the working capital situation. It is understood that a current ratio of 2 (two) for a manufacturing firm implies that the firm has an optimum amount of working capital. This is supplemented by Acid Test Ratio which should be at least 1 (one). Thus, it is considered that there is a comfortable liquidity position if liquid current assets are equal to current liabilities. Bankers, financial institutions, financial analysts, investors and other people interested in financial statements have, for years, considered the current ratio at 'two' and the acid test ratio at 'one' as indicators of a good working capital situation. As a thumb rule, this may be quite adequate. However, it should be remembered that optimum working capital can be determined only with reference to the particular circumstances of a specific situation. Thus, in a company where the inventories are easily saleable and the sundry debtors are as good as liquid cash, the current ratio may be lower than 2 and yet firm may be sound. In nutshell, a firm should have adequate working capital to run its business operations. Both excessive as well as inadequate working capital positions are dangerous.

⇒ **CONCEPT 4**

NATURE AND TYPES OF WORKING CAPITAL

In the working capital management, a financial manager is faced with a decision involving some of the consideration as follows:

1. What should be the total investment in working capital of the firm?
2. What should be the level of individual current assets?
3. What should be the relative proportion of different sources to finance the working capital requirements?

The term working capital may be used in different ways:

(i) ***Gross Working Capital (or Total Working Capital):*** The gross working capital refers to the firm's investment in all the current assets taken together. The total of investments in all the individual current assets is the gross working capital. For example, if a firm has a cash balance of Rs.50,000, debtors of Rs.70,000 and inventory of raw material and finished goods has been assessed at Rs.1,00,000, then the gross working capital of the firm is Rs.2,20,000 (*i.e.,* Rs.50,000 + Rs.70,000 + Rs.1,00,000).

(ii) ***Net Working Capital:*** The term 'net working capital' may be defined as the excess of total current assets over total current liabilities. It may be noted that the current liabilities refer to those liabilities which are payable within a period of 1 year. The extent, to which the payments to these current liabilities are delayed, the firm gets the availability of funds for that period. So, a part of the funds required to maintain current assets is provided by the current liabilities and the firm will be required to invest the funds in only those current assets which are not financed by the current liabilities.

(iii) ***Initial*** **working capital:** The capital, which is required at the time of the commencement of business, is called initial working capital. These are the promotion expenses incurred at the earliest stage of formation of the enterprise which include the incorporation fees, attorney's fees, office expenses and other preliminary expenses.

⇒ **CONCEPT 5**

FACTORS DETERMINING WORKING CAPITAL REQUIREMENT

The working capital needs of a firm are determined and influenced by various factors. A wide variety of considerations may affect the quantum of working capital required and these considerations may vary from time to time. The working capital needed at one point of time may not be good enough for some other situation. The determination of working capital requirement is a continuous process and must be undertaken on a regular basis in the light of the changing situations. Following are some of the factors which are relevant in determining the working capital needs of the firm:

1. ***Basic Nature of Business:*** The working capital requirement is closely related to the nature of the business of the firm. In case of a retail shop or a trading firm, the amount of working capital required is small enough. Most of the transactions are undertaken in cash and the length of the operating cycle is generally small. The trading concerns usually have smaller needs of working capital, however, in certain cases, large inventories of goods may be required and consequently the working capital may be large.

2. ***Business Cycle Fluctuations*:** Different phases of business cycle, *i.e.,* boom, recession, recovery, *etc.* also affect the working capital requirement. In case of boom conditions, inflationary pressure appears and business activities expand. As a result, the overall need for cash, inventories, *etc.,* increases resulting in more and more funds blocked in these current assets. In case of recession period however, there is usually dullness in business activities and there will be an opposite effect on the level of working capital requirement. There will be a fall in inventories and cash requirement, *etc.*

3. ***Seasonal Operations:*** If a firm is operating in goods and services having seasonal fluctuations in demand, then the working capital requirement will also fluctuate with every change. In a cold drink factory, the demand will certainly be higher during summer season and, therefore, more working capital is required to maintain higher production, in the form of larger inventories and bigger receivable. On the other hand, if the operations are smooth and evenly scattered throughout the year, then the working capital requirement will be constant and will not be affected by the seasonal factors.

4. ***Market Competitiveness:*** The market competitiveness has an important bearing on the working capital needs of a firm. In view of the competitive conditions prevailing in the market, the firm may have to offer liberal credit terms to the customers resulting in higher debtors. Even larger inventories may be maintained to serve an order as and when received; otherwise the customer may go to some other supplier. Thus, the working capital tends to be high as a result of greater investment in inventories and receivable. On the other hand, a monopolistic firm may not require larger working capital. It may ask the customers to pay in advance or to wait for some time after placing the order.

5. ***Credit Policy:*** The credit policy means the totality of terms and conditions on which goods are sold and purchased. A firm has to interact with two types of credit policies at a time. *One,* the credit policy of the supplier of raw materials, goods, *etc.,* and *two,* the credit policy relating to credit which it extends to its customers. In both the cases, however, the firm while deciding its credit policy, has to take care of the credit policy of the market. For example, a firm might be purchasing goods and services on credit terms but selling goods only for cash. The working capital requirement of this firm will be lower than that of a firm which is purchasing cash but has to sell on credit basis.

6. ***Supply Conditions:*** The time taken by a supplier of raw materials, goods, *etc.,* after placing an order, also determines the working capital requirement. If goods are received as soon as or in a short period after placing an order, then the purchaser will not like to maintain a high level of inventory of that good. Otherwise, larger inventories should be kept, *e.g.,* in case of imported goods. It is often seen that the shopkeepers may not be keeping stock of all items, but whenever there is a demand, they procure from the wholesale / producer and supply it to their customers.

Thus, the working capital requirement of a firm is determined by a host of factors. Every consideration is to be weighed relatively to determine the working capital requirement.

Further, the determination of working capital requirement is not once a while exercise, rather a continuous review must be made in order to assess the working capital requirement in the changing situation. There are various reasons which may requirement review of the working capital requirement, e.g., change in credit policy, change in sales volume, etc.

⇒ **CONCEPT 6**

OPERATING CYCLE AND WORKING CAPITAL NEEDS

The operating cycle of firm consists of the time required for the completion of the chronological sequences of some or all of the following:

(i) Procurement of raw materials and services.
(ii) Conversion of raw materials into work-in-progress.
(iii) Conversion of work-in-progress into finished goods.
(iv) Sale of finished goods (cash or credit).
(v) Conversion of receivable into cash.

Operating cycle period- The length or time duration of the operating cycle of any firm can be defined as the sum of its inventory conversion period and the receivable conversion period.

Inventory Conversion Period (ICP): It is the time required for the conversion of raw materials into saleable finished goods. In a manufacturing firm the ICP is consisting of Raw Material Conversion Period (RMCP), Work-in-Progress Conversion Period (WPCP), and the Finished Goods Conversion Period (FGCP). RMCP refers to the period for which the raw materials is generally kept in stores before it is issued to the production department. The WPCP refers to the period for which the raw material remains in the production process before it is taken out as a finished unit. The FGCP refers to the period for which finished units remain in stores before being sold to a customer.

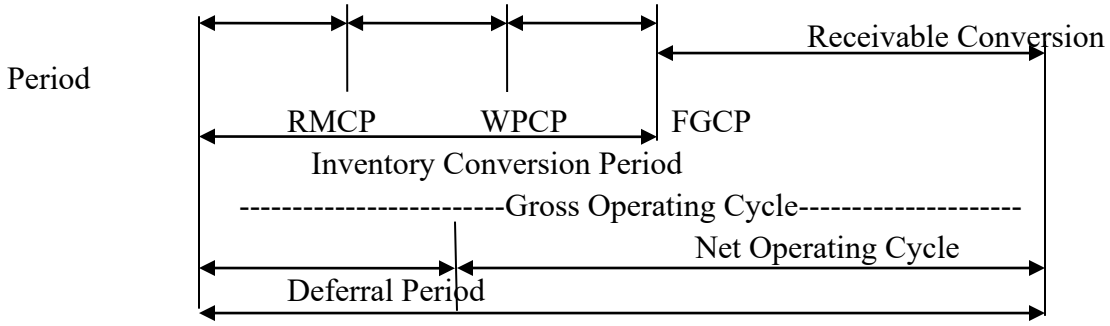
(i) ***Receivable Conversion Period (RCP):*** It is the time required to convert the credit sales into cash realisation. It refers to the period between the occurrence of credit sales and collection from debtors.

The total of ICP and RCP is also known as Total Operating Cycle Period (TOCP). The firm might be getting some credit facilities from the supplier of raw materials, wage earners, *etc.* This period for which the payments to these parties are deferred or delayed is known as Deferral Period (DP). The Net Operating Cycle (NOC) of the firm is arrived at by deducting the DP from the TOCP.

Thus,

$$NOC = TOCP - DP$$
$$= ICP + RCP - DP$$

The operating cycle of a firm has been as shown in below:



For calculation of TOCP and NOC, various conversion periods may be calculated as follows:

$$RMCP = \frac{\text{Average Raw Materials Stock}}{\text{Total Raw Materials Consumption}} \times 365$$

$$WPCP = \frac{\text{Average Work-in-progress}}{\text{Total Cost of production}} \times 365$$

$$FGCP = \frac{\text{Average Finished Goods}}{\text{Total Cost of Goods Sold}} \times 365$$

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

$$DP = \frac{\text{Average Creditors}}{\text{Total Credit Purchase}} \times 365$$

In respect of these formulations, the following points are worth noting:

1. The 'Average' value in the numerator is the average of opening balance and closing balance of the respective item. However, if only the closing balance is available, then even the closing balance may be taken as the 'Average'.

2. The figure '365' represents number of days in a year. However, there is no hard and fast rule and sometimes even 360 days are considered.

3. The 'Total' figure in the denominator refers to the total value of the item in a particular year.

4. In the calculation of RMCP, WPCP, and FGCP, the denominator is calculated at cost-basis and the profit margin has been excluded. The reason being that there is no investment of funds in profit as such.

On the basis of above conversion periods, the TOCP and NOC may be ascertained as follows:

Particulars	Number of Days
RMCP	**----- Days**
+ WPCP	**----- Days**
+ FGCP	**----- Days**
+ RCP	**----- Days**
TOCP	**----- Days**
-DP	**----- Days**
NOC	**----- Days**

The TOCP and NOC do not measure the absolute amount of funds invested in working capital. However, a longer NOC indicates a requirement for more working capital. The operating cycle for an individual component keeps on changing from time to time, particularly the RCP and the DP. Therefore, a regular attention and review is required. It would be extremely difficult to determine an optimum operating cycle for a particular firm. The comparison of firm's operating cycle for a period with that of the previous period and with that of the operating cycle of other firms may help in maintaining and controlling the length of the operating cycle.

⇒ **CONCEPT 7**

IMPORTANCE OF WORKING CAPITAL MANAGEMENT

The importance of working capital management can be expressed in terms of the following points:

(i) The level of current assets changes constantly and regularly depending upon the level of actual and forecasted sales. This requires that the decisions to bring a level of current assets to the desired levels of current assets should be made at the earliest opportunity and as frequently as required.

(ii) The changing levels of current assets may also require review of the financing pattern. How mush working capital needs to be financed by different sources of financing must be periodically reviewed.

(iii) Inefficient working capital management may result in loss of sales and consequently decline in profits of the firm.

(iv) Inefficient working capital management may also lead to insolvency of the firm if it is not in a position to meet its liabilities and commitments.

(v) Current assets usually represent a substantial portion of the total assets of the firm, resulting in investment of a larger chunk of funds in the current assets.

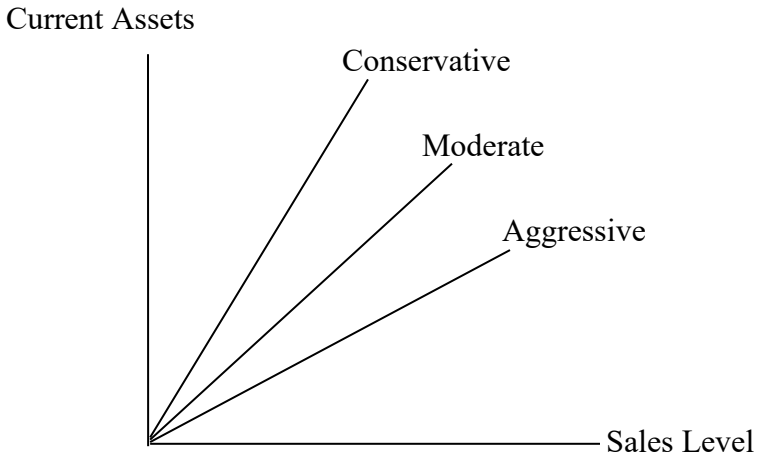
(vi) There is an obvious and inevitable relationship between the sales growth and the level of current assets. The target sales level can be achieved only if supported by adequate working capital. The increase in sales level requires increase in working capital and thus the financial manager must be able to respond quickly in providing and arranging additional working capital.

Thus, the efficient working capital management is important from the point of view of both the liquidity and the profitability. Keeping in view the importance of working capital management, the financial manager should look into the framing of a suitable working capital policy for the firm. Following are some of the important aspects of a working capital policy:

⇒ **CONCEPT 8**

DETERMINING THE RATIO OF CURRENT ASSETS TO SALES:

There is a relationship between the sales and the current assets. The actual and the forecasted sales have a major impact on the amount of current assets which the firm must maintain. So, depending upon the sale forecast, the financial manager should also estimate the requirement of current assets. However, as the sales forecast cannot be certain, so is the case with the forecast of current assets also. This uncertainty may result in spontaneous increase in current assets in line with the increase in sales level, and may bring the firm to face tight working capital position. In order to overcome this uncertainty, the financial manager may establish a minimum level as well as a safety component for each of the current assets for different levels of sales. There are three types of working capital policies which a firm may adopt, *i.e.,* Moderate working capital policy, Conservative working capital policy, and Aggressive working capital policy. These policies describe the relationship between sales level and the level of current assets and have been shown below:



Above figure shows that in case of Moderate working capital policy, the increase in sales level will be coupled with proportionate increase in level of current assets also, *e.g.,* if the sales increase or are expected to increase by 10%, then the level of current assets will also be increased by 10%. In case of Conservative working capital policy, the firm does not like to take risk. For every increase in sales, the level of current assets will be increased more than proportionately. Such a policy tends to reduce the risk of shortage of working capital by increasing the safety component of current assets. The conservative working capital policy also reduces the risk of non-payment to liabilities.

On the other hand, a firm is said to have adopted an Aggressive working capital policy if the increase in sales does not result in proportionate increase in current assets. For example, for 10% increase in sales the level of current assets is increased by 7% only. This type of aggressive policy has many implications. *First,* the risk of insolvency of the firm increases as the firm maintains lower liquidity. *Second,* the firm is exposed to greater risk as it may not be able to face unexpected change in market, and *third,* reduced investment in current assets will result in increase in profitability of the firm.

⇒ **CONCEPT 9**

LIQUIDITY VERSUS PROFITABILITY - A RISK-RETURN TRADE-OFF

Another important aspect of a working capital policy is to maintain and provide sufficient liquidity to the firm. A firm must maintain enough cash balance or other liquid assets so that it never faces problems of payment to liabilities. Does it mean that a firm should maintain unnecessarily large liquidity to pay the creditors? Can a firm adopt such a policy? Certainly not. There is also another side of the coin. Greater liquidity makes the firm meeting easily its payment commitments, but simultaneously greater liquidity involves cost also.

The risk-return trade-off involved in managing the firm's working capital is a trade-off between the firm's liquidity and its profitability. By maintaining a large investment in current assets like cash, inventory, *etc.,* the firm reduces the chances of (i) production stoppages and the lost sales from the inventory shortages, and (ii) the inability to pay the creditors on time. However, as the firm increases its investment in working capital, there is not a corresponding increase in its expected returns. This means that the firm's return on investment drops because the profits are unchanged while the investment in current assets increases.

In addition to the above, the firm's use of current liability *versus* long-term debt also involves a risk-return trade-off. Other things being equal, the greater the firm's reliance on the short-term debts or current liabilities in financing its current assets, the greater the risk of illiquidity. On the other hand, the use of current liability can be advantageous as it is less costly and flexible means of financing. A firm can reduce its risk of illiquidity and the profitability.

The effect of changing levels of current assets on the risk-return trade-off can be demonstrated as follows:

For a given firm, if the level of current assets is increased (it impliedly means that the fixed assets will reduce by the same amount) then the liquidity position of the firm will also increase and it will be easily meeting its payment commitments. But simultaneously its profit will decrease as the level of fixed assets has gone down. In other words, when the level of current assets is increased, the liquidity of the firm increases but there is always a cost associated with the increased liquidity. More and more funds will be blocked in current assets which are less profitable and, therefore, the profitability of the firm will suffer.

Now, in order to increase the profitability, the firm reduces the current assets (and thereby increasing the fixed assets). Consequently, the profitability of the firm will increase but the liquidity will be reduced. The firm is now exposed to a greater risk of insolvency. The risk-return syndrome can be summed up as follows: When liquidity increases, the risk of insolvency is reduced but the profitability is also reduced. However, when the liquidity is reduced, the profitability increases but the risk of insolvency also increases. So, the profitability and risk move in the same direction. What is required on the part of the financial manager is to maintain a balance between risk and profitability.

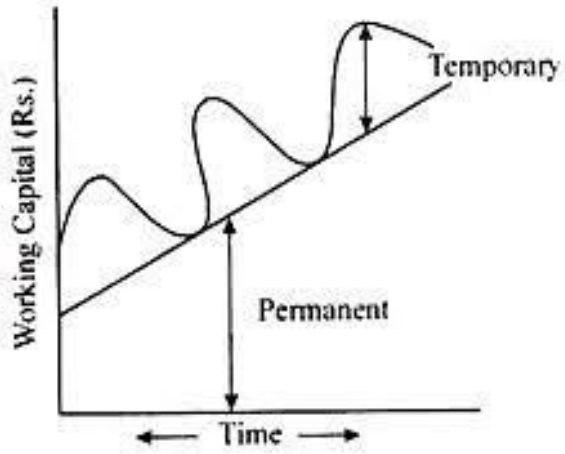
⇒ **CONCEPT 10**

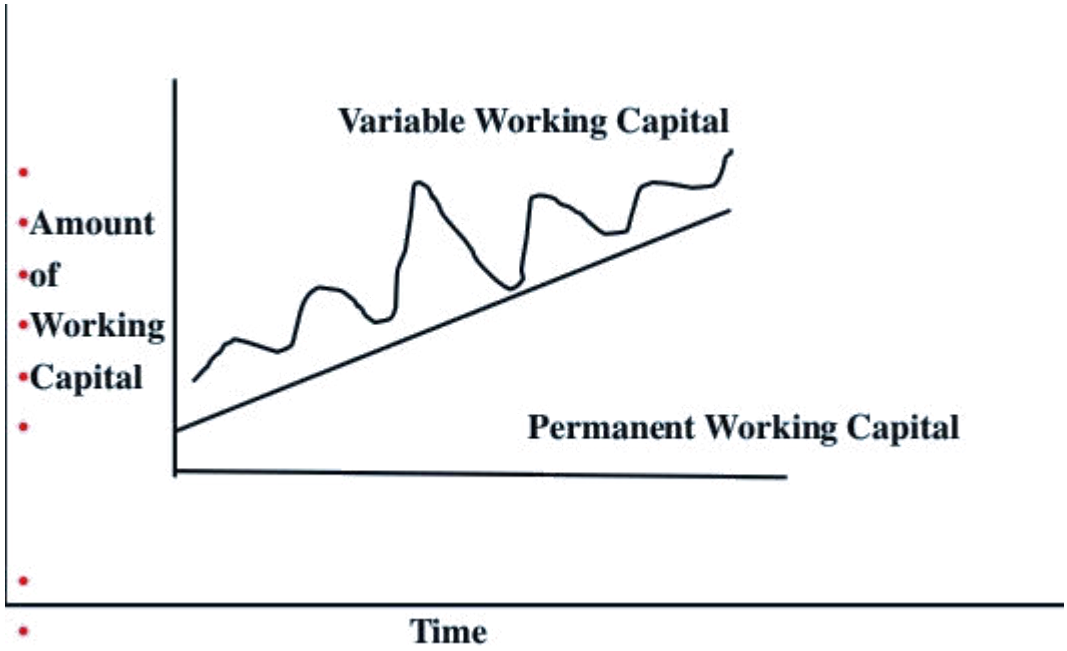
TYPES OF WORKING CAPITAL NEEDS

Another important aspect of working capital management is to segregate the total working capital needs of the firm into permanent and temporary needs.

1. ***Permanent Working Capital:*** PWC is the minimum level of working capital which is continuously required by a firm in order to maintain its activities. Every firm must have a minimum of cash, stock and other current assets in order to meet its business requirements irrespective of the level of operations. Even during slack season, every firm maintains some current assets. This minimum level of current assets which must be maintained by any firm all the times, is known as permanent working capital for that firm. This amount of working capital is constantly and regularly required in the same way as fixed assets are required. So, it may also be called fixed working capital.

2. ***Temporary Working Capital:*** Over and above the permanent working capital, the firm may also require additional working capital in order to meet the requirements arising out of fluctuations in sales volume. This extra working capital needed to support the increased volume of sales is known as temporary or fluctuating working capital for example, in case of spurt in sales, more stock must be maintained in order to meet the demand. This additional inventory may become excess when the normal sales level reappears after some time.





Above figure shows that the permanent working capital may either be constant over a period of time or may be increasing over a period of time. Further, that the permanent working capital is constant or increasing regularly while the temporary working capital is fluctuating from time to time. The bifurcation of total working capital into permanent and temporary components is relevant for the working capital policy decisions relating to financing of working capital needs.

⇒ **CONCEPT 11**

FINANCING OF CURRENT ASSETS

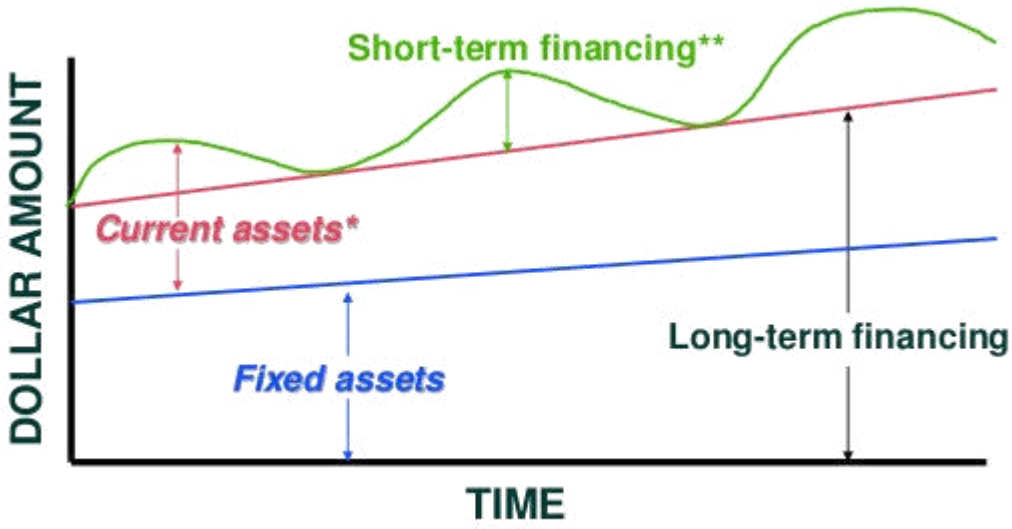
Another important aspect of working capital management is to decide the pattern of financing the current assets and one of the major problem in working capital management is the decision whether to finance the working capital with one source or the other. The firm has to decide about the sources of funds which can be availed to make investment in current assets.

It has been noted earlier that the net working capital is the excess of total current assets over total current liabilities. A part of total current assets is funded by current liabilities and only the remaining portion of current assets, known as net working capital, is to be arranged for. Therefore, the financial manager has to arrange funds for making investment in net working capital only. Different long-term and short-term sources of funds are available to a firm and all these sources are different from one another with respect to their nature and characteristics. The working capital requirements of a firm can be financed by all or any combination of these sources.

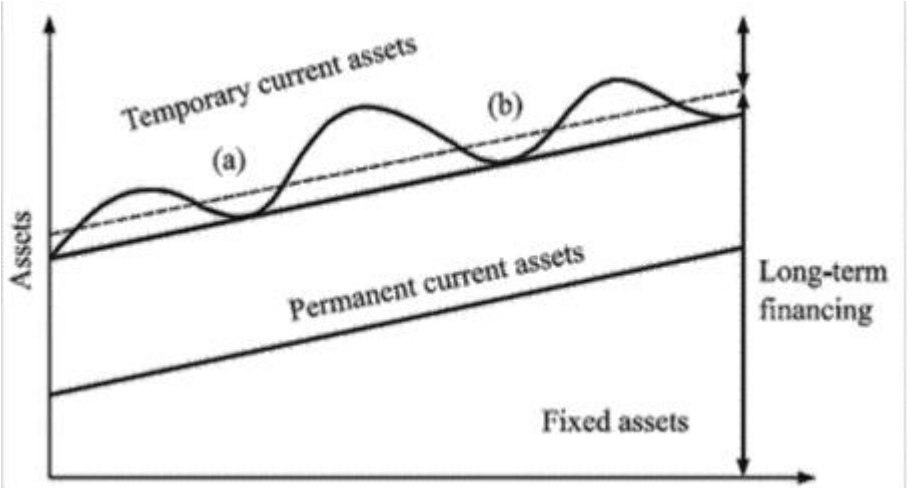
1. ***Hedging Approach (also known as Matching Approach):*** The hedging principle states that the financing maturity should follow the cash flow characteristics of the assets being financed. For example, an asset that is expected to provide cash flows over a period of say, 5 years, then it should be financed with a debt having similar pattern of cash flow requirements. The hedging approach involves matching the cash flows generating characteristics of an asset with the maturity of the sources of financing used to finance it.

   The Hedging Approach to working capital financing is based upon the concept of bifurcation of total working capital needs into permanent working capital and temporary working capital. As the name itself suggests, the life duration of current assets and the maturity period of the sources of funds are matched. The general rule is that the length of the finance should match with the life duration of the assets. That is why the fixed assets are always financed by long-term sources only. So, the permanent working capital needs are financed by long-term sources. On the other hand, the temporary working capital needs are financed by short-term sources only. In other words, the core or fixed working capital is financed by long-term sources of funds while the additional or fluctuating working capital needs are financed by the short-term sources.

The hedging approach to working capital financing has been shown below:

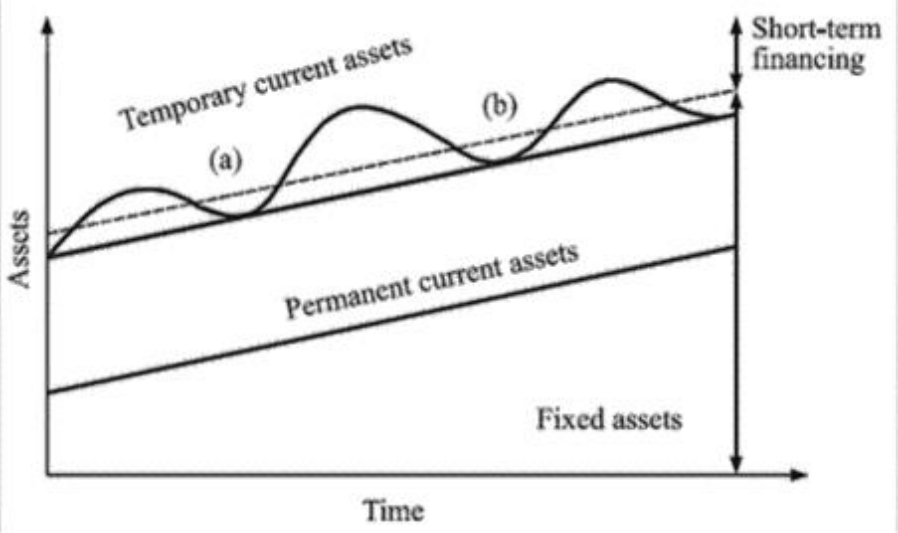


2. ***Conservative Approach:*** The working capital policy of a firm is called a conservative policy when all or most of the working capital needs are met by the long-term sources and thus the firm avoids the risk of insolvency. The conservative approach to financing of working capital has been shown in the figure A and figure B.



So, under the conservative approach, the working capital is primarily financed by long-term sources. The larger the portion of long-term sources used for financing the working capital, the more conservative is said to be working capital policy of the firm. In case, the firm has no temporary working capital need then the idle long-term funds can be invested in marketable securities. This will help the firm to earn some income. The Figure B shows that the firm uses a small amount of short-term sources to meet its peak level working capital needs. It also stores liquidity in the form of marketable securities in slack season. The light shaded area in Figure B shows the use of short-term financing for meeting the short-term needs while the dark shaded area shows the investment of excess funds in marketable securities.

3. ***Aggressive Approach:*** A working capital policy is called an aggressive policy if the firm decides to finance a part of the permanent working capital by short-term sources. So, the short-term financing under aggressive policy is more than the short-term financing under the hedging approach. The aggressive policy seeks to minimize excess liquidity while meeting the short-term requirements. The firm may accept even greater risk of insolvency in order to save cost of long-term financing and thus in order to earn greater return. Neither the Hedging approach nor the Conservative approach can be used by any firm in the strict sense. Therefore, the financial manager should try to have a trade-off between the hedging and conservative approach.



⇒ **CONCEPT 12**

SOURCES OF FINANCE IN WORKING CAPITAL

Sources of financing of working capital differ as per the classification of working capital into permanent working capital and variable working capital.

1. **Sources of permanent working capital are the following:**

   (a) Owner's funds are the main source. Sale of equity stock or preference stock could provide a permanent working capital to the business with no burden of repayment particularly during short period. These funds can be retained in the business permanently. Permanent working capital provides more strength to the business.

   (b) Another source of permanent working capital is bond financing but it has a fixed maturity period and ultimately repayment has to be made. For repayment of this source, company provides sinking funds for retirement of bonds issued for permanent working capital.

(c) Term loan from banks or financial institutions has the same characteristics as the bond financing of permanent working capital.

(d) Short-term borrowing is also a source of working capital finance on permanent basis.

2. Source of variable working capital

Working capital required for limited period of time may be secured from temporary sources as discussed below:

(a) Trade Creditors: Trade credit provide a quite effective source of financing variable working capital for the period falling between the point goods are purchased and the point when payment is made. The longer this period, the more advantageous it becomes for the firm to avoid efforts of seeking finance for holding inventories or receivables.

(b) Bank loan: Bank loan is used for variable or temporary working capital. Such loans run from 30 days to several months with renewals being very common. These loans are granted by bank on the goodwill and credit worthiness of the borrower, and collateral may include goods, accounts/notes receivable or Government obligations or other marketable securities, commodities and equipments.

(c) Commercial Paper: It can be defined as a short term money market instrument, issued in the form of promissory notes for a fixed maturity. It will be totally unsecured and will have a maturity period ranging from 90 days to 180 days. It will meet the short term finance requirements of the companies and will be good short term investment for parking temporary surpluses by corporate bodies.

(d) Depreciation as a source of working capital: Increase in working capital results form the difference in the amount of depreciation allowance deducted from earnings and new investment made in fixed assets.

Usually, the entire amount deducted towards depreciation on fixed assets is not invested in the acquisition of fixed assets and is saved and utilised in business as working capital. This is also a temporary source of working capital so long as the acquisition of fixed asset is deferred.

(e) Tax liabilities: Deferred payment of taxes is also a source of working capital. Taxes are not paid from day-to-day, but estimated liability for taxes is indicated in Balance Sheet. Besides, business organisations collect taxes by way of income tax payable on salaries of staff deducted at source, old age retirement benefits, excise taxes, sales taxes, etc. and retain them for some period in business to be used as working capital.

(f) Other miscellaneous sources are Dealer Deposits, Customer advances etc.

⇒ CONCEPT 13

NEGATIVE WORKING CAPITAL

Net working capital is the term used to denote the difference of current assets and current liabilities. Traditionally it has been assumed that the current assets of a firm should be more than adequate to meet the current liabilities.

In other words, the current ratio, i.e. the ratio of current assets to current liabilities should be more than one. The rationale behind this assumption is that the firm should at all times be in a position to maintain liquidity. By definition, current assets are treated as those assets which are capable of quick conversion into cash and secondly, the time period for conversion into cash is usually small but not more than one year in any case.

Carrying the argument further, one can postulate that the older the current asset gets, the lesser are its chances of easy conversion into cash. So, in order to maintain the quality of its current assets, the firm seeks to reduce their holding period. Simultaneously, the firm tries to prolong the time period available for payment of its current liabilities by building up the level of inventory through trade finance and using bank borrowing against inventory and debtors. The result of this exercise is that the net working capital of the firm turns negative and its current ratio becomes less than one.

On the face of, it the concept of negative net working capital appears to be thought with unfavorable consequences for the firm. In such a situation, if the firm is required to meet its current obligations all at once, it might not have adequate liquidity available and as a result, it could default on its obligations. This could happen in a situation where the cash has moved out of the operating cycle to long term uses like creation of fixed assets or towards non-productive investments in other firms. But if the firm has, as part of its conscious working capital management policy, kept the level of current assets to the minimum and deployed the surplus cash in non-working capital, yet liquid investments, then it can afford to function with a net working capital that is negative.

Hence so long as a firm does not default on payment of its current liabilities, the fact that it has a negative net working capital need not be a cause for concern. This may not always be true as most of the organisatons may like to see current assets more than current liabilities. Example of such organisations could be banks who provide short-term credit or suppliers of raw material who sell on credit to firms.

⇒ CONCEPT 14

WORKING CAPITAL: MONITORING AND CONTROL

It goes without saying that the working capital quantum as well as its financing pattern are subject to constant monitoring and review by the financial manager. There are different analytical tools which can help a financial manager in monitoring, reviewing and controlling the working capital, some of which are as follows:

1. ***Monitoring the Operating Cycle:*** It is already noted that the total working capital need depends upon the length of the operating cycle. The longer the operating cycle, the greater would be the working capital need. The operating cycle of a firm is consisting of different cycles for different elements of working capital. Therefore, the financial manager must monitor the duration of all these individual operating cycles for different elements in order to effectively control the working capital. The following points are worth noting here:

   (a) The actual operating cycle period should be ascertained for each element, *i.e.,* the raw materials, the work-in-progress, the finished goods, the receivables, *etc.,* over a period of time and should be compared with the standard operating cycle period set for the same firm or for the industry as a whole. Efforts should also be made to point out the reasons for differences in the actual operating cycle period and the standard operating cycle period.

   (b) There should always be an attempt to reduce the length of the operating cycle, total as well as for each element. The standard operating cycle period need not be lowered but the actual operating cycle period must be kept as low as possible. This makes the firm to have comfortable liquidity.

   (c) Efforts, in particular, are needed to control the Receivable Conversion Period. If the firm relaxes in collection, the customers will always like to take liberty.

2. ***Working Capital Ratios:*** Another analytical tool that can be used to monitor the working capital is the accounting ratios, particularly the working capital ratios. For this purpose, the following working capital ratios may be noted:

   (i) Current ratio, *i.e.,* Current assets to Current liabilities ratio.
   (ii) Liquid ratio, *i.e.,* Quick assets to Current liabilities ratio.
   (iii) Current assets to Total assets ratio.
   (iv) Current assets to Total sales ratio.

These ratios may be ascertained for a number of year to find out the emerging working capital position of the firm. It may be noted that the Current Ratio is the most important one and it indicates the position of net working capital also. If the Current Ratio is more than 1, then the net working capital is positive. If the Current Ratio is 1, then the current assets are just equal to current liability and there is no net working capital.

The Current Ratio as well as the Quick Ratio, both indicate the liquidity position of the firm *vis-à-vis* the current liabilities. However, the Quick Ratio is supposed to give a better indication of the liquidity since it excludes the stock which may not be immediately realizable. The standard form of Current Ratio and Quick Ratio is taken as 2 :1 and 1 : 1 respectively.

3. ***Monitoring the Liquidity*:** It is the liquidity which ensures the short-term survival of the firm. Sufficient liquidity can be obtained by efficient management of different elements of working capital. If a firm faces liquidity problems, then it must be realised that this liquidity problem arises from lack of finance. The liquidity problem can be overcome by raising additional funds from different sources. But this may not always be possible for the firm.

⇒ **CONCEPT 15**

WORKING CAPITAL LEVERAGE

Working capital leverage may refer to the way in which a company's profitability is affected in part by its working capital management. Profitability of a business enterprise is affected when working capital is varied relative to sales but not in the same proportion. If the flow of funds created by the movements of working capital through the various business processes is interrupted, the turnover of working capital is decreased as is the rate of return on investment. Working capital management should enhance the productivity of the current assets deployed in business. This correlates the working capital with Return-on-Investment (ROI). ROI is product of two factors

- assets turnover and profits margin. If either of these ratios can be increased, ROI will be increased to a great degree. DU Pont Chart illustrates this position as under:

If profit margins is 6% and Asset	By increasing profit margin	By increasing assets turnover
Turnover is 3 times then ROI would be 18%	by 1%, ROI increases by 3% i.e. 6 + 1 = 7 x 3 = 21%	by 1, ROI increases by 6% 6% x 4 = 24

Assets turnover side of ROI computation may also reflect the working capital management.

Current assets reflect the funds position of a company and is known as Gross Working Capital. Working Capital leverage is nothing but current assets leverage which refers to the asset turnover aspect of ROI. This reflects company's degree of efficiency in employing current assets. In other words, the ability of the company to guarantee large volume of sales with small current asset base is a measure of company's operating efficiency. This phenomenon is asset turnover which is a real tool in the hands of finance manager in a company to monitor the employment of fund on a cumulative basis to result into high degree of working capital leverage.

⇒ **CONCEPT 16**

THE MYTH OF ADEQUATE CURRENT ASSETS

Aligned to the first issue is the myth of adequate current asset. Traditionally, it has been believed that liquidity is proportional to the level of current assets. A firm having a high current ratio is treated as favorably placed as regards payment of its current liabilities. This is myth since the

holding of current assets is always in proportion to the turnover. If level of current assets is rising disproportionately to the turnover, then notwithstanding the high current ratio, the situation has the following implications:

- The age of current assets is increasing which tells upon their quality. As the current assets, particularly inventory and receivables, get older the chances of their easy and complete conversion into cash recede.

Once this happens, there is every possibility of the operating cycle cracking.

- The firm is paying a huge cost for the higher build up of current assets. This cost consists of

  a) The amount spent towards raw materials and intermediate inputs
  b) The cost incurred towards storing and maintaining the inventory.
  c) The interest cost for obtaining finance against these current assets
  d) The cost of obsolescence associated with holding inventory for longer periods and
  e) The cost of expected default on receivables as reflected in charge to Profit and loss account towards bad debts.

⇒ **CONCEPT 17**

DOES THE BALANCE SHEET GIVE A TRUE PICTURE OF CURRENT ASSETS?

We have restricted the discussion of current assets to the position obtained as on a particular date. This position may not be representative of the state of affairs prevailing on a day to day basis throughout the year. In order to even out the effects of daily variation in the level of current assets, it is advisable to take average of weekly, monthly or quarterly holding depending upon the nature of the industry and turnover of the assets.

The position at the end of a day is a static position which is not representative of the entire year. By taking period averages some amount of dynamism is brought into the picture.

The second point to be noted is that an industry might have seasonal peaks or troughs of working capital requirement. For example agro based industry like fruit processing unit would need to stock more raw material during the peak season when the crop has been harvested than during the lean season. In such cases different norms have to be applied for peak season and non peak season for holding of current assets for judging the reasonability of their holding.

We find, therefore that the high level of current assets is nothing but a fiction when we seek to realize the current assets. It may happen that the inventory carried by the firm may consist of obsolete items, packing materials, finished goods which have been rejected by buyers and items like

dies and tools which are more fixed than current in character. Prudence would advise that the firm should get rid of these current assets as early as possible.

On the other hand, the current liabilities are more ascertainable and less fictions. The payment of these liabilities, if not possible from the operating cycle, has to be arranged from long term sources of funds which results in a mismatch that is not conducive to financial health of the firm.

ILLUSTRATIONS FOR PRACTICE

Illustration.1 From the following information of XYZ Ltd. Calculate:

(i) Net operating cycle period.
(ii) Number of operating cycle in a year.

1. Row material inventory consumed during the year	6,00,000
2. Average stock of raw material	50,000
3. Work-in-progress inventory	5,00,000
4. Average work-in-progress inventory	30,000
5. Finished goods inventory	8,00,000
6. Average finished goods stock held	40,000
7. Average collect period from debtors	45 days
8. Average credit period availed	30 days
9. No of days in a year	360 days

Ans. (i) Statement Showing Computation of Net Operation Cycle Period

	Days
I. Raw Material conversion period	30
$\left[\frac{50,000}{6,00,000} \times 360\right]$	
II. Work-in-Progress conversion period	22
$\left[\frac{30,000}{5,00,000} \times 360\right]$	
III. Finished goods conversion period	18
$\left[\frac{40,000}{8,00,000} \times 360\right]$	
IV. Average collection period from debtors	45

V.	Less: Average credit period awaited	(30)
	Operating Cycle	85

(ii) No. of operating cycles in a year

$$= \frac{360}{85} = 4.24 \text{ cycle in a year}$$

Illustration. 2 XYZ Ltd. has obtained the following data concerning the average working capital cycle for other companies in the same industry:

Raw material stock turnover	20 Days
Credit received	- 45 Days
Work-in-progress turnover	15 Days
Finished goods stock turnover	40 Days
Debtor's collection period	60 Days
	95 Days

Using the following data, calculate the current working capital cycle for XYZ Ltd. and briefly comment on it.

	(Rs. in '000)
Sales	3,000
Cost of sales	2,100
Purchases	600
Average raw material stock	80
Average work-in-progress	85
Average finished goods stock	180
Average creditors	90
Average debtors	350

Ans. Statement showing operating cycle

Raw Material conversion period (80/600 x 360)	= 48 days
WIP Conversion period (85/2100 x 360)	= 15 days
Finished goods conversion period (180/2100 x 360)	= 31 days
Avg. collection period from Debtors (350/3000 x 360)	= 42 days
Average a period availed (900/600 x 360)	= 54 days
Operating cycle period	= 82 days

Comment: XYZ Ltd. has an operating cycle better than that of industry. Though the raw material of XYZ Ltd. takes more than double time to be converted in consumption in comparison to the

industry, however, the WIP takes the same period to be completed into finished product as the industry. Finished goods of XYZ Ltd. is converted into goods sold earlier than the industry. Further the credit period allowed to customers is less than the industry and credit period allowed by suppliers is more than the industry.

Illustration. 3 From the following information extracted from the books of a manufacturing concern, compute operating cycle in days.

Period Covered Average period of credit allowed by supplier	365 days 16 days
	(Rs. '000)
Average total of debtors outstanding	480
Raw material consumption	4,400
Total production cost	10,000
Total cost of sales	10,500
Sales for the year	16,000
Value of average stock maintained	
Raw materials	320
Work-in-progress	350
Finished goods	260

Ans. Computation of Operating Cycle

(a) Length of Raw Material Inventory $= \frac{\text{Average Stock of Raw material}}{\text{Raw Material Consumption Per Day}}$

Period $= \frac{320}{4400} \times 365 = 27 \text{ Days}$

(b) Length of Conversion Period $= \frac{\text{Average Stock of Work-in-Progress}}{\text{Total Cost of Production Per Day}}$

$= \frac{350}{10000} \times 365 = 13 \text{ Days}$

(c) Length of Finished Stock Period $= \frac{\text{Average Stock of Finished Goods}}{\text{Total Cost of Sales Per Day}}$

$= \frac{260}{10{,}500} \times 365 = 9 \text{ Days}$

(d) Period of Credit Allowed to Debtors $= \frac{\text{Average Total of Debtors Outstanding}}{\text{Sales Per Day}}$

$$= \frac{480}{16{,}000} \times 365 = 11 \text{ Days}$$

(e)	Gross Total Period of Operating Cycle (a+b+c+d)	60 days
	Less: Average Period of Credit Allowed by Suppliers	16 days
	Net Total Period of Operating Cycle	44 days

Illustration. 4 Calculate the Operating cycle from the following figures related to company 'X':

Particulars	**Average amount Outstanding (Rs.)**	**Average value per day (340 days assumed) (Rs.)**
Raw Material inventory	1,80,000	
Work-in-progress inventory	96,000	
Finished goods inventory	1,20,000	
Debtors	1,50,000	
Creditors	1,00,000	
Purchase of Raw Material		2,500
Cost of Sales		4,000
Sales		5,000

Ans. **Calculation of operating cycle**

			Days
1. Period of Raw Material Stock	$\frac{1{,}80{,}000}{2500}$	72	
Less: Credit granted by supplier	$\frac{1{,}00{,}000}{2500}$	40	**32**
2. Period of Production	$\frac{96{,}000}{4000}$		**24**
3. Turnover of Finished Goods	$\frac{1{,}20{,}000}{4000}$		**30**
4. Credit taken by customers	$\frac{1{,}50{,}000}{5000}$		**30**
Operating Cycle Period			**116**

Comments: Operating cycle is long and a number of steps could be taken to shorten this operating cycle. Debtors could be cut by a quicker collection of accounts.

Finished goods could be turned over more rapidly, the level of raw material inventory could be reduced or the production period shortened.

Illustration. 5 The following information is available for Swati Ltd.

	Rs.
Average stock of raw materials and stores	2,00,000
Average work-in-progress inventory	3,00,000
Average finished goods inventory	1,80,000
Average accounts receivable	3,00,000
Average accounts payable	1,80,000
Average raw materials and stores purchased on credit and consumed per day	10,000
Average work-in-progress value of raw materials committed per day	12,500
Average cost of goods sold per day	18,000
Average sales per day	20,000

Calculate the duration of operating cycle.

Ans. **Calculation of operating cycle**

		Days
Period of Raw Material Stock	$\frac{2,00,000}{10,000}$	**20**
Period of work-in-progress stage	$\frac{3,00,000}{12,500}$	**24**
Period of finished goods stage	$\frac{1,80,000}{18,000}$	**10**
Period of Accounts receivable stage	$\frac{3,00,000}{20,000}$	**15**
Period of Accounts payable stage	$\frac{1,80,000}{10,000}$	**18**

Duration of operating cycle = (20 + 24 + 10 + 15) – 18 =51 days

CHAPTER 10
ESTIMATION & CALCULATIONS

⇒ **CONCEPT 1**

ASSESSMENT OF WORKING CAPITAL

Requirement of working capital over the operating cycle period could be guessed for short-term, medium term as well as long-term. For short term, working capital is required to support a given level of turnover to pay for the goods and services before the cash is received from sales to customers.

Effort is made that there remains no idle cash and no shortage of money to erase liquidity within the company's working process. For this purpose sales budget could be linked to the expected operating cycle to know working capital requirement for any given period of time or for each month. Medium term working capital include profit and depreciation provisions. These funds are retained in business and reduced by expenditure on capital replacements and dividend and tax payment.

By preparing budget the minimum amount required for medium term working capital can be estimated. The company can work out its working capital needs for different periods through cash budget which is key part of working capital planning. To prepare such a budget operating cycle parameters are of great use as estimation of future sales level, time and amount of funds flowing into business, future expenditure and costs all can be made with least difficulty to help the main target.
Then, operating cycle help in assessing the needs of working capital accurately by determining the relationship between debtors and sales, creditors and sales and inventory and sales. Even requirement of extra working capital can be guessed from such estimate.

⇒ **CONCEPT 2**

WORKING CAPITAL REQUIREMENT ASSESSMENT

Working capital requirement assessment requires :

1. Calculation of average value of Raw Material Inventory, Work in Progress inventory and Finished Goods inventory
2. Calculation of Trade receivables
3. Calculation of Cash and Cash Convertibles required for normal running of business,

4. Calculation of trade payables.

The formula which is used for assessing the working capital requirement is listed below:

A. Current Assets `	
Value of Raw Material Stock	XXXX
Value of Work in Progress	XXXX
Value of Finished Goods Stock	XXXX
Value of Trade Receivables	XXXX
Value of Cash Required	XXXX
Total of A	XXXXX
B. Current Liabilities	
Value of Trade Payable	XXXX
Value of Bank Overdraft	XXXX
Value of Outstanding expenses	XXXX
Total of B	XXXXX
Working Capital Total of (A)-Total of (B)	XXXX

⇒ **CONCEPT 3**

TANDON COMMITTEE (MPBF)

Bank lending: The Committee introduced the concept of working capital gap. This gap arised due to the no coverage of the current assets by the current liabilities other than bank borrowings. A certain portion of this gap will be filled up by the borrower's own funds and long-term borrowings. The Committee developed three alternatives for working out the maximum permissible level of bank borrowings:

1. 75% of the working capital gap will be financed by the bank i.e.

Total Current assets
Less: Current Liabilities other than Bank Borrowings
= Working Capital Gap.
Less: 25% of Working Capital gap from long-term sources.

2. Alternatively, the borrower has to provide for a minimum of 25% of the total current assets out of long-term funds and the bank will provide the balance. The total current liabilities inclusive of bank borrowings will not exceed 75% of the current assets:

Total Current Assets
Less: 25% of current assets from long-term sources.
Less: Current liabilities other than Bank borrowings
= Maximum Bank Borrowing permissible.

3. The third alternative is also the same as the second one noted above except that it excludes the permanent portion of current assets from the total current assets to be financed out of the long-term funds, viz.

Total Current assets
Less: Permanent portion of current assets
Real Current Assets
Less: 25% of Real Current Assets
Less: Current liabilities other than Bank Borrowings
= Maximum Bank borrowing permissible.

Thus, by following the above measures, the excessive borrowings from banks will be gradually eliminated and the funds could be put to more productive purposes.

ILLUSTRATIONS

Illustration 1
Astle Garments Ltd. is a famous manufacturer and exporter of garments to the European countries. The Finance manager of the company is preparing its working capital forecast for the next year. After carefully screening all the documents, following information is collected:

Production during the previous year was 15,00,000 units. The same level of activity is intended to be maintained during the current year. The expected ratios of cost to selling price are:

Raw material	40%
Direct wages	20%
Overheads	20%

The raw materials ordinarily remain in stores for 3 months before production. Every units of production remains in the process for 2 months and is assumed to be consisting of 100% raw material, wages and overheads. Finished goods remain in the warehouse for 3 months. Credit allowed by the creditors is 4 months from the date of the delivery of raw material and credit given to debtors is 3 months from the date of dispatch.

Estimated balance of cash to be held	Rs. 2,00,000
Lag in payment of overhead expenses	½ month
Lag in payment of direct wages expenses	½ month

Selling price is Rs. 10 per units. Both production and sales are in regular cycle. You are required to make provision of 10% for contingency (except cash). Relevant assumption may be made.

As the Finance Manager of the Company you are required to prepare the forecast statement of estimated working capital required.

Solution

Calculation of Profit Margin

Particulars	**%**	**Rs. (per unit)**
Raw material	40	4
Direct wages	20	2
Overheads	20	2
Total cost	80	8
Add: Profit	20	2
Selling price	100	10

Estimation of Working Capital

Current Assets		
Raw materials stock	(15,00,000 units × Rs. 4 × 3/12)	15,00,000
Work-in-progress	(15,00,000 units × Rs. 8 × 2/12)	20,00,000
Finished goods stock	(15,00,000 units × Rs. 8 × 3/12)	30,00,000
Debtors	(15,00,000 units × Rs. 10 × 3/12)	37,50,000
	(a)	1,02,50,000
Current Liabilities		
Creditors for raw material	(15,00,000 units × Rs. 4 × 4/12)	20,00,000
Wages outstanding	(15,00,000 units × Rs. 2 × 0.5/12)	1,25,000
Outstanding expenses	(15,00,000 units × Rs. 2 × 0.5/12)	1,25,000
	(b)	22,50,000
Current assets *less* current liabilities	(a) – (b)	80,00,000

Add: Contingency	(10% of Rs. 80,00,000)	8,00,000
Add: desired cash balance		2,00,000
Estimated Working capital		90,00,000

Illustration 2

Total Current Assets required: Rs. 40,000
Current liabilities other than bank borrowings: Rs. 10,000
Core current assets: Rs. 5,000
Compute maximum permissible bank finance under all the three methods of lending norms as suggested by the Tandon Committee.

Solution

	Rs.
1st Method	
Total current assets required	40,000
Less: current liabilities	(10,000)
Working capital gap	30,000
Less 25% permissible bank borrowings	(7,500)
Maximum permissible bank borrowings	22,500
2nd Method	
Current assets required	40,000
Less: 25% to be provided	(10,000)
Long term funds	30,000
Less: Current Liabilities	(10,000)
Maximum permissible bank borrowings	20,000
3rd Method	
Current assets	40,000
Less: Core current assets required	(5,000)
Less: 25% to be provided for	(8,750)
Long term funds	26,250
Less: Current Liabilities	(10,000)
Maximum permissible bank borrowings	16,250

UNSOLVED QUESTION

Ques.1 PQR Ltd. is engaged in sale and purchase of durables. It expects to attain a turnover of Rs.60,00,000 next year. Past experience shows that the operating cycle of the firm is 90 days. It requires a cash balance of Rs.1,00,000. Find out the expected working capital requirement given that the year consists of 360 days.

Ans. 1600,000.

Ques.2 Calculate the amount of working capital requirement for SRCC Ltd. from the following information:

	Rs. (Per Unit)
Raw Material	160
Direct Labour	60
Overheads	120
Total Cost	340
Profit	60
Selling Price	400

Raw materials are held in stock on an average for one month. Materials are in process on an average for half-a-month. Finished goods are in stock on an average for one month.

Credit allowed by suppliers is one month and credit allowed to debtors is two months. Time lag in payment of wages is 1 ½ weeks. Time lag in payment of overhead expenses is one month. One-fourth of the sales are made on cash basis.

Cash in hand and at the bank is expected to be Rs.50,000: and expected level of production amounts to 1,04,000 units for a year of 52 weeks.

You may assumed that production is carried on evenly throughout the year and a time period of four weeks is equivalent to a month.

Ans. 67,10,000.

Ques.3 Prepare an estimate of net working capital requirement of Nuro Ltd. from the data given below:

	Cost per Unit (Rs.)
Raw Materials	100
Direct Labour	40
Overheads	80
	220

The following is the additional information:

Selling price per unit	Rs.240
Level of activity	1,04,000 units per annum
Raw Materials in stock	average 4 weeks
Work-in-progress [Assume 100% stage of Completion of materials and 50% for labour & overheads]	average 2 weeks
Finished Goods in stock	average 4 weeks
Credit allowed by Suppliers	average 4 weeks
Credit allowed to Debtors	average 8 weeks
Lag in payment of Wages	average 1 ½ weeks

Cash at Bank is expected to be Rs.25,000. Assume that production is sustained during 52 weeks of the year.

Ans. 58,25,000.

Ques.4 The cost sheet of PQR Ltd. provides the following data:

	Cost per unit (Rs.)
Raw material	50
Direct Labour	20
Overheads (including depreciation of Rs.10)	40
Total cost	110
Profits	20
Selling price	130

Average raw material in stock is for one month. Average material in work-in-progress is for half month. Credit allowed by suppliers: one month; credit allowed to debtors: one month. Average time lag in payment of wages: 10 days; average time lag in payment of overheads 30 days. 25% of the sales are on cash basis. Cash balance expected to be Rs.1,00,000. Finished goods lie in the warehouse for one month.

You are required to prepare a statement of the working capital needed to finance a level of the activity of 54,000 units of output. Production is carried on evenly throughout the year and wages and overheads accrue similarly. State your assumption, if any, clearly.

Ans. 8,91,250

Ques.5 The management of Royal Industries has called for a statement showing the working capital to finance a level of activity of 1,80,000 units of output for the year. The cost structure for the company's product for the above mentioned activity level is detailed below:

	Cost per unit (Rs.)
Raw material	20
Direct labour	5
Overheads (including depreciation of Rs.5 per unit)	15
	40
Profit	10
Selling price	50

Additional information:

(a) Minimum desired cash balance is Rs.20,000.
(b) Raw materials are held in stock, on an average, for two months.
(c) Work-in-progress (assume 50% completion stage for all components) will approximate to half-a-month's production.
(d) Finished goods remain in warehouse, on an average, for a month.
(e) Suppliers of materials extend a month's credit and debtors are provided two month's credit; cash sales are 25% of total sales.
(f) There is a time-lag in payment of wages of a month; and half-a-month in the case of overheads.

From the above facts, you are required to prepare a statement showing working capital requirement.

Ans. 16,13,750

Ques.6 RTS Ltd. expects to sell 30,000 units in a year. The expected cost of production is as follows:

	Rs(Per Unit)
Raw Material	100
Manufacturing Expenses	30
Selling, Administration and Financial Expenses	20
Selling Price	200

The duration at various stages of the operating cycles is expected to be as follows:

Raw Material Stage	2 months
Work-in-progress stage	1 month
Finished Goods stage	½ month
Debtors stage	1 month

Assuming the monthly sales level of 2,500 units, estimate the Gross Working Capital requirement if the desired cash balance is 5% of the gross working capital requirement, and work-in-progress is 25% complete with respect to manufacturing expenses.

Ans. 13,75,000

Ques.7 Prepare a working capital forecast from the following information:
Production during the previous year was 10,00,000 units. The same level of activity is intended to be maintained during the current year:

The expected ratios of cost to selling price are:

Raw materials	40%
Direct wages	20%
Overheads	20%

The raw materials ordinarily remain in stores for 3 months before production. Every unit of production remains in the process for 2 months and is assumed to be consisting of 100% raw materials, wages and overheads. Finished goods remain in the warehouse for 3 months. Credit allowed by creditors is 4 months from the date of the delivery of raw materials and credit given to debtors is 3 months from the date of dispatch.

The estimated balance of cash to be held Rs.2,00,000.

Lag in payment of wages ½ month.
Lag in payment of expenses ½ month.

Selling price is Rs.8 per unit. Both production and sales are in a regular cycle. You are required to make a provision of 10% for contingency (except cash). Relevant assumptions may be made.

Ans. 44,53,334

CHAPTER 11
RECEIVABLES MANAGEMENT

⇒ **CONCEPT 1**

WHAT IS RECEIVABLE MANAGEMENT

Receivable Management means planning, organizing, directing and controlling of Receivables. It provides an answer to the following basic questions:

1. To whom credit should be allowed	It involves as identification of customers, to whom the goods can be sold on credit after carrying out credit analysis.
2. How much credit period should be allowed?	It involves the determination of Credit Period within which the customers are required to pay.
3. How much amount of credit should be allowed?	It involves the determination of amount upto which the credit can be granted to the customers.

⇒ **CONCEPT 2**

WHAT IS THE OBJECTIVE OF RECEIVABLE MANAGEMENT

The objective of Receivable Management is to avoid the situation of excessive and inadequate receivables and to determine and maintain optimum level of receivables after achieving a trade off between the profitability and liquidity so as to maximize the wealth of shareholders as a whole. Whenever the situation of excessive and inadequate receivables arises, prompt and timely action should be taken by management to correct imbalances. Then optimum level of receivables will lie between the two danger points of excessive and inadequate receivables. The consequences of excessive and inadequate receivables are:

Consequences of Excessive Receivables	Consequences of Inadequate Receivables
1. High Opportunity Cost of investment in Receivables **2.** High Risk of Bad debts **3.** High Credit Administration Cost **4.** 4. High Risk of Liquidity	**1.** Decrease in Sales **2.** Risk of loosing Market Share

⇒ **CONCEPT 3**

WHAT ARE RECEIVABLES

Receivables (also known as Book Debts) represent the amount to be collected from the customers to whom the goods or services have been sold on credit.
Customers from whom receivables or book debts have to be collected in near future are called trade debtors. Investment in Debtors represents the funds blocked for the period beginning from the date of sale and ending with the date of payment.

⇒ **CONCEPT 4**

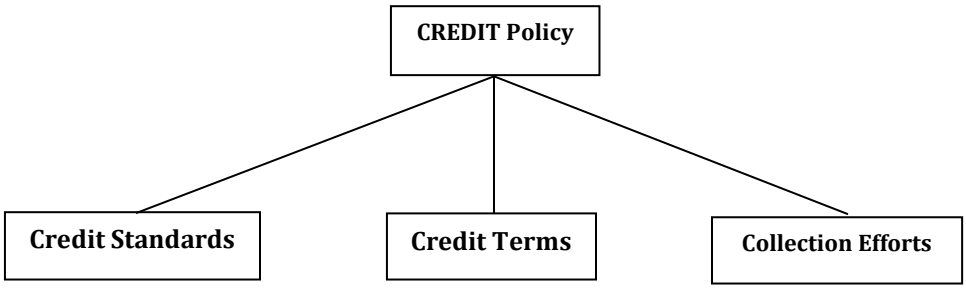
WHY DO FIRMS GRANT CREDIT

The firms credit to retain old customers and the create new customers. In other words, the firms grant credit to maintain the exiting market share and to increase their market share, which may pass to their competitors otherwise.

⇒ **CONCEPT 5**

WHAT IS CREDIT POLICY

Credit Policy refers to the combination of following three decision variables:



➢ **CREDIT STANDARDS**

Credit standards are criteria to decide to whom credit sales can be made and to what extent. The firm may have soft standards or tight standards.

Type of Standard	Effect on Sales	Effect on Bad Debt	Effect on Credit Administration Cost
Soft Standards	Increase in Sales	Increase in bad debt	Increase in Credit administration Cost

Tight Standards	Decrease in Sales	Decrease in bad debt	Decrease in Credit administration Cost

To prepare the various categories of customers, credit analysis should be carried out. Under credit analysis, the following two factors should be considered:

(a) Average Collection Period, which means the time taken by customers to repay the credit obligation.

(b) Default Risk, which is the likelihood that a custoit obligation. Default risk is usually measured in terms of bad debt losses ratio. To determine the default risk, the credit manager should consider the following three factors:

(i) Character, which refers to the customer's willingness to pay.
(ii) Capacity, which refers to the customer's ability to pay.
(iii) Condition, which refers to economic conditions, which may affect the customer's ability to pay.

After credit analysis, the customers may be classified in various categories such as follows:

Category of Customers	Average Collection Period	Default Risk
Good	Within credit period	0
Marginal	Moderate Collection Period	Moderate
Bad	Very Large Collection Period	High

- **CREDIT TERMS**

Credit terms refer to the stipulations under which the firm sells goods on credit to the customers. These include (a) credit period and (b) cash discount.

a) ***Credit Period*** refers to the length of time for which credit is granted to the customers. It is usually stated in terms of net days. For example, if credit terms are "net 60", it means customers required to pay within 60 days.

b) ***A Cash Discount*** is a reduction in payment offered to customers to include them to pat within a specified period of time, which will be less than the discount terms specify the rate of discount and the period for which it is available. If a customer wants to avail cash discount, he must make the payment in specific credit period otherwise he may make the payment within cash discount if payment is made 20 days and so cash discount, if payment is made within normal credit period. For example: Credit terms of

"2/20 net 60" implies 2 % cash discount if payment is made within 20 days no cash discount, if payment is made within days.

Credit Terms may be soft or tight.

Types of Terms	**Effect on Sales**	**Effect on Investment in Accounts Receivables**	**Effect on Bad Debt**	**Effect on Credit Administration Cost**
Soft Terms	Increase in	Increase in Investment	Increase in bad debt	Increase in Credit
Tight Terms	Decrease in	Decrease in Investment in Accounts receivable.	Decrease in Bad debt	Decrease in Credit Administration Cost

➢ **COLLECTION EFFORTS**

Collection efforts are needed to accelerate collection from slow payers and to reduce bad debt losses. The collection policy should specify the collection procedures clearly. The following procedure is suggested when the customers has not made the payment within the credit period allowed.

a) Send first reminder in polite wordings.
b) If customers still does not respond, send second reminder in some strong wordings.
c) If the customer still does not respond, send third reminder in strong wordings and follows up by e-mail, fax telephone, personal visit etc.
d) If the customer still fails to make the payment and his financial position appears to be weak, a personal visit should be made with intention to settles the payment with compromise. On the other hand, if the financial position appears to be strong, initiate a legal action.

However individual cases should be dealt with on the merits of each individual case.

⇒ **CONCEPT 6**

WHAT IS THE GOOD OF CREDIT POLICY

The goal of credit policy is to maximize shareholders' wealth. I is neither the maximisation of sales nor minimisation of bad debt losses. If sales maximisation would have been the goal of firm's credit policy, the firm would follow a very lenient credit policy and would sell on credit

to everyone. If ministration of debt losses would have been the goal of firm's credit policy, the firm would follows tight credit policy and would not sell on credit to anyone.

⇒ **CONCEPT 7**

WHAT IS OPTIMUM CREDIT POLICY

Optimum Credit Policy refers to the policy, which maximizes the value of the firm. The value of the firm is maximized when the incremental rate of return (also called the marginal rate of rerun) is equal to the incremental rate of return required by suppliers of funds (also called the marginal cost of capital) used to finance the investment. The evaluation of investment in accounts receivable may be done by following either the total approach or incremental approach.

➢ What are the major factors on which the firm's investment in accounts receivables depends?

Following may be expressed in terms of sales revenue or cost.

Example: Average Credit Sales is Rs. 10 lacs per day, Average collection Period is 60 days and Cost of Sales is 80%.

Thus, firm's investment in Accounts receivable (in terms of sales revenue)
= Daily Credit Sales x Average Collection Period (in days)
= 10 Lacs x 60 = Rs. 600 lacs

Thus, firm's investment in Accounts receivables (in terms cost)
= Cost of Daily Credit Sales x Average Collection Period (in days)
= 10 Lacs x 80% x 60 = Rs. 480 Lacs

⇒ **CONCEPT 8**

DISTINCTION BETWEEN CREDIT PERIOD AND AVERAGE COLLECTION PERIOD

Credit Period- Credit period refers to the period for which credit is granted to the customers as per firm's credit policy. It is the period within which customers are required to make the payment. It is usually stated in terms of days. Depending upon the availability of Cash Discount, the credit period may be stated as follows:

Case	Credit Period
1. Where no Cash Discount is allowed	**1. 'net 30'** means customers are required to pay within 30 days.
2. Where Cash Discount is allowed	**2. "2/10, net 30"** means with 2% Cash Discount, make payment within 10 days and without Cash Discount make payments 30 days.

⇒ **CONCEPT 9**

OPPORTUNITY COST OF INVESTMENT IN RECEIVABLES

Meaning - Opportunity Cost of Investment in Receivables is the return forgone on funds blocked in receivables, which could have been earned if such funds would have been invested elsewhere.

Usefulness - It is useful in evaluating various debtors policies and in determining the optimal debtors policy.

How to Calculate - It is calculated as follows :

$$\text{Opportunity Cost} = \text{Cost of Credit Sales} \times \frac{\text{Collection Period (days)}}{\text{365 days}} \times \text{Required Rate of Return}$$

⇒ **CONCEPT 10**

MEANING OF FACTORING

Factoring is a financial service, which involves managing, financing and collecting receivables. It is both a financial as well as management support to supplier of goods/services. It is method of converting non-productive assets (receivables) into productive assets (Cash). A factor makes the conversion of receivables into cash possible. Factoring may be defined as a contract between the supplier of goods/services and the factor under which the factor agrees to perform atleast two of the following functions:

a) To finance the assigned book debts (receivables).
b) To maintain accounts relating to receivables.
c) To collect book debts.
d) To provide protection against default in payment by debtors.
e) To provide credit administration services to the clients to decide whether or not and how much credit should be extended to the customers.

Some of the major factoring firms in India are SBI Factors and Commercial Services Ltd., Canara Bank Factors Ltd. (1991), Fair Growth Factors Ltd. (1992) Services Ltd., Canara Bank Factors Ltd. (1991), Fair Growth Factors Ltd. (1992)

⇒ **CONCEPT 11**

FACTORING COMMISSION

The commission charged by the factor for providing factoring services is known as factoring commission. It is usually expressed as a percentage of face value of receivables factored. In India, it ranges between 2.5 to 3 per cent. The commission is expected to be lower for recourse factoring since the factor does not assume the risk of bad debts. The commission is expected to be higher for non-recourse factoring since the factor assumes the risk of bad debts.

⇒ **CONCEPT 12**

TYPES OF FACTORING

The factoring services may be classified under following categories :

1. ***Non-recourse Factoring*** (Old Line Factoring) - Under Non-recourse factoring factor assumes the risk of bad debts and charges higher commission for and advances cash upto 80/90% of book debts immediately.

2. ***Recourse Factoring*** - Under recourse factoring, factor does not assume the risk of bad debts and charges lower commission for and advances cash upto 70/80% of book debts.

3. ***Advance Factoring*** - Under advance factoring, factor advances cash against the book debts due to client immediately.

4. ***Maturity Factoring*** - Under maturity factoring, the factor makes the payment on maturity (i.e. in case of non-recourse factoring on collection of book debts or on insolvency of customers, in case of recourse factoring on collection of book debts from customers).

5. ***Financial Factoring (Bulk/Agency Factoring)*** - Under finance factoring, the factor simply finances the book debts against bulk either on recourse or without recourse and the client continues to administer and operate sales ledger.

6. ***Non-Notification Factoring*** - Under non-notification factoring, the notice of assignment of receivables is not given to the debtors. But the factor performs all his functions without a disclosure to the customers that he owns the book debts.

⇒ **CONCEPT 13**

PARTIES TO FACTORING CONTRACT

There are **three parties** involved generally in a factoring contract as follows:

1. ***Buyers*** of goods who has to pay for goods bought on credit terms.

2. ***Sellers*** of goods who has to realize credit sales from buyer.

3. ***Factor*** who acts as agent in realizing credit sales from buyer and passes on the realized sum to seller after deducting his commission.

⇒ **CONCEPT 14**

ADVANTAGES OF FACTORING

The advantages resulting from the factoring are as follows :

1. Eliminating of trade discounts.
2. Prompt payments and credits.
3. Improves scope for operating leverage.
4. Reduction of administrative cost and burden.
5. Increase in return to the client.
6. Improvement in liquidity.
7. Provides insurance against bad debts.
8. It is neither a loan nor a deposit but facilities liquidity.
9. It avoids increased debts.
10. Current assets are efficiently managed thus reducing working capital requirements.
11. Better credit discipline amongst customers by regular realization of dues, effective control of sales journal, reduced credit risk, better working capital management etc.

⇒ **CONCEPT 15**

HOW TO DECIDE WHETHER OR NOT TO ENGAGE A FACTOR

To decide whether or not to engage a factor, the cost and benefits of factoring should be evaluated.

The cost of factoring includes:

(a) Factoring commission;
(b) Interest Charged by Factor on advance granted;

The benefits of factoring includes:

(a) Saving in costs of in House Credit Collection Department.
(b) Saving in Bad Debt losses;
(c) Saving in Cost of Funds invested in receivables due to reduction n Average Collection Period.

Que What is Mechanics of factors?

Ans: - The dynamics of factoring comprises of sequence of events outlined in figure:

(i) Seller negotiates with factor for establishing factoring relationship.
(ii) Seller requests credit check on buyer (client)
(iii) Factor check credit credentials & approves buyer for each approved buyer a credit limit & period of credit is fixed.
(iv) Seller sell goods to buyer
(v) Seller send invoices to factor & these are accounted in buyer's account in factor's sales ledger.
(vi) Factor sends copy of invoice to buyer.
(vii) Factor advances the amount to which seller is entitled after retaining a margin.
(viii) On expiry of agreed credit period, buyer makes payment to factor.
(ix) Factor pays residual amount to seller

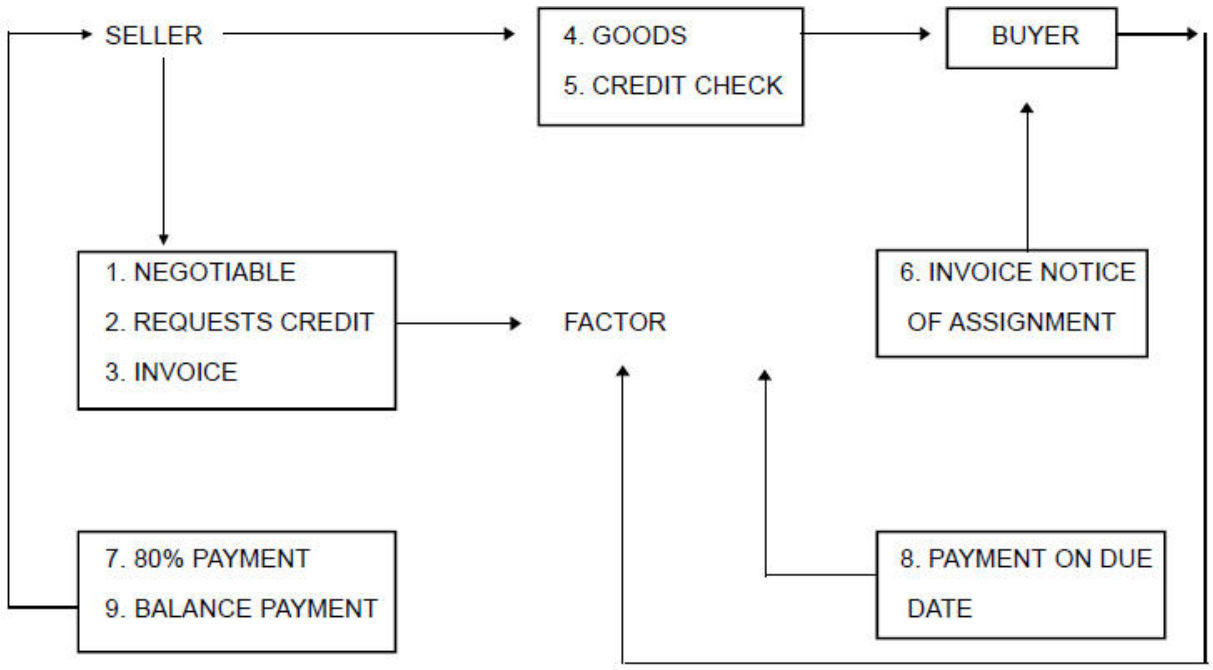


Figure: Mechanics of Factoring

⇒ **CONCEPT 16**

AGING SCHEDULE

Another technique available for monitoring the receivable is known as aging schedule. The quality of the receivables of a firm can be measured by looking at the age of receivables. The older the receivable, the lower is the quality and greater the likelihood of a default. In the aging schedule, the lower is the total outstanding receivables on a particular day (at the end of a month or year) are classified into different age groups (age being the number of days since becoming outstanding) together with percentage of total receivables that fall in each age group. For example, the receivables of a firm, having credit period of 30 days, may be classified as follows:

When compared with the past aging schedule done by the same firm or done by other comparable firms, this may provide an indication of whether the firm should start worrying about its collection procedure.

By comparing the aging schedule for different periods, the financial manager can get an idea of any required change in the collection procedure and can also point out those customers which require special attention.

Age Group (Number of Days)	% of Total outstanding Receivables
Less than 30 days	60%
31 - 45 days	20%
46 - 60 days	10%
61 days and above	10%

IIlustration-1. A company has a 15% required rate of return. The credit sales of the company are Rs. 160 crore a year and the cost of sales is 75%. The company's collection period currently is 60 days. company offered a discount policy with terms of 2/20, net 70, 60 per cent of its customers will take the discount and the collection period will be reduced to 40 days. Should the terms be changed? (Assume 360 days in a year)

Ans.

Statement showing the Evaluation of Debtors Policies

Particulars	Present Policy Rs. in crores	Proposed Policy Rs. in crore
A. Expected Profit:		
a) Credit Sales	160.00	160.00
b) Total Cost other than Cash Discount	120.00	120.00
c) Cash Discount	-	1.92
d) Expected Profit [(a) - (b) - (c)]	40.00	38.08
	3.00	2.00
B. Opportunity Cost of Investment in Receivables	**37.00**	**36.08**
C. Net Benefits (A -B)		

Recommendation: The Present Policy should be continued since the net benefits under this policy are higher than those under the proposed policy.

IIlustration-2. MP Ltd. is considering to change its credit terms and provides you the following information.

Particulars	Present Policy	Proposed Policy I
Credit Terms	Net 30	1/10, Net 30
Sales	14,40,000	Increase in sales by Rs.40,000
Average Collection Period	30 days	Decline in Period by 1/3rd
Bad Debts	2%	2%

It is expected that 50% of the customers will customers will take discount and pay on 10th day. The Variable cost ratio is 70%. And the opportunity cost of investment in receivables is 10% (Pre-tax). The tax rate is 50% should the company change its credit terms? (Assume 360 day in a year)

Ans. **Statement showing the Evaluation of Debtors Policies**

Particular	Present Policy Rs.	Proposed Policy Rs.
A. Expected Profit:		
a) Credit Sales	14,40,000	14,80,000
b) Total Cost other than Bad Debts & Cash Discount	10,08,000 28,800	10,36,000 29,600
c) Bad Debts	-	7,400
d) Profit Before Tax [(a) - (b) - (c) - (d)]	4,03,200	4,07,000
e) Less: Tax	2,01,200	2,03,500
f) Profit after tax	2,01,600	2,03,500
B. Opportunity Cost of investment in Receivables	4,200	2,878
C. Net Benefits [A -B]	**1,97,400**	**2,00,622**

Recommendation: The Proposed Policy should be adopted since the net benefits under this policy are higher than those under the present policy.

IIlustration-3 PM Ltd. is considering of introducing a cash discount and provides you the following information.

Particular	Present Policy	Proposed Policy
Credit Firms	Net 40	1/10, Net 50
Sales	120 lakhs	120 lakhs
Average Collection Period	60 days	30 days

It is expected that 50% of the customers will take advantage of the changed credit terms. The Cost of Sales Ratio is 80%. The required rate of return (pre-tax) in 15% and tax rate is 50%.

Required : Should the company change its credit terms ? (Assume 30 days)

Solution

Statement showing the Evaluation of Debtors Policies

Particulars	Present Policy (Rs. in lakhs)	Proposed Policy (Rs. in lakhs)
A. Expected Profit :		
(a) Credit Sales	120	120
(b) Variable Costs of Sales	96	96
(c) Cash discount	-	0.6
(d) Expected Profit before tax [(a)-(b)-(c)	24 12.00	23.4 11.7
(e) Less : Tax @ 50%	12.00	11.7
(f) Expected Profit after tax		
B. Opportunity Cost of Investment in Receivables	1.2	0.60
C. Net Benefits [A-B]	**10.8**	**11.1**

Recommendation : The Proposed Policy should be adopted since the benefits under this policy are higher than under the present policy.

IIlustration-4 X Ltd. has credit sales of Rs. 360 lakhs and its average collection period is 30 days. The financial controller estimates that bad debt losses are around 2% of credit sales. The firm spends Rs. 1,40,000 annually on debtors administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avodable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @ 15% p.a. after withholding 10% as reserve.

Required : Should the company engage factor ? (Assume 360 days in a year).

Solution

Calculation of Factoring Commission, Interest Charge and Advance Granted by Factor

	Particulars	Rs.
A.	Average Level of Receivables [Rs. 360 lakh x 30 days/360 days]	30,00,000
B.	Less : Factoring Commission [1% of Rs. 30 lakhs]	30,000
C.	Less : Factoring Reserve [10% of Rs. 30 lakhs]	3,00,000
D.	Eligible Amount of Advance [A-B-C]	26,70,000
E.	Less : Interest Charges [Rs. 26.7 lakhs x 15% 30 days/360 days]	33,375
F.	Actual Advance granted [D-E]	26,36,625

State showing the Evaluation of Factoring Arrangement

Particulars		Rs.
A.	**Annual Benefits of Factoring to the Firm :**	
	Credit Debts avoided [2% of 360 lakhs]	1,40,000
	Bad Debts avoided [2% of 360 lakhs]	7,20,000
	Total	8,60,000
B.	**Annual Cost of Factoring to the Firm :**	
	Factoring Commission [1% Rs. 360 lakh]	3,60,000
	Interest Charged by Factor on advance [Rs. 33,375 x 360 days/30 days	4,00,500
	Total	7,60,500
C.	**Net Annual Benefits of Factoring to the Firm :**	**99,500**

Recommendation: The company should adopt the Non-recourse Factoring alternative since it results in Net Annual Benefits of Rs. 99,500.

UNSOLVED QUESTION

Ques.1 The company has prepared the following projections for a year:

Sales	21,000 units
Selling Price per unit	Rs.40
Variable Costs per unit	Rs.25
Total Costs per unit	Rs.35
Credit period allowed	One month

The Company proposes to increase the credit period allowed to its customers from one month to two months. It is envisaged that the change in the policy as above will increase the sales by 8%. The company desires a return of 25% on its investment. You are required to examine and advise whether the proposed Credit Policy should be implemented or not.

[Answer. Yes, proposed policy should be accepted]

Ques.2 ABC & Company is making sales of Rs.16,00,000 and it extends a credit of 90 days to its customers. However, in order to overcome the financial difficulties, it is considering to change the credit policy. The proposed terms of credit and expected sales are given hereunder:

Policy	Terms	Sales
I	75 days	Rs.15,00,000
II	60 days	Rs.14,50,000
III	45 days	Rs.14,25,000
IV	30 days	Rs.13,50,000
V	15 days	Rs.13,00,000

The firm has a variable cost of 80% and a fixed cost of Rs.1,00,000. The cost of capital is 15%. Evaluate different proposed policies and which policy should be adopted? (Year may be taken as 360 days).

[Answer. Net Profit = 168250, 159375, 158500, 161750, 155250, 152875]

Ques.3 XYZ & Company is making sales of Rs.50,00,000 by extending a credit to its customers resulting in Average Debtors of Rs.4,29,604. It has a variable cost of 70%. It is believed that sales can be increased by liberalizing the credit terms from present position upto 90 days. The sales manager has given following estimates of sales under different credit period.

Policy	Terms	Sales
I	45 days	Rs.56,00,000
II	60 days	Rs.60,00,000
III	75 days	Rs.65,00,000
IV	90 days	Rs.72,00,000

Which policy is best for the firm given that the cost of capital of the firm is 20% (Year = 360 days)

[Answer. Incremental Profit = 142144, 220144, 320561, 468144.]

Ques.4 A trader whose current sales are Rs.15 lacs per annum and average collection period is 30 days, wants to pursue a more liberal credit policy to improve sales. A study made by a consultant firm reveals the following information:

Credit Policy	Increase in Collection Period	Increase in Sales
A	15 days	Rs.60,000
B	30 days	Rs.90,000
C	45 days	Rs.1,50,000
D	60 days	Rs.1,80,000
E	90 days	Rs.2,00,000

The selling price per unit is Rs.5. Average cost per unit is Rs.4 and variable cost per unit is Rs.2.75 paise per unit. The required rate of return on additional investments is 20 per cent. Assume 360 days a year and also assume that there are no bad debts. Which of the above policies would you recommend for adoption?

[Answer. Net Profit(A -B) 2,80,000; 2,96,175; 2,98,850; 3,14,063; 3,16,050; 3,02,667]

Ques.5 ABC Ltd. is examining the question of relaxing its credit policy. It sells at present 20,000 units at a price of Rs.100 per unit, the variable cost per unit is Rs.88 and average cost per unit at the current sales volume is Rs.92. All the sales are on credit, the average collection period being 36 days. A relaxed credit policy is expected to increase sales by 10% and the average age of receivables to 60 days. Assuming 15% return, should the firm relax its credit policy?

[Answer. 1,32,400; 1,33,600]

Ques.6 H. Ltd. has an annual sales level of 10,000 units at Rs.300/- per unit. The variable cost per unit is Rs.200 per unit and the fixed costs amount to Rs.3,00,000 per annum. The present credit allowed by the company is one month. The company is considering a proposal to increase the credit period to two months and three months and has made the following estimates:

Credit Policy	**Existing**	**Proposed**	
	One Month	**2 Months**	**3 Months**
Increase in Sales	-	15%	30%
% of Bad debts	1%	3%	5%

There will be increase in fixed cost by Rs.50,000 on account of increase in sales beyond 15% of present level. The company plans a pre tax-return of 20% on investment in receivables. You are required to compute the most paying credit policy for the company.

[Answer. Incremental Profit 28,167; -24,167]

Ques.7 A company sells a product @ Rs.30 per unit with a variable cost of Rs.20 per unit. The fixed costs amount to Rs.6,25,000 per annum and the total annual sales to Rs.75 lacs. It is estimated that if the present credit facility of one month is doubled, sales could be increased by Rs.6,00,000 per annum, the company expects a return on investment of at least 20% prior to taxation. Justify by calculation that this course can be adopted.
[Answer: The credit period may be doubled as it will result in net increase in profit by Rs.92,917]

Ques.8 ABC Ltd. has currently an annual credit sales of Rs.8,00,000. Its average age of accounts receivables is 60 days. It is contemplating a change in its credit policy that is expected to increase sales to Rs.10,00,000 and increase the average age of accounts receivables to 72 days. The firm's sale price is Rs.25 per unit, the Variable cost per unit is Rs.12 and the average cost per unit at Rs.8,00,000 sales volume is Rs.17. Assume a 360 days year, and calculate the following:

(i) What is the average accounts receivable with both the present and the proposed plans?

(ii) What is the cost of marginal investment, if the assumed rate of return is 15%?

[Answer: Average investment in debtors in existing and proposed plan is Rs.90,667 and Rs.1,28,000 respectively. So, the marginal increase is (1,28,000 - 90,667) = Rs.37,333 and its cost @ 15% is Rs.5,600.]

Ques.9 PQR Ltd. is considering relaxing its credit policy and evaluating two proposed policies. Currently, the firm has annual credit sales of Rs.50 lacs and Accounts receivables of Rs.12,50,000. The current level of loss due to bad debts is Rs.1,50,000. The firm is to give a return of 20% on investment in the new (additional) accounts receivables. The company's variable costs are 70% of the selling price. The following further information is furnished:

	Present Policy	**Policy option I**	**Policy option II**
Annual Credit sales	Rs.50,00,000	Rs.60,00,000	Rs.67,50,000
Accounts Receivables	Rs.12,50,000	Rs.20,00,000	Rs.28,12,500
Bad debt losses	Rs. 1,50,000	Rs. 3,00,000	Rs. 4,50,000

You are the management accountant of the firm. Advise the MD which option should be adopted.

[Answer: Policy Option I may be adopted as it is expected to increase profit by Rs.45,000.]

Ques.10 ABC Company's present annual sales amount to Rs.30 lacs at Rs.12 per unit. Variable costs are Rs.8 per unit and fixed costs amount to Rs.2.50 lacs per annum. Its present credit period of one month is proposed to be extended to either 2 or 3 months, whichever appears to be more profitable.

The following estimates are made for the purpose:

Credit Policy	1 month	2 months	3 months
Increase in Sales (%)	-	8	30
% of Bad debt to Sales	1	3	6

Fixed cost will increase by Rs.50,000 annually after any increase in sales above 25% over the present level. The company requires a pre tax return on investment of at least 20% for the level of risk involved. What will be the most rewarding credit policy in case of ABC company under the above circumstances? Present your answer in a tabular form.

[Answer: Contribution is 1/3 of sales. The present policy is the best. The proposals of 2 months and 3 months credit are not justified as the return on additional investment in not 20%.]

CHAPTER 12
INVENTORY MANAGEMENT

- ✓ Inventory Management - A Concept
- ✓ Objective of Inventory Management
- ✓ Assumptions of EOQ Technique
- ✓ Limitations of EOQ Technique

⇒ **CONCEPT 1**

WHAT IS INVENTORY MANAGEMENT

Inventory Management means planning, organizing, directing and controlling of inventory. It provides an **answer to** the following **two basic questions:**

How much to order - It means what should be the size of an order. How much to order will depend upon the annual consumption, carrying cost per unit per annum, ordering cost per order and stock out cost. It involves the determination of E.O.Q.

When to place an order - It means when the fresh order should be placed with supplier to procure additional inventory. It involves the determination of Re-order level/point.

⇒ **CONCEPT 2**

WHAT IS THE OBJECTIVE OF INVENTORY MANAGEMENT

The objective of Inventory Management is to avoid the situation of excessive and inadequate inventory and to determine and maintain optimum level of inventory after achieving a trade off between the profitability and liquidity so as to maximize the wealth of shareholders as a whole. Whenever the situation of excessive and inadequate inventory arises, prompt and timely action should be taken by management to correct imbalances. The optimum level of inventory will lie between the two danger points of excessive and inadequate inventory. The consequences of excessive and inadequate to inventory are:

Consequences of Excessive inventory	Consequences of Inadequate Inventory
1. Opportunity Costs of funds tied up in inventory **2.** Excessive Carrying Costs such as storage costs, handling cost, insurance etc.	1. Interruption in Production 2. Excessive stock out costs

3. Risk of Liquidity	

Thus, an effective management should ensure the procurement of inventory

- Of right quality,
- In the right quantity,
- At right time,
- At right place,
- Form right source.

⇒ **CONCEPT 3**

NEED FOR HOLDING INVENTORY

Following are the three principle motives for holding inventory:

Transaction Motive - It is need to hold inventories to facilities smooth production and sales.

1. Stock of raw material is to be held to facilities continous supply of material to production department for uninterrupted production.
2. Stock of W.I.P. is to be held because of production cycle, which is the time span between introduction of raw material into production and emergence of finished product.
3. Stock of finished goods is to be held to facilities continous supply of product to customers.

Precautionary Motive - It is need to hold inventory to meet contingencies in future.
Speculative Motive - It is the need to hold inventory in order to take advantage of profitable opportunities as and when they arise.

- **<u>Re-Oder quantity or Economic order quantity (EOQ)</u>**

1. ***Meaning of Economic order quantity (EOQ):-*** Re-order quantity is the quantity for which order is placed when the stock reaches re-order level. It is known as economic order quantity when it is the quantity which is most economical to order.
   EOQ refers to the quantity of inventory, at which total of ordering costs and the carrying costs is minimum. At EOQ the ordering costs are equal to carrying costs.

2. ***Objective of Economic Order Quantity (EOQ):-*** The objective of EOQ is to determine that order size which is most economical to order.

3. ***Importance of EOQ:-*** The EOQ technique also solves one of the major problems of the inventory management i.e. the **order quantity problem** by answering to the question: **'How much inventory should be ordered at a particular point of time?'**

➢ **Assumptions of EOQ Technique**

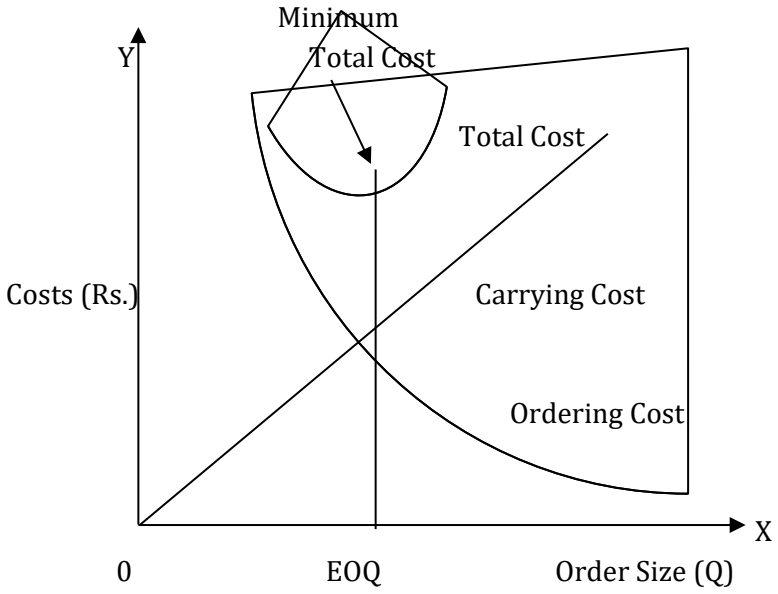
Following are the assumptions of EOQ:

1. Annual Usage (consumption) of inventory is known.
2. Rate of usage is known and constant.
3. Ordering Costs are known and constant.
4. Carrying Costs are known and constant.
5. Zero lead-time/delivery period. (i.e., Inputs are supplied as and when ordered)

Tutorial Notes

(i) Annual total cost of ordering and carrying is minimum at EOQ order size.

(ii) Carrying cost and ordering cost are equal at EOW order size.



⇒ **CONCEPT 4**

LIMITATION OF EOQ TECHNIQUE

1) Expected annual usage may not be same as the actual due to unusual and unexpected demand for inventory.

2) Rate of usage may not be constant due to unusual and expected demand for inventory.

3) Ordering and carrying costs may not be constant due to fluctuations in the costs of various components comprising costs.

4) Lead-time may not be constant due to reason beyond supplier's control.

⇒ **CONCEPT 5**

ABC ANALYSIS

This system is based on the assumption that in view of the scarcity of managerial time and efforts, more attention should be paid to those items which account for a larger chunk of the value of consumption rather than the quantity of consumption. Let us take an example of a firm having three major components of raw material:

Component	*Units Consumed*	*% to total*	*Value per unit*	*Total Value (Lacs)*	*%*
A	5000	45.45	1000	50	22.93
B	4000	36.36	1200	48	22
C	2000	18.18	6000	120	55.05
	11000	100	218	100	

Thus, the cost of raw material C which accounts for 55% of the total consumption value should be given priority over item A although the number of units consumed of the latter is much more than former.

Illustration.1 A publishing house purchases 72,000 rims of a special type paper per annum at cost Rs. 90 per rim. Ordering cost per order is Rs. 500 and the carrying cost is 5 per cent per year of the inventory cost. Normal lead time is 20 days and safety stock is NIL. Assume 300 working days in a year:

You are required:

(i) Calculate the Economic Order Quantity (E.O.Q).
(ii) Calculate the Reorder Inventory Level.
(iii) If a 1 per cent quantity discount is offered by the supplier for purchases in lots of 18,000 rims or more, should the publishing house accept the proposal?

Answer

$$EOQ = \sqrt{\frac{2\,AO}{C}}$$

Where,

A = Annual consumption
O = Ordering cost per order
C = Stock carrying cost per unit per annum

$$= \sqrt{\frac{2 \times 72{,}000 \times 500}{5\%\ of\ Rs.90}}$$

$$= \sqrt{1{,}60{,}00{,}000}$$

= 4,000 Rims.

(ii) Re-order Level = Normal Lead Time ´ Normal Usage

= 20 × 240
= 4,800 Rims.

Note:

$$Normal\ Usage = \frac{Annual\ usage}{Normal\ working\ days\ in\ a\ year}$$

$$= \frac{72{,}000}{300} = 240\ Rims$$

	EOQ	**Discount Offer**
Size of order	4,000 Rims	18,000 Rims
No. of orders in a year	18	4
Average inventory $\left(\frac{Order\ size}{2}\right)$	2,000 Rims	9,000 Rims
Cost:	Rs.	Rs.
Ordering Cost @ Rs. 500 per order	9,000	2,000
Inventory carrying cost		

At EOQ – (4,000/2) x Rs. 4.5	9,000	-
At Discount offer – (18,000/2) x Rs. 4.455	-	40,095
Purchases Cost		
At EOQ – 72,000 x Rs. 90	64,80,000	-
At discount offer – 72,000 x Rs. 89.10		
Total Cost	**64,98,000**	**64,57,295**

The total cost is less in case of quantity discount offer. Hence, quantity discount offer should be accepted.

Illustration.2 (a) Priyanka Ltd. requires 2,000 units of an item annually. The cost of the item per unit is Rs 20 and ordering cost is Rs 50 per order. If the carrying cost is 25% of the cost of item find the optimum lot size. If the company purchases in lots of 1,000 or more units of the item, it gets a rebate of 3%. Should the company accept the offer?

Answer.

The following information of Priyanka Ltd is given:

A = total annual requirement for the item – 2,000 units

B = Ordering cost per order of that item – Rs 50

C = Carrying cost per unit per annum – Rs 20 x .25 = Rs 5

$$EOQ = \sqrt{\frac{2AB}{C}}$$

$$= \sqrt{\frac{2 \times 2{,}000 \times Rs\ 50}{Rs\ 5}} = 200\ units$$

Company opts for EOQ

Total cost = Purchase cost + Ordering cost + Carrying cost

= 2,000 x Rs 20 + 2,000/200 x Rs 50 + 200/2 x Rs 5

= Rs 40,000 + Rs 500 + Rs 500 = Rs 41,000

When the company purchases in lot of 1,000 units

Total cost = Rs 2,000 x Rs 20 x .97 + 2,000/1,000 x Rs 50 + 1000/2 x Rs 5 x .97

= Rs 38,800 + Rs 100 + Rs 2,245 = Rs 41,325

Since the total cost in second case is higher than the cost when company purchases in economic lot size, the company should not accept the offer.

Illustration 3

A company buys in lot of 125 boxes which is a three months supply. The cost per box is Rs 125 and the ordering cost is Rs 250 per order. The inventory carrying cost is estimated at 20% of unit value per annum.

You are required per annum.

(i) What is the total annual cost of the existing inventory policy?

(ii) How much money would be saves by employing the economic order quantity (EOQ)?

Answer Economic Ordering Quantity (EOQ)= $\sqrt{2AB/C}$

Where,

A = Annual usage = 125 x 4 = 500 units

B = Buying cost or ordering cost = Rs 250

C= Carrying cost per unit per annum = 20% of Rs 125 =Rs 25

EOQ= $\sqrt{2 \times AB/C} = \sqrt{2 \times 500 \times 250/25} = \sqrt{10000} = 100\ units$

(i) Annual Cost = buying cost + carrying cost per unit

= (250 x 5) + 50 x 25 = 1250 + 12,50 = Rs 2500

(ii) Money saved to be incurred if EOQ is not followed

Actual cost to be incurred if EOQ is not followed

Illustration.4

Laxmi Ltd. produces an auto part with a monthly demand of 4,000 units. The product requires Component- X which is purchased at Rs 20. For every finished product, one unit of Component-X is required. The ordering cost is Rs 120 per order and the holding cost is 10% per annum.

You are required to calculate-

(i) Economic order quantity (EOQ)

(ii) If the minimum lot size to be supplied is 4,000 units, what is the extra cost, the company has to incur?

(iii) What is the minimum carrying cost, the company has to incur?

Answer

$$EOQ = \sqrt{\frac{2A\ O}{C}}$$

(i) Where,

EOQ = Economic Order Quantity

A = Annual Consumption = 12 months x 4,000 = 48,000 units

O = fixed cost per order = Rs 120

C = carrying cost per unit = 10% of Rs 20 = Rs 2 per unit

$$EOQ = \sqrt{\frac{2 \times 48.000\ \times 120}{2}} = 2{,}400\ units$$

(ii) Extra Cost to be incurred if lot size is 4,000 units

	If Lot Size is 2,400 units	**If Lot Size is 4,000 units**
inventory Ordering Cost		
Formula:		
$\frac{Annual\ requiremnent \times ordering\ cost}{order\ Size}$	$\frac{48{,}000 \times 120}{2400}$	$\frac{48{,}000 \times 120}{4000}$
	$\frac{5{,}76{,}0000}{2400}$	$\frac{5{,}76{,}0000}{2400}$
	= 2400	=1440
Inventory carrying Cost		
Formula	$\frac{24{,}00 \times 2}{2}$	$\frac{4{,}000 \times 2}{2}$
$\frac{inventory\ Size \times carrying\ cost\ per\ unit}{2}$	= 24,000	=4,000
total inventory holding cost	Rs 2,400 + Rs 2,400	Rs 1,440+ Rs 4,000
	= Rs 4,800	= Rs 5,440
Extra cost incurred if minimum lot size is 4,000 units	Rs 5,440 - Rs 4,800 = Rs 640	

(iii) The carrying cost will be least at the lowest level of inventory. Since the company's monthly demand is 4,000 units, it may order at least in size of 4,000 units

Inventory carrying cost at the order level of 4,000 units = $\frac{4000\times2}{2}$

Formula:

$$\frac{Inventory\ Size\ \times carring\ cost\ per\ units}{2} = 4{,}000$$

Illustration.5 EXE Limited has received an offer of quantity discounts on its order of materials as under :

Price per tonne (Rs.)	Tonnes (Nos.)
1,200	Less than 500
1,180	500 and less than 1,000
1,160	1,000 and less than 2,000
1,140	2,000 and less than 3,000
1,120	3,000 and above

The annual requirement for the material is 5,000 tonnes. The ordering cost per order is Rs. 1,200 and the stock holding cost is estimated at 20% of material cost per annum.

Required : **(a)** Compute the most economical purchase level.
(b) What will be your answer to the question which precedes this if there are no discounts offered and the price per tonne is Rs. 1,500?

Ans.

(a) Statement Showing the Total Cost at Various Order Sizes

Total Annual Require-ments	**Order Size (Tonnes)**	**No. of Orders**	**Price Per Tonnes**	**Total Purchasing Price of Inventory**	**Ordering Cost**	**Carrying Cost p.u 1**	**Total**
A	**B**	**C = A/B**	**D**	**E = A x D**	**F = C x Rs. 1200**	**G**	**H= E+F+G**
		Rs.	**Rs.**	**Rs.**	**Rs.**	**Rs.**	**Rs.**
5,000	250	20	1,200	60,00,000	24,000	30,000 (125 x Rs. 240)	60,54,000

5,000	500	10	1,180	59,00,000	12,000	59,000 (250 x Rs. 236)	59,71,000
5,000	1,000	5	1,160	58,00,000	6,000	1,16,000 (500 x Rs. 232)	59,22,000
5,000	2,000	2.5	1,140	57,00,000	3,000	2,28,000 (1000 x Rs. 228)	59,31,000
5,000	3,000	1.666	1,120	56,00,000	2,000	3,36,000 (1500 x Rs. 224)	59,38,000

The most economical purchase level is 1000 tonnes because total cost is minimum (Rs. 59,22,000) at this order size.

$$(b) EOQ = \sqrt{\frac{2AO}{C}}$$

$$Where, A = Annual\ Usage, O = Ordering\ Cost\ per\ order$$

$$C = Carrying\ Cost\ per\ unit\ per\ annum.$$

$$= \sqrt{\frac{2\ x\ 5000\ x\ Rs.1200}{20\%\ Rs.1500}} = 200\ Tonnes.$$

CHAPTER 13
MANAGEMENT OF CASH

⇒ **CONCEPT 1**

MEANING OF CASH MANAGEMENT

Cash Management means planning, organizing, directing and controlling of cash. It provides an answer to the following basic questions:

(a) How much to maintain cash balance?
It means what should be level of cash in the organization. How much to maintain cash balance will depend upon the cash operating cycle. Larger the operating cycle, larger the cash balance required.

(b) How to finance deficit (i.e., excess of estimated cash outflows over estimated cash inflows)?

(c) How to invest surplus (i.e., excess of estimated cash inflows over estimated cash outflows)?

⇒ **CONCEPT 2**

OBJECTIVE OF CASH MANAGEMENT

The objective of cash management is to avoid the situation of excessive and inadequate cash and to determine and maintain the optimum level of cash after achieving a trade off between the profitability and liquidity so as to maximize the wealth of shareholders as a whole.

Whenever the situation of surplus or deficit cash arises, prompt and timely action should be taken by the management to correct the imbalances.

⇒ **CONCEPT 3**

NEED FOR CASH/ MOTIVE OF HOLDING CASH/

The following are the three principal motives for holding cash :

a) Transactional Motive

This is the most essential motive for holding cash because cash is the medium through which all the transactions of the firm are carried out. Some examples of transactions of a manufacturing firm are given below:

- Purchase of Capital Goods like plant and machinery
- Purchase of raw material and components
- Payment of rent and wages
- Payment for utilities like water, power and telephone
- Payment for service like freight and courier

These transactions are paid for from the cash pool or cash reservoir which is all the time being supplemented by inflows. These inflows are of the following kinds:

- Capital inflows from promoters' capital and borrowed funds
- Sales proceeds of finished goods
- Capital gains from investments

The size of the cash pool depends upon the overall operations of the firm. Ideally, for transaction purposes, the working capital inflows should be more than the working capital outflows at any point of time.

b) Speculative Motive

Since cash is the most liquid current asset, it has the maximum potential of value addition to a firm's business. The value addition can come in two forms. First, as the originating and terminal point of the operating cycle, cash is invaluable. But cash has an opportunity cost also and if cash is kept idle, it becomes a liability rather than an asset. Therefore, efficient firms seek to deploy surplus cash in short term investments to get better returns. It is here that the second form of value addition from cash can be had. Since this deployment of cash needs to be done skillfully, not all the firms hold cash for speculative motive. Further the amount of cash held for speculative motive should not cause any strain upon the operating cycle.

c) Contingency Motive

This motive of holding cash takes into account the element of uncertainty associated with any form of business. The uncertainty can result in prolongation of the working capital operating cycle or even its disruption. It is possible that cost of raw materials or components might go up or the time taken for conversion of raw materials into finished goods might increase. For such contingencies, some amount of cash is kept by every firm

⇒ **CONCEPT 4**

WHAT IS FLOAT & ITS KIND?

Float - The term float is used to refer to the periods that effect cash as it moves through the different stages of the collection process, it represents time gap for receiving cash after sales.

Kind of Float - Different kinds of float with reference to management of cash are as follows.

1. ***Billing Float*** - Billing float refers to the time between the sale and mailing the invoice to the customer.

2. ***Mail Float*** - Mail float refers to the gap between the time a customer sends the cheque and the time the cheque is received by the firm.

3. **Cheque Processing Float** - Cheque Processing float refers to the gap between the time the cheques is received by the firm and the time the cheque is deposited into the bank.

4. **Banking Processing Float** - Banking Processing float refers to the gap between the time the cheque is deposited into the bank and the time the cheque is credited to firm's bank account.

⇒ **CONCEPT 5**

HOW TO ACCELERATE CASH COLLECTION

Cash collection can be accelerated:

(a) By reducing processing time in raising the invoice to the customer.
(b) By reducing the time gap between the time a customer sends the cheque and the time the cheque is received by the firm.
(c) By reducing the processing time between the time the cheque is received by the firm and the time the cheque is deposited into bank.
(d) By reducing the collection time between the time the cheque is deposited in bank and the time the cheque is credited to firm's bank account.

The amount of cheques sent by customers, which are not yet collected is called **collection or deposit float.**

⇒ **CONCEPT 6**

METHODS OF ACCELERATING CASH COLLECTION

➢ Lock Box System

Purpose - The purpose of lock box system is to eliminate the time gap between the receipt of cheque and its deposits into the bank.

Working - The working of lock box system is as follows:

(a) The firm establishes a number of collection centres considering customer's location and volume of remittances.
(b) The firm hires a local post office box at each center.
(c) The firm instructs its customers to mail their remittances to the lock boxes.
(d) The firm authorities its local bank at each center to pick up their remittance from local box.
(e) The bank picks up the mail several times a day and deposits the cheques in firm's bank account.

Decision - Whether a lock box system should be used or not should be decided on the basis of its costs and benefits. If its benefits exceed its costs, the system should be introduced, otherwise not.

Example

Lockers Pvt. Ltd. is considering the use of a lockbox system to handle its daily collections. The company's credit sales are Rs.160 crore per year, and it currently processes 1,300 cheques per day. The cost of the lockbox system is Rs.95,000 per year. The system allows for up to 1,000 cheques per day. Any additional cheques are processed at an additional charge of Rs.1.50 per cheque. The company estimates that the system will reduce its float by 3 days. The firm's discount rate for equally risky projects is 15 per cent, its tax rate is 40 per cent, and its cost of short-term capital is 12 per cent. (Assume a 360-day year).

(a) How much cash will be released for other uses if the lockbox system is used ?

(b) What net benefit will Lockers Ltd. gain from using lockbox system ?

(c) Should Lockers Ltd. adopt the proposed lockbox system ?

(d) Assume now that the institution that offers the lockbox system requires a Rs.7,00,000 compensating balance to be held for the complete year in a non-interest-bearing account. Should Lockers Ltd. adopt the system ?

1) Credit sales per day = 160 croe / 360 days = 44,44,444

2) Cost if lock box system is adopted

Cost of lock box = Rs.95,000

Additional cost for cheques = 300 cheque x Rs.1.5 x 360 = Rs. 1,62,000

Opportunity cost = 2,57,000 x 12% = 30,840

Total cost = 257,000 + 30,840 = 2,87,840.

3) Cost of Funds = 7,00,000 x 12% = 84,000.

4) Reduction in float days = 3

(a) Cash that will be released for other use = 44,44,444 x 3 days = 1,33,33,332.

(b) Cost of locker = 2,87,840.

Gain on release of fund = 1,33,33,332 x 15% = 20,00,000 Apprx.

Hence net benefit from use of lock box = 20,00,000 - 287,840 =17,12,160.

(c) Lockers Ltd. should adopt the lock box system.

(d) Total cost if Rs. 7,00,000 to be deposited = 84,000 + 2,87,840 = 3,71,840.

Net gain = 20,00,000 - 371,840 = 16,28,160. Still Lockers Ltd. should adopt the lock box system.

⇒ **CONCEPT 7**

BAUMOL'S MODEL

Application- The Baumol's Model helps in determining the optimum cash balance **when the demand for cash is certain.**

Optimum Cash Balance - According to Baumol's model, optimum cash balance is that level of cash where the total of carrying costs (or holding costs) and transactions costs is the minimum.

Meaning of Economic Lot Size - The Economic Lot Size refers to the size of lot, at which total of transaction costs and the holding costs is minimum. At Economic Lot Size, total transaction costs are equal to total holding costs.

Factors to be Considered - Economic Lot Size is determined after considering the following factors.

(a) Transaction Costs: The transaction costs refer to the costs involved in converting the marketable securities into cash. This happen when the firm falls short of cash and has to sell the securities resulting in clerical, brokerage, registration and other costs. The transaction cost per transaction is assumed to be constant. Total transaction cost is calculated as follows:

$$\text{Total Transaction Cost} = \text{Total No. of Transaction} \times \text{Per Transaction}$$

$$\text{Total No. of Transaction} = \frac{\text{Annual cash requirment (A)}}{\text{Economic lot size (C)}}$$

There is an **Inverse** relationship between lot size and transaction cost.

Larger the lot size	Lower the transaction costs because of fewer lots
Smaller the lot size	Higher the transaction costs because of more lots

(b) ***Holding Costs*** : The holding cost or opportunity cost refers to the return foregone on marketable securities or the cost incurred in maintaining an Average Cash Balance. It varies with the Average Cash Balance.

There is **positive** relationship between lot size and holding cost.

Large the lot size	Higher the holding costs because of high average cash balance.
Smaller the lot size	Lower the holding costs because of low average cash balance

The total holding cost is calculated as follows

Total Holding Cost = Average Cash Balance × Holding Cost p.a.

$$= \frac{\text{Economic Lot Size (C)}}{2} \times \text{Holding Cost p. a. (H)}$$

$$= \frac{C}{2} \times H$$

(c) ***Annual Requirement of Cash.***

Importance of Economic Lot Size - The Economic Lot Size technique solves one of the major problems of the cash management i.e., the **lot size problem by** answering to the question : 'How much marketable securities should be sold at a particular point of time ?'

Assumptions of Economic Lot Size Technique

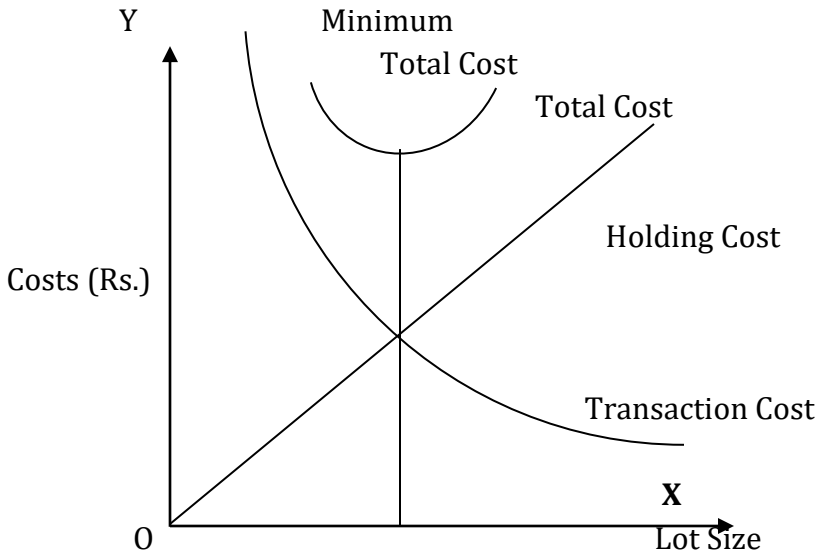
Following are the assumptions of Economic Lot Size:

1. Constant Annual Requirement of Cash
2. Constant Rate of Demand for Cash
3. Constant Transaction Costs
4. Constant Holding Costs, and
5. Zero Conversion Period

Tutorial Notes:

(i) Annual total cost of transaction and holding is minimum at Economics Lot Size.

(ii) Holding cost and transaction cost are equal at Economics Lot Size.



Control Limits - In the Miller-Orr's model, control limits are set for cash balances. These limits consist of upper limit (h), the return point (z) & the lower limit (o).

1. Upper Limit (h)	It is level of cash balance at which the marketable securities are purchased to bring down the cash balance back to the normal level.
2. Lower Limit (o)	It is that level of cash balance at which the marketable securities are sold to bring up cash balance back to the normal level.
3. Return Point (z)	It is normal level of cash balance which lies between the upper limit and lower limit and which is to be attained after purchase/sale of marketable securities.

ILLUSTRATION

Illustration-1 The annual cash requirement of A Ltd. is Rs. 10 lakhs. The company has marketable securities in lot sizes of Rs. 50,000, Rs. 1,00,000, Rs. 2,00,000, Rs. 2,50,000 and Rs. 5,00,000. Cost of conversion of marketable securities per lot is Rs. 1,000. The company can earn 5% annual yield on its securities.

You required to prepare a table indicating which lot size will have to be sold by the company. Also show that the economic lot size can be obtained by the Baumol Model.

Ans.

Table Indicating Total Cost at different lot sizes of securities

Total Annual Cash Requirement (A)	10,00,000	10,00,000	10,00,000	10,00,000	10,00,000
Lot Size (Rs.) (S)	50,000	1,00,000	2,00,000	2,50,000	50,00,000
Number of Lots	20	10	5	4	2
Transaction Cost (Rs.) [A/S x Rs. 1,000]	20,000	10,000	5,000	4,000	2,000
Hold Cost (Rs.) [S/2 × 5%]	1,250	2,500	5,000	6,250	12,500
Total Cost (Rs.)	21,250	12,500	10,000	10,250	14,500

Economic lot size is Rs. 2,00,000 at which total costs are minimum.

Illustration-2 X Ltd. is to start production on 1st January. The prime cost of a unit is expected to Rs. 40 out of which Rs. 16 is for material and Rs. 24 for labour. In addition variable expenses per unit are expected to be Rs. 8 and fixed expenses per month Rs. 30,000. Payment for materials is to be made in the month following the purchases. One third of sale will be for cash and the rest on credit for settlement in the following the month. Expenses are payable in the which they are incurred. The selling price is fixed at Rs. 80 per unit. The number of units manufacture and sold are expected to be as under:

January	900	April	2,100
February	1,200	May	2,100
March	1,800	June	2,400

Required : Draw up a statement showing requirements of cash from month to month, ignoring the question of stock.

Ans.

Statement showing requirements of Cash for 6 months from January to June

Particular	**January Rs.**	**February Rs.**	**March Rs.**	**April Rs.**	**May Rs.**	**June Rs.**
A. Total Cash Available:						
Cash Sales	24,000	32,000	48,000	56,000	56,000	64,000
Collection from Debtors	-	48,000	64,000	96,000	1,12,000	1,12,000
B. Total Cash Payments:	24,000	80,000	1,12,000	1,52,000	1,68,000	1,76,000
Payment to Creditors	-	14,400	19,200	28,800	33,600	33,600
Labour	21,600	28,800	43,200	50,400	50,400	57,600
Variable Expenses	7,200	9,600	14,400	16,800	16,800	19,200

Fixed Expenditure	30,000	30,000	30,000	30,000	30,000	30,000
	58,800	82,800	1,06,800	1,26,000	1,30,800	1,40,400
C. Surplus (Deficit) [A -B]	-34,800	-2,800	5,200	26,000	37,200	35,600
D. Cumulative Surplus (Deficit)	-34,800	-37,600	-32,400	-6,400	30,800	66,400

Illustration-3 X & Co. has furnished the following information. Based on this, prepare a cash budget for three months i.e., June, July and August :

Month	**Sales Rs.**	**Materials Purchases Rs.**	**Wages Rs.**	**Production Overheads Rs.**	**Office & Selling Expenses Rs.**
June	72,000	25,000	10,000	6,000	5,500
July	97,000	31,000	12,100	6,300	6,700
Aug.	86,000	25,500	10,600	6,000	7,500

a) Cash balance in as hand as on 1st June : Rs. 72,500.
b) 50% of sales are Cash sales.
c) A fixed assets has to be purchased for Rs. 8,000 in July 2008.
d) Debtors are allowed one month's credit.
e) Creditors for materials grant one month's credit.
f) Sales commission at 3% on sales is paid to the salesman each month.

Ans.

Cash Budget for Three Months for June to Aug.

Particulars	**June Rs.**	**July Rs.**	**August Rs.**
A. Total Cash Available:			
Opening Balance	72,500	84,840	1,08,330
Cash Sales	36,000	48,500	43,000
Collection from Debtors	-	36,000	48,500
	1,08,500	1,69,340	1,99,830
B. Total Cash Payments:			
Creditors	-	25,000	31,000
Sales Commission 3%	2,160	2,910	2,580
Wages	10,000	12,100	10,600
Production Overheads	6,000	6,300	6,000

Office & Selling Expenses	5,500	6,700	7,500
Fixed Assets	-	8,000	-
	23,660	61,010	57,680
C. Closing Balance [A-B]	84,840	108,330	1,42,150

REVISIONARY PROBLEMS

Ques.1 Based on the following information prepare a cash budget for ABC Ltd.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Opening cash balance	Rs.10,000			
Collection from customers	1,25,000	Rs.1,50,000	Rs.1,60,000	Rs.2,21,000
Payment:	20,000	35,000	35,000	54,200
Purchase of Materials	25,000	20,000	20,000	17,000
Other Expenses	90,000	95,000	95,000	1,09,200
Salary and Wages	5,000	-	-	-
Income Tax	-	-	-	20,000
Purchase of Machinery				

The company desires to maintain a cash balance of Rs.15,000 at the end of the each quarter. Principal can be borrowed or repaid in multiples of Rs.500 at an interest of 10% per annum.

Management does not want to borrow cash more than what is necessary and wants to repay as early as possible. In any event, loans cannot be extended beyond four quarters. Interest is computed and paid when repayment is made at the end of the quarter& borrowing are made at beginning of every quarter.

[Answer: Interest payable in 3rd and 4th quarter is Rs.675 and Rs.1,100. Cash balance at the end of 4th quarter is Rs.23,825.]

Ques.2 The following data is collected by SRG Iron and Steel Co. for first four months of the next financial year:

	Month 1	Month 2	Month 3	Month 4
Sales	Rs.15,000	Rs.24,000	Rs.36,000	Rs.24,000
Purchase of assets	1,200	2,000	4,000	-

Raw materials	14,000	15,000	16,000	17,000
Expenses	2,000	4,000	4,000	8,600

Additional Information:

(i) The opening cash balance in the beginning is expected at Rs.12,000 and the firm wants to maintain a minimum cash balance of Rs.5,000 at the end of each month.

(ii) Opening debtors for the Month 1 are Rs.5,000.

(iii) On an average, 2/3 of monthly sales are on credit basis and collected next month.

(iv) Borrowing, if any, may be made in the beginning of a month in the multiple of Rs.1,000. Repayment can be made at the end of a month together with interest @ 2% per month.

Prepare Cash Budget for four months.

[Answer: Borrowing in Month I and II are of Rs.1,000 and Rs.3,000. Repayment in Month III Rs.4,180 (4,000 + 180). Balance at the end of Month IV is Rs.12,020.]

Chapter 14:
SECURITY ANALYSIS

INTRODUCTION

"An Investment is the current commitment of money or other resources in the expectation of reaping future benefits." (Zvi Bodie, 2016). Investment means to forego present consumption for the increased consumption resource available in the future. It can be in any form, assets of all type and kind be it jewellery, commodity, real estate etc. An investor can buy a share of a company in anticipation of getting good returns in future. In this section of the book, we are interested in the Financial Assets or securities like equity shares, bonds and debentures etc. At this point, reader should understand that the financial assets are different from real assets. While financial assets are the paper claim representing an indirect claim to real assets in form of debt orequity commitments, the real assets are land and building, machines, etc., which are used to produce goods and services. Therefore, a security is understood to be a debt or equity instrument issued by a firm in lieuof the funds raised by it to meet its long term and short term requirements. Among the many properties that distinguish real from financial assets are liquidity and marketability. These features make the financial assets more attractive for investors as they are able to liquidate their investments easily in ready and active markets.

The decision of the investor is confronted with many issues, like- in which asset class to invest; shares, bonds,bullion etc. The investor must decide the time horizon for which he/she needs to invest and balance the combination of his/her expected return to the risk they are ready to face. These are some of the issues which any investor will face. In this chapter we shall describe the term securities generally and discuss the prevalent options available in the Indian Securities market.

WHAT ARE SECURITIES

Securities may be defined as instruments issued by seekers of funds in the investment market to the providersof funds in lieu of funds.

These instruments *prima facie* provide evidence of ownership to the holder of the instrument. The owner is entitled to receive all the benefits due on the instrument and to retrieve his investment at the time of redemption.Securities can broadly be divided into two categories — Debt Securities and Equity Securities. However, Section2(h) of Securities Contract (Regulation) Act, 1956, defines securities as under:

Securities include –

(i) shares, scrips, stocks, bonds, debentures, debenture stock or other marketable

securities of a likenature in or of any incorporated company or other body corporate.

(ia) derivative.

(ib) units or any other instrument issued by any collective investment scheme to the Investors in suchschemes.

(ic) security receipt as defined in clause (zg) of Section 2 of the Securitisation and Reconstruction ofFinancial Assets and Enforcement of Security Interest Act, 2002.

(id) units or any other such instrument issued to the investors under any mutual fund scheme.

(ii) Government securities.

(iia) such other instruments as may be declared by the Central Government to be securities and,

(iii) rights or interests in securities.

INVESTMENT

Investment is the employment of funds on assets with the aim of earning income or capital appreciation. Investment has two attributes namely time and risk. Present consumption is sacrificed to get a return in the future. The sacrifice that has to be borne is certain but the return in the future may be uncertain. This attribute ofinvestment indicates the risk factor. The risk is undertaken with a view to reap some return from the investment.

The investor makes a comparison of the returns available from each avenue of investment, the element of riskinvolved in it and then makes the investment decision that he perceives to be the best having regard to the timeframe of the investment and his own risk profile.

Any investment decision will be influenced by three objectives – security, liquidity and yield. A best investment decision will be one, which has the best possible compromise between these three objectives.

- Security
- Liquidity
- Yield

A best investment decision will be one, which has the best possible compromise between these three objectives.When selecting where to invest our funds, we have to analyze and manage following three objectives.

(i) Security: Central to any investment objective is the certainty in recovery of the principal. One can affordto lose the returns at any given point of time, but s/he can ill afford to lose the very principal itself. By identifying the importance of security, we will be able to identify and select the instrument that meets this criterion. For example, when

compared with corporate bonds, we can vouch the safety of returnof investment in treasury bonds as we have more faith in governments than in corporations. Hence, treasury bonds are highly secured instruments. The safest investments are usually found in the moneymarket and include such securities as Treasury bills (T-bills), certificates of deposit (CD), commercial paper or bankers' acceptance slips; or in the fixed income (bond) market in the form of municipal and other government bonds, and in corporate bonds.

(ii) Liquidity : Because we may have to convert our investment back to cash or funds to meet our unexpected demands and needs, our investment should be highly liquid. They should be en cashable at shortnotice, without loss and without any difficulty. If they cannot come to our rescue, we may have to borrowor raise funds externally at high cost and at unfavorable terms and conditions. Such liquidity can bepossible only in the case of investment, which has always-ready market and willing buyers and sellers. Such instruments of investment are called highly liquid investment. Common stock is often consideredthe most liquid of investments, since it can usually be sold within a day or two of the decision to sell.Bonds can also be fairly marketable, but some bonds are highly illiquid, or nontradable, possessing a fixed term. Similarly, money market instruments may only be redeemable at the precise date at which the fixed term ends. If an investor seeks liquidity, money market assets and non-tradable bonds aren'tlikely to be held in his or her portfolio.

(iii) Yield: Yield is best described as the net return out of any investment. Hence given the level or kindof security and liquidity of the investment, the appropriate yield should encourage the investor to gofor the investment. If the yield is low compared to the expectation of the investor, s/he may prefer to avoid such investment and keep the funds in the bank account or in worst case, in cash form in lockers.Hence yield is the attraction for any investment and normally deciding the right yield is the key to any investment.

INVESTMENT VS. SPECULATION

According to Benjamin Graham "An investment operation is one which, upon thorough analysis, promises safetyof principal and an adequate return. Operations not meeting these requirements are speculative."

Thus investment differs from speculation. Speculation also involves deployment of funds but it is not backed

by a conscious analysis of pros and cons. Mostly it is a spur of the moment activity that is promoted and supported by half-baked information and rumours. Speculative deployment of funds is generally prevalent in the secondary equity market. What attracts people to speculation is a rate of return that is abnormally higher than the prevailing market rates. The balancing of risk and return nevertheless operates in speculative activity also and as such the risk element in speculation is very high. Very broadly, the characteristics of an investor differ from the speculator as follows:

BASIS FOR COMPARISON	***INVESTMENT***	***SPECULATION***
Meaning	The purchase of an asset with the hopeof getting returns is called investment.	Speculation is an act of conducting a risky financial transaction, in the hope of substantial profit.
Basis for decision	Fundamental factors, i.e. performance of the company.	Hearsay, technical charts and market psychology.
Time horizon	Long term	Short term
Risk involved	Moderate risk	High risk
Intent to profit	Changes in value	Changes in prices
Expected rate of return	Modest rate of return	High rate of return
Funds	An investor uses his own funds.	A speculator uses borrowed funds.
Income	Stable	Uncertain and Erratic
Behavior of participants	Conservative and Cautious	Daring and Careless

INVESTMENT VS. GAMBLING

Investment differs from gambling and betting also. Both gambling and betting are games of chance in which return is dependent upon a particular event happening. Here also, there is no place for research-based activity.The returns in gambling are high and known to the parties in advance. Gambling is different from Investment inthe following respects:

BASIC FOR COMPARISON	*INVESTMENT*	*GAMBLING*
Planning Horizon	Longer Planning Horizon	Short Planning Horizon
Basis for Decisions	Scientific Analysis of Intrinsic worth of the security	Based on tips and rumors
Nature	Planned activity	Unplanned activity
Risk	Commercial Risk	Artificial Risk
Return Expectation	Risk-return trade-off determines return	Negative returns are expected
Motive	Safety of principal and stability of returns	Entertainment while earning

To say that investors like return and dislike risk is, however, simplistic. To facilitate our job of analyzing securities and portfolios within a risk return context, we must begin with a clear understanding of what risk and return are,what creates them and how they should be measured.

SECURITY ANALYSIS

Security analysis is the first part of investment decision process involving the valuation and analysis of individualsecurities. Security Analysis is primarily concerned with the analysis of a security with a view to determine the value of the security, so that appropriate decisions may be made based on such valuation as compared with the value placed on the security in the market.

Two basic approaches of security analysis are fundamental analysis and technical analysis.

Fundamental Analysis can be segregated into economic analysis, industry analysis and company analysis

Fundamental analysis is a three level systematic process that analyse the overall external and internalenvironment of the company before placing a value on its shares. The three levels at which the analysis is carried out are the following:

(a) Analysis of the economy

(b) Industry Level Analysis

(c) Company Analysis

We shall describe the analytical process at all these levels in details hereunder:

Analysis of the economy

Performance of a company is intimately related to the overall economic environment of the country because demand for products and services of the company would under normal circumstances be directly related to growth of the country's economy. If the country has an improving GDP growth rate, controlled inflation and increasing investment activity then chances are that the valuation of securities shall be liberal. The capital market is said to be in a bullish phase with share values shooting up across the board. As the economy is growing, the analyst expects almost every industry to do well.

On the other hand, if the GDP growth rate slackens, inflation is out of control and investment activity is stagnant or declining, the investor or the analyst will expect the performance of industries to slow down. Under such circumstances, valuation of securities tends to be conservative. The capital market enters a bearish phase andshare values decline across to board.

While undertaking the analysis of the economy, the following macro-economic factors are commonly used.

i) **Gross Domestic Product:** Gross Domestic Product (GDP) indicates the rate of growth of the economy. GDP represents the aggregate value of the goods and services produced in the economy. GDP consists of personal consumption expenditure, gross private domestic investment and government expenditureon goods and services and net export of goods and services. As mentioned above, whenever the GDPgrows, it indicates economic growth and higher return for investors.

ii) **Savings and Investment:** It is obvious that growth demands investment which in turn needs substantial amount of domestic savings. Stock market is a channel through which the savings of the investorsare made available to corporate houses. Savings are distributed over different assets such as equity shares, deposits, mutual fund units, real estate and bullion.

iii) **Inflation :** Along with the growth rate of GDP, if the inflation rate also increases, then the real rate of growth of would be very less. The demand in the consumer product industry is significantly affected. The industries which come under the government price control policy may lose the market. It is to be noted that mild level of inflation is good for the stock market and high rate of inflation is detrimental to the stock market.

iii) **Interest rates:** The interest rate affects the cost of financing to the firms. A decrease in interest rate implies lower cost of finance for firms and more profitability. More money is available at a lower interestrate for the brokers who are doing business with borrowed money. Availability of funds at low interest rates fosters speculation and rise in the price of shares.

iv) **Budget:** The Union Budget provides a detailed account of the government revenues and expenditures.A deficit budget may lead to high rate of inflation and adversely impact the cost of production. Surplus budgets may result in deflation. Hence, balance budget is highly favourable to the stock market.

v) **Tax structure:** Tax concessions and incentives given to certain industries encourages investment in that particular industry. Tax reliefs provided to savings encourage savings.

vi) **Other factors:** Other factors include the balance of payment, monsoon and agriculture, infrastructure facilities and demographic factors.

Industry Level Analysis

Industry level analysis focuses on a particular industry rather than on the broader economy. In this analysis, theanalyst has to look for the composition of the industry, its criticality vis-à-vis the national economy, its position along the industrial life cycle, entry and exit barriers. All these factors have a bearing upon the performance of the company.

Industry is a combination or group of units whose end products and services are similar. Having a common market, the participants in the industry group face similar problems and opportunities. To the extent that an industry loses or gains from certain happenings, the performance of the participants is sure to be similarly impacted. These happenings may be technological changes, shifts in consumer preferences, availability of substitutes etc. These changes also drive the life cycle of the industry.

The industry life cycle or the industry growth cycle can be divided into three major stages- pioneering stage, expansion stage and stagnation stage. The pioneering stage is related to sunrise status of the industry. It is thestage when technological development takes places. The products have been newly introduced in the market and they gain ready acceptance. The pioneering units in the industry make extraordinary profits and thus attract competition. As competition increases profitability in the industry comes under strain and less efficient firms are forced out of the market. At the end of the pioneering stage, selected leading companies remain in the industry.

In the expansion stage of the growth cycle the demand for the products increases but at a lower rate. There is less volatility in prices and production. Capital is easily available in plenty for these units. Due to retention of profits, internal accruals increase.

At the stagnation stage, the growth rate initially slows down, then stagnates and ultimately turns negative. There is no product innovation. External capital is hard to come by. Even the internal capital takes flight. This stage of the industry is most valuable during times of slow down in national economy.

Company Analysis

Armed with the economic and industry forecasts, the analyst looks at the company specific information. Company information is generated internally and externally. The principle source of internal informationabout a company is its financial statements. Quarterly and annual reports including the income statement, the

balance sheet and cash flows must be screened to assure that the statements are correct, complete, consistent, and comparable. Many popular and widely circulated sources of information about the companies emanate from outside, or external sources. These sources provide supplements to company-generated information by overcoming some of its bias, such as public pronouncements by its officers. External information sources also provide certain kinds of information not found in the materials made available by companies themselves. There are traditional and modern techniques of company analysis.

Among the traditional techniques are forecasting expected dividends and earnings using price-earning ratios which help us to determine whether a stock is fairly valued at a point in time. Such approaches allow us to evaluate an equity share for a short term horizon. Moreover, an approach combining the dividend discount model (with variable growth rates) and the concept of systematic risk can also be helpful in evaluating a stock for a longer term holding period. Among the modern methods are regression analysis, and the related tools of trend and correlation analysis, decision tree analysis and simulation. Modern methods have strengths of the traditional methods while attempting to overcoming their shortcomings.

Fundamental Analysis Tools: Although the raw data of the Financial Statement has some useful information, much more can be understood about the value of a stock by applying a variety of tools to the financial data.

1. Earnings per Share – EPS
2. Price to Earnings Ratio – P/E
3. Projected Earnings Growth – PEG
4. Price to Sales – P/S
5. Price to Book – P/B
6. Dividend Yield
7. Dividend Payout Ratio
8. Book value per share
9. Return on Equity

At this juncture, it is imperative to understand various Ratios, Comparative Financial Statements, Trend Analysis, Common Size Statements, Fund Flow Analysis and Cash Flow Analysis

A. Ratio Analysis

Ratio is a relationship between two figures expressed mathematically. Financial ratio provides numerical relationship between two relevant financial data. Financial ratios are calculated from the balance sheet and profit and loss account.

Financial ratios may be divided into six groups

- Liquidity Ratios
- Turnover Ratios
- Leverage Ratios
- Profit Margin Ratios
- Coverage Ratios
- Valuation Ratios

a) ***Liquidity Ratios***: Liquidity means the ability of the firm to meet its short term obligations. Current ratio and acid test ratio are the most popular ratios used to analyse the liquidity. The liquidity ratio indicates the liquidityin a rough fashion and the adequacy of the working capital.

1. **Current Ratio:** The current ratio is a liquidity ratio that measures a company's ability to pay short-termobligations or those due within one year.

   = Current Assets / Current Liabilities

2. **Acid Test Ratio:** The acid-test ratio (ATR), also commonly known as the quick ratio, measures the liquidity of a company by calculating how well current assets can cover current liabilities. The quick ratio uses only the most liquid current assets that can be converted to cash within 90 days or less.

   = Current Assets – Inventories / Current Liabilities

b) ***Turnover Ratios*****:** The turnover ratios show how well the assets are used and the extent of excess inventory, if any. These ratios are also known as activity ratios or asset management ratios. Commonly calculated ratios aresales to current assets, sales to fixed assets, sales to inventory, receivable to sales and total assets to turnover.Sales to current assets ratio shows the utilisation of current assets. Various turnover ratios are as under:

1. **Inventory Turnover Ratio:** Inventory turnover is the rate that inventory stock is sold, or used, and replaced. The inventory turnover ratio is calculated by dividing the cost of goods by average inventory for the same period. A higher ratio tends to point to strong sales and a lower one to weak sales.

   = Net Sales / Inventory or

   Cost of Goods Sold / Average Inventory.

2. **Receivables Turnover Ratio:** The receivables turnover ratio measures the efficiency with whicha company is able to collect on its receivables or the credit it extends to customers. The ratio also measures how many times a company's receivables are converted to cash in a certain period of time.

   = Net Credit Sales / Average Accounts Receivable

3. **Capital Employed Turnover Ratio:** The capital employed turnover ratio indicates the

efficiency with which a company utilizes its capital employed with reference to sales.

= Net Sales / Average Capital Employed

4. **Working Capital Turnover Ratio:** Working capital turnover ratio is the ratio between the net revenue orturnover of a business and its working capital.

   = Net Sales / Working Capital

5. **Asset Turnover Ratio:** Asset turnover ratio is the ratio between the value of a company's sales or revenues and the value of its assets. It is an indicator of the efficiency with which a company is deployingits assets to produce the revenue. Thus, asset turnover ratio can be a determinant of a company's performance.

   = Net Sales / Average Total Assets

c) ***Leverage Ratios***: The investors are generally interested to find out the debt portion of the capital. The debt affects the dividend payment because of the outflow of profit in the form of interest. High leverage indicates significance reliance on external debt financing sources. Low leverage signifies operations are mostly funded with internally generated cash (retained earnings).

The financial leverage affects the risk and return aspects of holding the shares. In general, increased amountsof leverage in the capital structure equates to more financial risk, since the company incurs greater interest expense and mandatory debt amortization as well as principal repayments coming up in the future. Various leverage ratios are as under:

1. **Debt-to-Assets Ratio:** The debt-to-assets ratio compares a company's total debt to its assets, with a higher value meaning that the company has purchased the majority of its assets using debt.

   Debt-to-Assets Ratio = Total Debt / Total Assets

2. **Debt-to-Equity Ratio (D/E):** The debt-to-equity ratio compares a company's debt to the shareholders'equity, with a high ratio suggesting the company's operations have been financed with more debt.

   Debt-to-Equity Ratio (D/E) = Total Debt / Total Equity

3. **Debt-to-Total Capitalization:** The debt-to-capital ratio compares the total debt to the sum of all capitalsources, with the purpose of measuring the percentage of the total capital structure attributable to debt.

   Debt-to-Total Capitalization = Total Debt / (Debt + Equity + Minority Interest + Preferred Stock)

4. **Net Debt-to-Total Capitalization:** The inherent assumption in the net debt-to-capital ratio is that the cash on the B/S can be used to help pay down existing debt — thus the total debt amount is adjusted toaccount for the available cash balance.

Net Debt-to-Capital = (Total Debt – Cash) / (Debt + Equity + Minority Interest + Preferred Stock – Cash)

5. **Operating Leverage Ratio:** The degree of operating leverage (DOL) is a financial ratio that measuresthe sensitivity of a company's operating income to its sales. This financial metric shows how a changein the company's sales will affect its operating income.

   DOL = (Sales – Variable Costs) / Profit

   Where Profit can be calculated using the following

   formula, Profit= Sales – Variable Costs – Fixed

   Costs

6. **Financial Leverage Ratio:** Just as operating leverage results from the existence of operating expensesin the enterprise's income stream, financial leverage results from the presence of fixed financial charges in the firm's income stream. Financial leverage is the use of debt to buy more assets. Leverageis employed to increase the return on equity. However, an excessive amount of financial leverage increases the risk of failure, since it becomes more difficult to repay debt.

   The degree of financial leverage (DFL) is a leverage ratio that measures the sensitivity of a company'searnings per share to fluctuations in its operating income, as a result of changes in its capital structure.This ratio indicates that the higher the degree of financial leverage, the more volatile earnings will be.

   DFL = (EBIT) / (EBT)

d)*Profitability Ratios*: Profitability ratios are a class of financial metrics that are used to assess a business's ability to generate earnings relative to its revenue, operating costs, balance sheet assets, or shareholders' equity over time, using data from a specific point in time.

Profitability ratios can be compared with efficiency ratios, which consider how well a company uses its assets internally to generate income (as opposed to after-cost profits). Profitability ratios assess a company's ability toearn profits from its sales or operations, balance sheet assets, or shareholders' equity.

Profitability ratios indicate how efficiently a company generates profit and value for shareholders. Higher ratio results are often more favourable, but these ratios provide much more information when compared to results ofsimilar companies, the company's own historical performance, or the industry average.

The following are covered under the profitability ratios:

1. **Gross Profit Margin**: The Gross Margin Ratio, also known as the gross profit margin ratio, is a profitability ratio that compares the gross margin of a company to its revenue. It shows how much profit a companymakes after paying off its Cost of Goods Sold (COGS).

Gross Profit Margin = Gross Profit / Net Sales

* 100 Where,

Gross Profit = Net Sales – Cost of Goods Sold

Net Sales = Total Sales – Discounts – Allowances – Sales Returns

2. **Operating Profit Margin:** Operating Profit Margin helps measure the company's ability to maintain operating expenses to generate profit before interest expense and tax deduction. In other words, the revenue that remains after costs is deducted from net sales.

   A higher ratio indicates that the company is well equipped to pay its fixed costs, interest obligations, handle economic slowdowns and also offer lower prices than its competitors at lower margins. Moreover, the company management most frequently uses this to improve profitability by managing its costs.

   Operating Profit Margin Ratio = Operating Profit / Net

   Sales * 100Where,

   Operating Profit = Gross Profit – Operating Expenses – Depreciation and

   AmortisationNet Sales = Total Sales – Discounts – Allowances – Sales

   Returns

3. **Net Profit Margin:** The net profit margin, or simply net margin, measures how much net income or profit is generated as a percentage of revenue. It is the ratio of net profits to revenues for a company orbusiness segment. Net profit margin is typically expressed as a percentage but can also be representedin decimal form. The net profit margin illustrates how much of each dollar /rupee in revenue collected by a company translates into profit.

   Net Profit Margin Ratio = Net Income / Net

   Sales * 100Where,

   Net Income = Gross Profit – All Expenses – Interest – Taxes

   Net Sales = Total Sales – Discounts – Allowances – Sales Returns

4. **Return on Equity (ROE):** ROE measures how well a company can use its shareholders' money to generate profits. Also, it indicates the returns on the sum of money the investors have invested in the company.

   Furthermore, ROE is usually watched by investors and analysts. Moreover, a higher ROE ratio can beone of the reasons to buy a company's stock. Companies with a high return on equity can generate cash internally, and thus they will be less dependent on debt financing.

Return on Equity = Net Profit after Taxes / Shareholder's

Equity x 100 Where,

Shareholder's Equity = Equity Share Capital

5. **Return on Assets (ROA):** Return on Assets (ROA) measures how well a company uses its assets to generate profits. In other words, it focuses on how much profit it generates on every rupee invested. Also, it measures the asset intensity of the company. Thus, a lower ROA indicates a more asset-intensive company.

   On the contrary, a higher ROA indicates more profitability against the company's number of assets to operate. Moreover, companies with higher asset intensity must invest a significant amount in machinery and equipment to generate income. For example — telecommunication, car manufacturers, railroads, etc.

   Return on Assets = Net Profit after Taxes / Total Assets

   x 100 Where,

   Total assets = All the assets on the balance sheet

6. **Return on Capital Employed (ROCE):** Return on Capital Employed (ROCE) measures the company's overall return against the overall investment of both shareholders and bondholders. This ratio is very similar to ROE, but it is more comprehensive as it includes the returns generated from bondholders capital investments.

   Return on Capital Employed (ROCE) = EBIT / Capital

   EmployedWhere,

   EBIT (Earnings Before Interest & Taxes) = Net Profit Before Interest

   and TaxesCapital Employed = Total Assets – Current Liabilities

e) ***Coverage Ratios***: A coverage ratio, broadly, is a metric intended to measure a company's ability to service its debt and meet its financial obligations, such as interest payments or dividends. The higher the coverage ratio, the easier it should be to make interest payments on its debt or pay dividends.

The most common coverage ratios are:

1. **Interest coverage ratio:** The ability of a company to pay the interest expense (only) on its debt.

   = Operating Income / Interest Expense.

2. **Debt service coverage ratio**: The ability of a company to pay all debt obligations, including repaymentof principal and interest.

   = Operating Income / Total Debt Service

3. **Cash coverage ratio:** The ability of a company to pay interest expense with its cash balance.

   = Total Cash / Interest Expense

4. **Asset coverage ratio:** The ability of a company to repay its debt obligations with its assets.

   = (Total Assets – Intangible Assets) – (Current Liabilities- Short-term Debts) / Interest Expense

f) ***Valuation Ratios or Market Value Ratios***: Valuation ratios, or market value ratios, are measurements of howappropriately shares in a company are valued and what type of return an investor may get. By calculating the market value, a potential investor can see if the shares are overvalued, undervalued, or at a fair price.

1. **Price- to -Earnings Ratio:** Price-to-earnings ratio (P/E) looks at the relationship between a company'sstock price and its earnings. The P/E ratio gives investors an idea of what the market is willing to pay for the company's earnings. The ratio is determined by dividing a company's current share price by itsearnings per share.

   Companies with a high Price Earnings Ratio are often considered to be growth stocks. This indicates a positive future performance, and investors have higher expectations for future earnings growth and arewilling to pay more for them.

   Companies with a low Price Earnings Ratio are often considered to be value stocks. It means they areundervalued because their stock prices trade lower relative to their fundamentals. This mispricing will be a great bargain and will prompt investors to buy the stock before the market corrects it.

   P/E = Stock Price Per Share / Earnings Per

   Shareor

   P/E = Market Capitalization / Total Net

   Earningsor

   Justified P/E = Dividend Payout Ratio

   / R – Gwhere;

   R = Required Rate of

   Return G = Sustainable

   Growth Rate

2. **Price-to-Book Value Ratio:** Price-to-book value (P/B) is a measurement that looks at the value the market places on the book value of the company. It is calculated by taking the current price per share and dividing by the book value per share. The book value of a

company is the difference between the balance sheet assets and balance sheet liabilities. A ratio over 1 generally implies that the market is willing to pay more than the equity per share, while a ratio under 1 implies that the market is willing to pay less.

The P/B ratio reflects the value that market participants attach to a company's equity relative to the bookvalue of its equity. A stock's market value is a forward-looking metric that reflects a company's future cash flows. The book value of equity is an accounting measure based on the historic cost principle and reflects past issuances of equity, augmented by any profits or losses, and reduced by dividends and share buybacks.

$$\text{P/B Ratio} = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$$

3. **Price-to-Sales Ratio**: The price-to-sales ratio (P/S) shows how much the market values every dollar of the company's sales. To calculate it, take the company's market capitalization and divide it by the company's total sales over the past 12 months. A company's market cap is the number of shares issuedmultiplied by the share price. The P/S ratio can be used in place of the P/E ratio in situations where thecompany has a net loss.

   One of the advantages of using the P/S ratio is that sales are much harder to manipulate than earnings.Since a company's sales are generally more stable than its earnings level, any large changes in the P/S ratio are often more likely to indicate a departure from the intrinsic value of the company (either upor down).

$$\text{P/S Ratio} = \frac{\text{MV}}{\text{S}}$$

Where:

SPS

MVS = Market Value per

ShareSPS = Sales per

Share

4. **Price-to-Cash Flow Ratio**: Price-to-cash flow ratio (P/CF) evaluates the price of a company's stock relative to how much cash flow the company generates. It is calculated by dividing the company's market cap by its operating cash flow in the most recent 12 months. It can also be calculated by dividingthe per-share stock price by the per-share operating cash flow. P/CF ratio is an alternative method to P/E ratio.

   Many investors prefer to use a P/CF metric because it is considered harder to manipulate cash tallies than it would be to massage earnings reports under generally accepted accounting principles, which could make the cash-based benchmark a more reliable indicator.

   $$\text{Price to cash flow ratio} = \frac{\text{Share price}}{\text{Operation cash flow per share}}$$

5. **Price/earnings-to-growth (PEG):** Price/earnings-to-growth ratio is the relationship between the P/E ratio and the projected earnings growth of a company. It is calculated by dividing the P/E ratio by the earnings-per-share growth. For example, if a company's P/E ratio is 16.5 and its earnings-per-share growth over the next 3 years is expected to be 10.8%, its PEG ratio would be 1.5.

   A PEG of 1 or less is typically taken to indicate that the company is undervalued. A PEG of more than 1is typically taken to indicate that the company is overvalued. To get a clearer picture of value, the PEGof the company should also be compared with the PEG of the market and with the industry that the company competes in.

   $$\text{PEG Ratio} = \frac{\text{Price}}{\text{EPS growth}}$$

   EPS = The earnings per share

B. Comparative Financial Statements

In the comparative financial statements balance sheet figures are provided for more than one year. The comparative financial statement provides time perspective to the balance sheet figures. The annual data are compared with similar data of previous years, either in absolute terms or in percentages.

Example:

From the following Balance Sheet, prepare Comparative Balance Sheet of Beta Ltd.:

Particulars	*Note No.*	*31st March, 2022 (*RS*)*	*31st March, 2021 (1)*
I. **EQUITY AND LIABILITIES**			
1. **Shareholder's Funds**			
(a) Share Capital		3,50,000	3,00,000
2. Non-Current Liabilities			
Long-term Borrowings		1,00,000	2,00,000
3. Current Liabilities :			
Trade Payables		1,50,000	1,00,000
Total		6,00,000	6,00,000
II. ASSETS			
1. Non-Current Assets			
Fixed Assets (Tangible)		4,00,000	3,00,000
2. Current Assets			
Trade Receivables		2,00,000	3,00,000
Total		6,00,000	6,00,000

Solution:

In the books of Sun Ltd.

Comparative Balance Sheet
as at March 31, 2018 and 2019

Particulars	*2021 (RS)*	*2022(*RS*)*	*AbsoluteChange (*RS*)*	*Percentage Change (%)*

I. Equity and Liabilities				
1. **Shareholders' Funds**				
a. Share Capital	3,00,000	3,50,000	50,000	16.67
Shareholders' Fund	3,00,000	3,50,000	50,000	16.67
2. **Non-Current Liabilities**				
a. Long-term Borrowings	2,00,000	1,00,000	(1,00,000)	(50.00)
3. **Current Liabilities**				
a. Trade Payables	1,00,000	1,50,000	50,000	50.00
Total	6,00,000	6,00,000	—	—
II. Assets				
1. **Non-Current Assets**				
a. Fixed Assets (Tangible)	3,00,000	4,00,000	1,00,000	33.33
2. **Current Assets**				
a. Trade Receivables	3,00,000	2,00,000	(1,00,000)	(33.33)
Total	**6,00,000**	**6,00,000**	–	–

C. Trend Analysis

In trend analysis percentages are calculated with a base year. This would provide insight into the growth or decline of the sale or profit over the years. Sometimes sales may be increasing continuously, and the inventoriesmay also be rising. This would indicate the loss of market share of the particular company's product. Likewise sales may have an increasing trend but profits may remain the same. Here the investor has to look into the costand management efficiency of the company.

D. Common size statement

A common size financial statement displays line items as a percentage of one selected or common figure. Creating common size financial statements makes it easier to analyze a company over time and compare it with its peers. Using common size financial statements helps you spot trends that a raw financial statement maynot uncover.

All three of the primary financial statements can be put into a common size format. Financial statements in dollar amounts can easily be converted to common size statements using a spreadsheet. Below is an overviewof each financial statement and a more detailed summary of the benefits and drawbacks that such an analysiscan provide to you.

Balance Sheet Analysis

The common figure for a common size balance sheet analysis is total assets. Based on the

accounting equation,this also equals total liabilities and shareholders' equity, making either term interchangeable in the analysis.It is also possible to use total liabilities to indicate where a company's obligations lie and whether it is being conservative or risky in managing its debts.

The common size strategy from a balance sheet perspective lends insight into a firm's capital structure and howit compares to its rivals. You can also look to determine an optimal capital structure for a given industry and compare it to the firm being analysed. Then, you can conclude whether the debt level is too high, excess cash is being retained on the balance sheet, or inventories are growing too high. The goodwill level on a balance sheetalso helps indicate the extent to which a company has relied on acquisitions for growth.

Analysing the Income Statement

The common figure for an income statement is total top-line sales. This is actually the same analysis as calculating a company's margins. For instance, a net profit margin is simply net income divided by sales, whichalso happens to be a common size analysis.

The same goes for calculating gross and operating margins. The common size method is appealing for research-intensive companies, for example, because they tend to focus on research and development (R&D) and what itrepresents as a percent of total sales.

Taking the example of Apple Inc. to understand the concept and see the trend in the financials of the last threeyears.

All Amount in Millions

Period	***2018***	***2017***	***2016***	***2018***	***2017***	***2016***
Total Revenue	$2,65,595	$2,29,234	$2,15,639	100.00%	100.00%	100.00%
Cost of Revenue	$1,63,756	$1,41,048	$1,31,376	61.70%	61.50%	60.90%
Gross Profit	**$1,01,839**	**$88,186**	**$84,263**	**38.30%**	**38.50%**	**39.10%**
Operating Expenses						

Period	***2018***	***2017***	***2016***	***2018***	***2017***	***2016***
Research & Development	$14,236	$11,581	$10,045	5.40%	5.10%	4.70%
Sales, General & Admin	$16,705	$15,261	$14,194	6.30%	6.70%	6.60%
Operating Income	**$70,898**	**$61,344**	**$60,024**	**26.70%**	**26.80%**	**27.80%**
Add Income and Expense Items	$2,005	$2,745	$1,348	0.80%	1.20%	0.60%
Earnings Before Interest andTax	$72,903	$64,089	$61,372	27.40%	28.00%	28.50%
Interest Expense	$0	$0	$0	0.00%	0.00%	0.00%

Earnings Before Tax	$72,903	$64,089	$61,372	27.40%	28.00%	28.50%
Income Tax	$13,372	$15,738	$15,685	5.00%	6.90%	7.30%
Net Income	**$59,531**	**$48,351**	**$45,687**	**$22.40%**	**21.10%**	21.20%

Advantages of Common Size Income Statement Analysis

i) A helps a financial user to understand the income statement more clearly in terms of the ratio orpercentage of each item in the income statement as a percentage of the company's total sales.

ii) It helps an analyst ascertain the trend concerning the percentage share of each item on the incomestatement and its impact on the company's net income.

iii) A financial analyst can use a common-size income statement to compare the financial performances ofdifferent entities at a glance since each item is expressed in terms of the percentage of total sales.

Disadvantages of Common Size Income Statement Analysis

i) Many financial experts see the common size income statement as useless because there isn't any approved standard proportion of each item to the total sales.

ii) If year after year preparation of a particular company's income statement is not consistent, then performing any comparative study of common size statement income statements may end up being misleading

E. Fund Flow Analysis

The balance sheet gives a static picture of the company's position on a particular data. It does not disclose thechanges that have occurred in the financial position of the unit over a period of time. The investor should know,

a) How are the profits utilized?

b) Financial source of dividend.

c) Source of fiancé for capital expenditure.

d) Source of finance for repayment of debts.

e) The destiny of the sale proceeds of the fixed assets and

f) Use of the proceeds of the share or debenture issue or fixed deposits raised from public.

These items of information are provided in the funds flow statement. It is a statement of the sources and application of funds. It highlights the changes in the financial condition of a business enterprise between two balance sheet dates.

The investor could see clearly the amount of funds generated or lost in operations. He could see

how these funds have divided into three significant uses like taxes, dividends and reserves.

Moreover, the application of long term funds towards the acquisition of current assets can be found out. This would reveal the real picture of the financial position of the company.

Example 1: Top Cements Limited presents the following information and you are required to calculate funds from operations.

Profit and Loss Account

Particulars	***Amount(Rs. in Lakhs)***	***Particulars***	***Amount(Rs. in Lakhs)***
To Operation Expenses	100000	By Gross Profit	200000
To Depreciation	40000	By Gain on Sale of Plant	20000
To Loss on Sale of Building	10000		
To Advertisement Suspense Account	5000		
To Discount Allowed	500		
To Discount on Issue of Shares writtenoff	500		
To Goodwill written off	12000		
To Net Profit	52000		
	220000		220000

Solution:

Calculation of Funds from Operations

Particulars	***Amount (Rs. In Lakhs)***	***Amount (Rs. In Lakhs)***
Net Profit (given)		52000
Add: Non-fund or non-operating items which have beendebited to Profit & Loss A/c:		
Depreciation	40000	
Loss on Sale of Building	10000	
Advertisement written off	5000	

Discount written off	500	

Goodwill written off	12000	67500
		119500
Less: Non-fund or non-operating items which have beencredited to Profit & Loss A/c:		
Gain on Sale of Plant	20000	20000
Funds from Operations		99500

Alternatively,

Adjusted Profit & Loss Account

Particulars	***Amount (Rs. In Lakhs)***	***Particulars***	***Amount (Rs. in Lakhs)***
To Depreciation	40000	By Opening balance	-
To Loss on Sale of Building	10000	By Gain on Sale of Plant	20000
To Advertisement Suspense A/c	5000	**By Funds from Operations (Balancing Figure)**	**99500**
To Discount written off	500		
To Goodwill written off	12000		
To Closing balance	52000		
	119500		119500

Example 2: The Balance Sheets of United Corporation as on 31st December, 2020 and 31st December, 2021 areas follows:

Liabilities	***2020 (Rs.)***	***2021 (Rs.)***	***Assets***	***2020 (Rs.)***	***2021 (Rs.)***
Share Capital	500000	700000	Land and Buildings	80000	120000
Profit & Loss	100000	160000	Plant and Machinery	500000	800000

General Reserve	50000	70000	Stock	100000	75000
Sundry Creditors	153000	190000	Debtors	150000	160000
Bills Payable	40000	50000	Cash	20000	20000
Outstandin gExpenses	7000	5000			
	850000	1175000		850000	1175000

Additional information:

1. Rs.50000 depreciation has been charged on plant and machinery during 2021.
2. A piece of machinery was sold for Rs.8000 during 2021. It had cost Rs.12000, depreciation of Rs.7000had been provided on it.

Prepare a Schedule of Changes in Working Capital and a Statement showing the Sources and Application ofFunds for 2021.

Solution:

Schedule of Changes in Working Capital

Items	***2020***	***2021***	***Changes in Working Capital***	
			Increase	***Decrease***
Current Assets:				
Stock	100000	75000	-	25000
Debtors	150000	160000	10000	-
Cash	20000	20000	-	-
	270000	255000		
Current Liabilities:				
Sundry Creditors	153000	190000	-	37000
Bills Payable	40000	50000	-	10000

Outstanding Expenses	7000	5000	2000	-
	200000	245000		
Working Capital (CurrentAssets – Current Liabilities)	70000	10000		
Net Decrease in WorkingCapital		**60000**	60000	
	70000	70000	72000	72000

Statement and Sources of Application of Funds(For the year ended December 31, 2021)

Sources	***Rs.***	***Application***	***Rs.***
Funds from Operations(1)	127000	Purchase of Land and Buildings	40000
Issue of Shares	200000	Purchase of Plant and Machinery(2)	355000
Sale proceeds of machinery	80000		
Decrease in working capital	60000		
	395000		395000

Workings:

(1) Adjusted Profit & Loss Account

Particulars	***Rs.***	***Particulars***	***Rs.***
To Plant & Machinery A/c (Depreciation)	50000	By Balance b/d (OpeningBalance)	100000
To General Reserve (Transferred during 2021)	20000	By Plant & Machinery (Profit onsale)	3000

To Balance c/d	160000	By Funds from Operations(Balancing figure)	127000
	230000		230000

(2) Plant & Machinery

Particulars	*Rs.*	*Particulars*	*Rs.*
To Balance b/d	500000	By Bank (Sale of machinery)	8000
To Profit & Loss A/c (profit onsale)	3000	By Profit & Loss A/c (Depreciation)	50000
To Bank A/c (Purchase ofMachinery & Plant) (Balancing figure)	355000	By Balance c/d	800000
	858000		858000

F. Cash Flow Statement

The investor is interested in knowing the cash inflow and outflow of the enterprise. The cash flow statement is prepared with the help of balance sheet, income statement and some additional information. It can be either prepared in the vertical form or in the horizontal form. Cash flows related to operations and other transactions are computed. The statement shows the causes of changes in cash movements over an operating cycle. The factors responsible for the reduction of cash balances in spite of increase in profits or vice versa are ascertained.

Example 1: From the following Profit and Loss Account of Success Ltd., calculate Net Cash Flows from operating activities.

Particulars	*$*	*Particulars*	*$*
To depreciation	40800	By gross profit	394400
To rent	72000	By profit on sale of building	53600
To administrative expenses	48000	By profit on sale of furniture	50400
To salaries	64000	By income tax refund	18400
To loss on sale of plant	12800		
To provision for bad debts	64000		

To goodwill written off	34400		
To loss on sale of machinery	19600		
To provision for tax	24000		
To proposed dividend	48000		
To net profit	89200		
Total	**5,16,800**	**Total**	**5,16,800**

Solution:

Calculation of Net Cash Flow from Operating Activities of Success Limited

Particulars	***$***	***$***
Profit for the year		89200
Add:		
Provision for bad debts	64000	
Depreciation	40800	
Goodwill written off	34400	
Loss on sale of plant	12800	
Loss on sale of machinery	19600	
Provision for tax	24000	
Proposed dividend	48000	243600
		332800
Less:		
Profit on sale of building	53600	
Profit on sale of furniture	50400	
Income tax refund	18400	122400
Net Cash Flow from Operating Activities		210400

Example 2:

From the following information extracted from the book of Max Ltd. for the year 2019-20, calculate net cash flowfrom investing activities.

Particulars	*2018-19 ($)*	*2019-20 ($)*
Furniture	100,000	120,000
Machinery	1,500,000	1,800,000
Building	2,000,000	1,980,000
Land (at cost)	1,800,000	1,600,000
Investment (long-term)	90,000	210,000

Additional information is given as follows:

- Depreciation charged on furniture during the year was $10,000.
- Depreciation on machinery charged during the year was $25,000.
- Machinery, the book value of which was $80,000, sold for $75,000.
- Land was sold at a profit of $90,000.

Solution:

Particulars	*$*	*$*
Cash Receipts		
Cash receipts from sale of land	290000	
Sale of machinery	75000	365000
Cash Payments		
Purchase of furniture	30000	
Purchase of machinery	405000	
Purchase of investment (210000 – 90000)	120000	555000
Net Cash Flow from Investing Activities		(190000)

Note: $190,000 indicates cash outflows are more than inflows.

Working Notes:

Furniture Account

Particulars	*$*	*Particulars*	*$*
To balance b/d	100000	By Depreciation	10000
To Bank- Purchase of Furniture(Balancing figure)	30000	By Balance c/d	120000
	130000		130000

Machinery Account

Particulars	*$*	*Particulars*	*$*
To balance b/d	1500000	By Depreciation	25000
		By Bank- Sale of Machinery	75000
		By Loss on Sale of Machinery($80000 - $75000)	5000
To Bank- Purchase of Machinery	405000	By Balance c/d	1800000
	1905000		1905000

Building Account

Particulars	*$*	*Particulars*	*$*
To balance b/d	2000000	By Depreciation (Balancingfigure)	20000
		By Balance c/d	1980000
	2000000		2000000

Land Account

Particulars	$	*Particulars*	$
To balance b/d	1800000	By Bank — Sale of Land($200000 + $90000)	290000
To Profit and Loss Account (Profit onSale of Land)	90000	By Balance c/d	1600000
	1890000		1890000

TECHNICAL ANALYSIS

In the fundamental analysis, share prices are predicted on the basis of a three stage analysis. After the analysishas been completed, the deciding factors that emerge are the financial performance indicators like earnings and dividends of the company. The fundamentalist makes a judgement of the equity share value with a risk return framework based upon the earning power and the economic environment. However, in actual practice,it often happens that a share having sound fundamentals refuses to rise in value and vice versa. We would now examine an alternative approach to predict share price behavior. This approach is called the Technical Analysis. It is used in conjunction with fundamental analysis and not as its substitute.

Technical analysis is an analysis for forecasting the direction of prices through the study of past

market data, primarily price and volume. This Technique assumes market prices of securities are determined by the demand-supply equilibrium. The shifts in this equilibrium give rise to certain patterns of price and volume of trading whichhave a tendency to repeat themselves over a period of time. An analyst who is familiar with these patterns canpredict the future behaviour of stock prices by noticing the formation of these patterns. These predictions are indicative and do not provide irrefutable declarations about future trends. In this type of analysis, no weightageis given to intangible items like investors' attitude, market sentiment, optimism, pessimism etc.

Technical analysis is based on the following assumptions:

- The inter-play of demand and supply determines the market value of shares.
- Supply and demand are governed by various factors – both rational and irrational.
- Stock values tend to move in trends that persist for a reasonable time.
- These trends change as a result of change in demand-supply equilibrium.
- Shifts in demand and supply can be detected in charts of market action.
- Chart patterns tend to repeat themselves and this repetition can be used to forecast future pricemovements.
- Markets behave in a random style.
- Markets discount every future event that has a bearing upon share values.

DOW JONES THEORY

It is one of the earliest theories of technical analysis. The theory was formulated by Charles H. Dow of Dow Jones& Co. who was the first editor of Wall street Journal of USA. According to this theory, share prices demonstratea pattern over four to five years.

These patterns can be divided into three distinct cyclical trends- primary, secondary or intermediate and minortrends.

Primary Trends

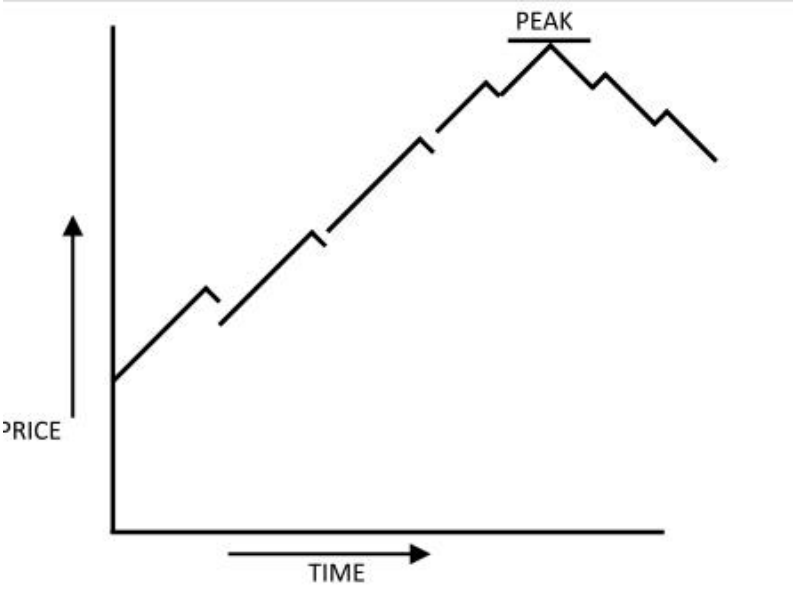
The primary trend lasts from one to three years. Over this period, the markets exhibit definite upward or downward movement which is punctuated by shorter spans of trend reversal in the opposite directions. The trend reversal is called the secondary trend. Primary trend is indicative of the overall pattern of movement.

In Dow theory, the primary trend is the major trend of the market, which makes it the most important one to determine. This is because the overriding trend is the one that affects the movements in stock prices. The primary trend will also impact the secondary and minor trends within the market.

If the primary trend is upward, it is called a bullish phase of the market. If the primary trend is

downwards, it iscalled a bearish phase. Illustrations of bullish phase and bearish phase are given below:

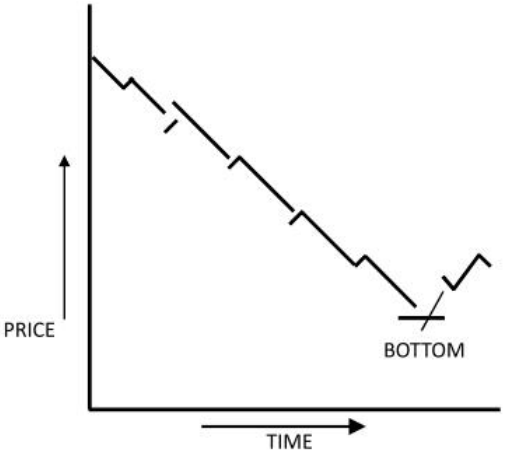
Graph of Bullish Phase



In a bullish phase, after each peak, there is a fall but the subsequent rise is higher than the previous one. The prices reach higher level with each rise. After the peak has been reached, the primary trend now turns to a bearish phase.

Graph of a Bearish Phase

In a bearish phase, the overall trend is that of decline in share values. After each fall, there is slight rise but thesubsequent fall is even sharper.



Secondary Trends

In Dow theory, a primary trend is the main direction in which the market is moving. Conversely, a secondary trend moves in the opposite direction of the primary trend, or as a correction to the primary trend.

For example, an upward primary trend will be composed of secondary downward trends. This is the movementfrom a consecutively higher high to a consecutively lower high. In a primary downward trend the secondary trend will be an upward move, or a rally. This is the movement from a consecutively lower low to a consecutivelyhigher low.

In general, a secondary, or intermediate, trend typically lasts between three weeks and three months, whilethe retracement of the secondary trend generally ranges between one-third to two-thirds of the primary trend'smovement.

Minor Trend

The last of the three trend types in Dow theory is the minor trend, which is defined as a market movement lasting less than three weeks. Minor trends are changes occurring every day within a narrow range. These trends are not decisive of any major movement. The minor trend is generally the corrective moves within a secondary move, or those moves that go against the direction of the secondary trend.

TOOLS OF TECHNICAL ANALYSIS

The two variables concerning groups of securities or individual securities that technicians watch are the behaviorof prices and volume of trading contributing to and influenced by changing prices. Technical analysts use two major types of tools for their analysis. These are the charts and the price indicators.

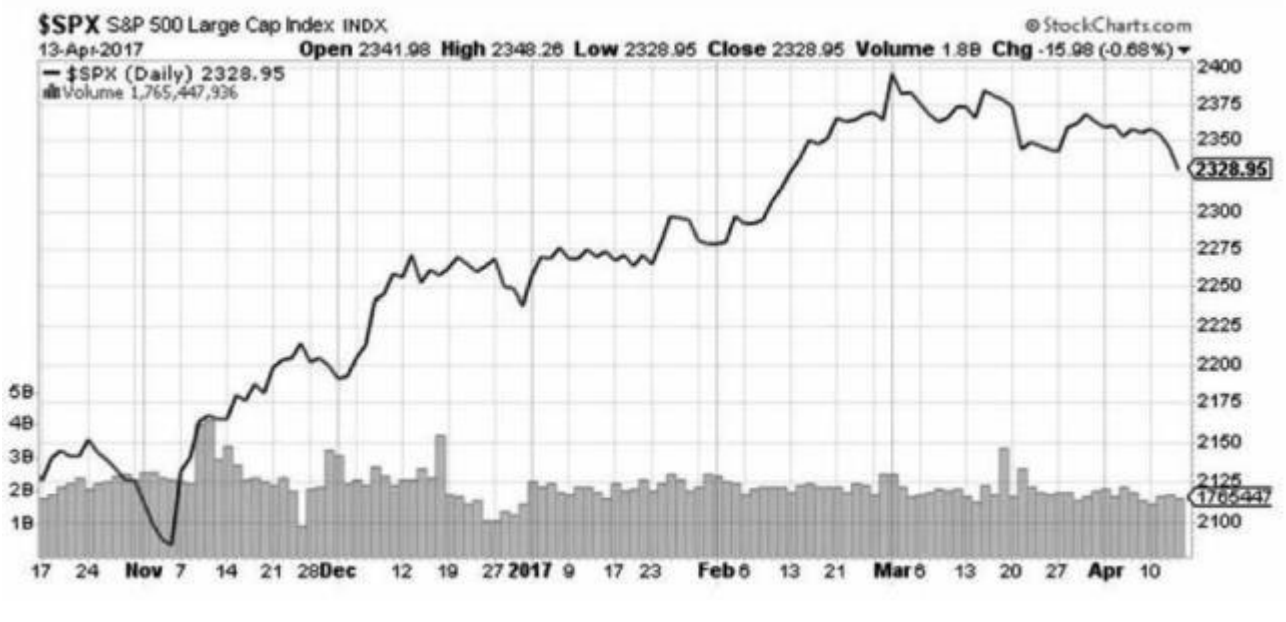
1. TECHNICAL CHARTS

These are the plottings of prices and trading volumes on charts. The purpose of reading and analysing these charts is to determine the demand-supply equation at various levels and thus to predict the direction and extentof future movement of the prices. The charts are not infallible but because of their repeated accuracy, they have come to be accepted. In all the charts, a correlation exists between market price action and the volume of trading when the price increase is accompanied by a surge in trading volumes, it is a sure sign of strength. On the other hand, when the decline in share prices is accompanied by increased volumes, it is indicative of beginning of bearish trend.

There are four ways to construct a chart. These are Line Chart, Bar Chart, Candle Stick Chart and Point & FigureChart.

Line Chart

A Line chart is a style of chart that is created by connecting a series of data points together with a line. This is the most basic type of chart used in finance and it is generally created by connecting a series of past prices together with a line. Line charts are the most basic type of chart because it represents only the closing prices over a set period. The line is formed by connecting the closing prices for each period over the timeframe and the intra-period highs and lows of stock prices are ignored. This type of chart is useful for making broad analysisover a longer period of time.



Line Chart Example – Source: StockCharts.com

Bar Chart

Bar charts expand upon the line chart by adding the open, high, low, and close — or the daily price range, in other words — to the mix. The chart is made up of a series of vertical lines that represent the price range for a given period with a horizontal dash on each side that represents the open and closing prices. The opening priceis the horizontal dash on the left side of the horizontal line and the closing price is located on the right side of the line. If the opening price is lower than the closing price, the line is often shaded black to represent a rising period. The opposite is true for a falling period, which is represented by a red shade.

Bar Chart Example – Source: StockCharts.com

Candlestick Charts

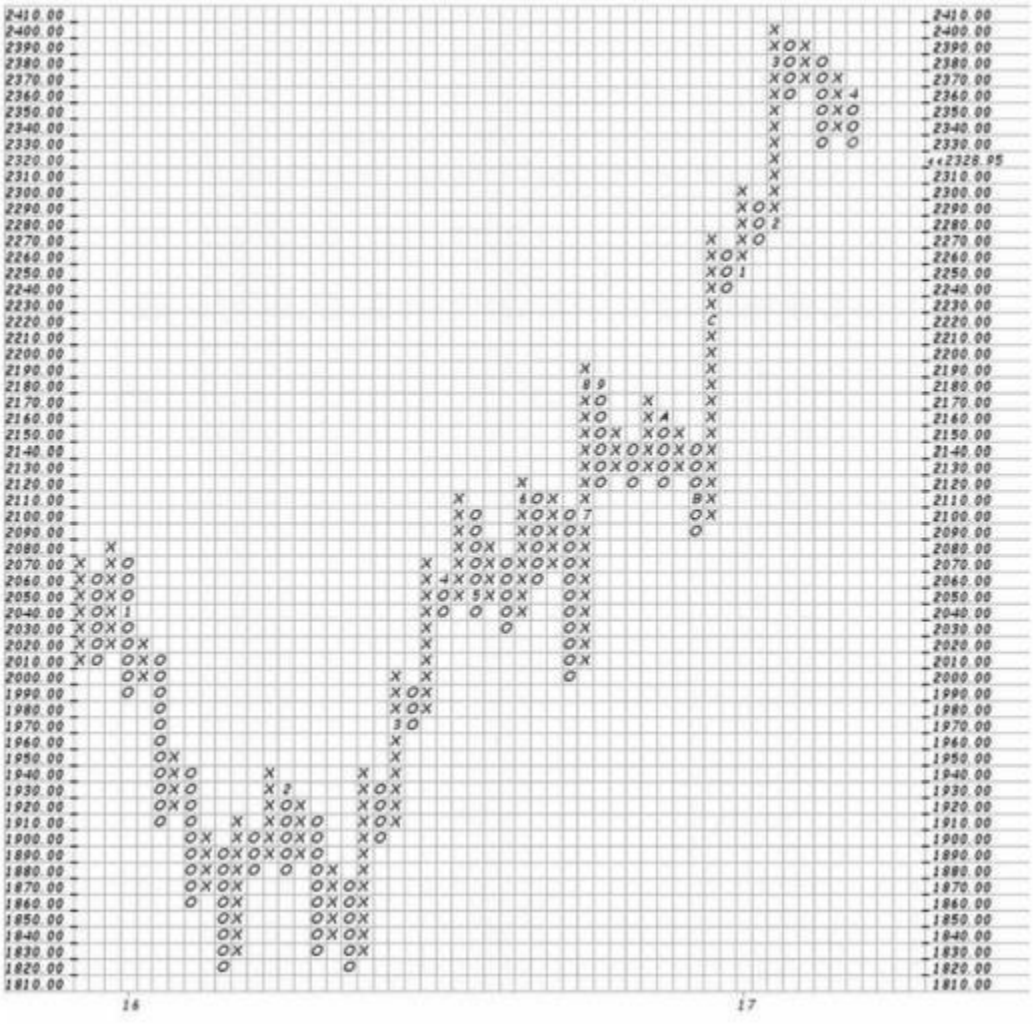
Like a bar chart, candlestick charts have a thin vertical line showing the price range for a given period that is shaded different colors based on whether the stock ended higher or lower. The difference is a wider bar or rectangle that represents the difference between the opening and closing prices.

Falling periods will typically have a red or black candlestick body, while rising periods will have a white orclear candlestick body. Days where the open and closing prices are the same will not have any wide body or rectangle at all.

Candlestick Example – Source: StockCharts.com

Point and Figure Charts

n this type of charts, emphasis is laid on charting price changes only and time and volume elements are ignored. The first step in drawing a figure and point chart is to put a X in the appropriate price column of a graph.Successive price increases are added vertically upwards in the same column as long as the uptrend continues.Once the price drops, the figures are moved to another column and Os are entered in downward series till the downward trend is reversed.



Point and Figure Chare Example – Source: StockCharts.com

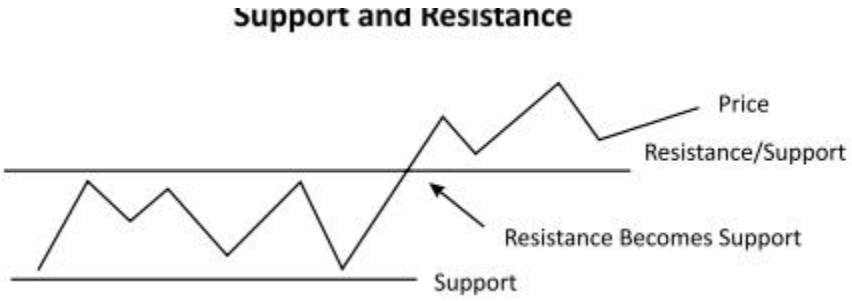
Patterns created by charts

Once the charts have been constructed, analysts seek to locate certain indicators/patterns in the charts. Thecommon patterns are being described below:

1.*Support and resistance levels*

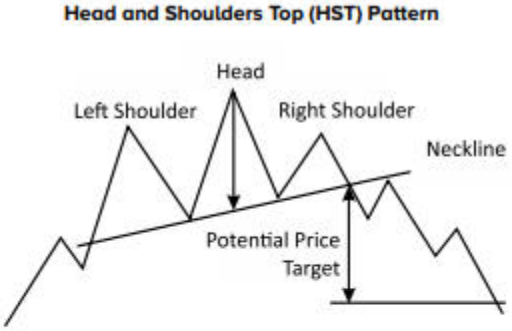
A support level indicates the bottom which the share values are unable to pierce. After rising time and again, the share price dips to a particular level and then starts rising again. At this level, the share gets buying support.A resistance level is that level after which the share price refuses

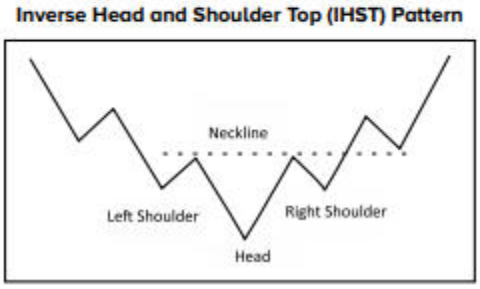
to move up in repeated efforts. At this level, selling emerges. Support and resistance levels are valid for a particular time period. Once these levels are breached, beginning of a new bull or bear phase is signaled.



2. ***Heads and Shoulders configuration***

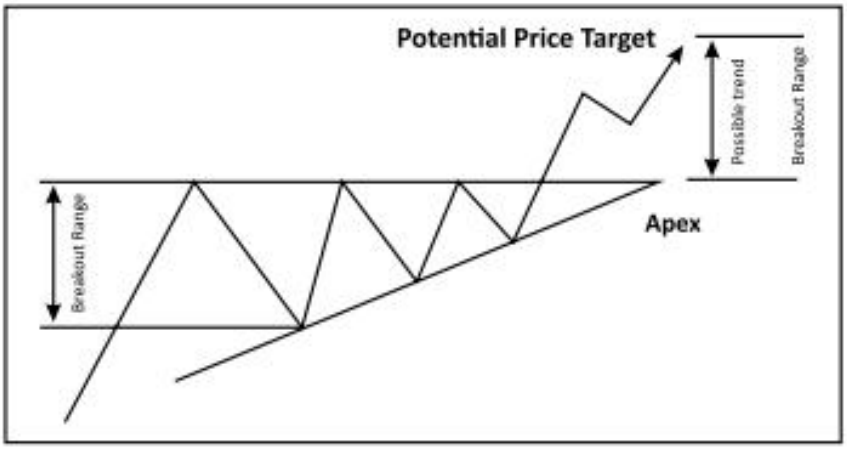
In this type of chart configuration, a formation similar to heads and shoulders is created wherein the neckline acts as the resistance or support line. As the head and shoulder top is formed, a resistance level appears at thetop of the head. The volumes start declining near the head top and reversal sets in. The volumes become heavyagain and shrink near the neckline where another reversal of trend begins.





3. *Triangle or coil formation*

This pattern represents a pattern of uncertainty. Hence it is difficult to predict which way the price will break out.

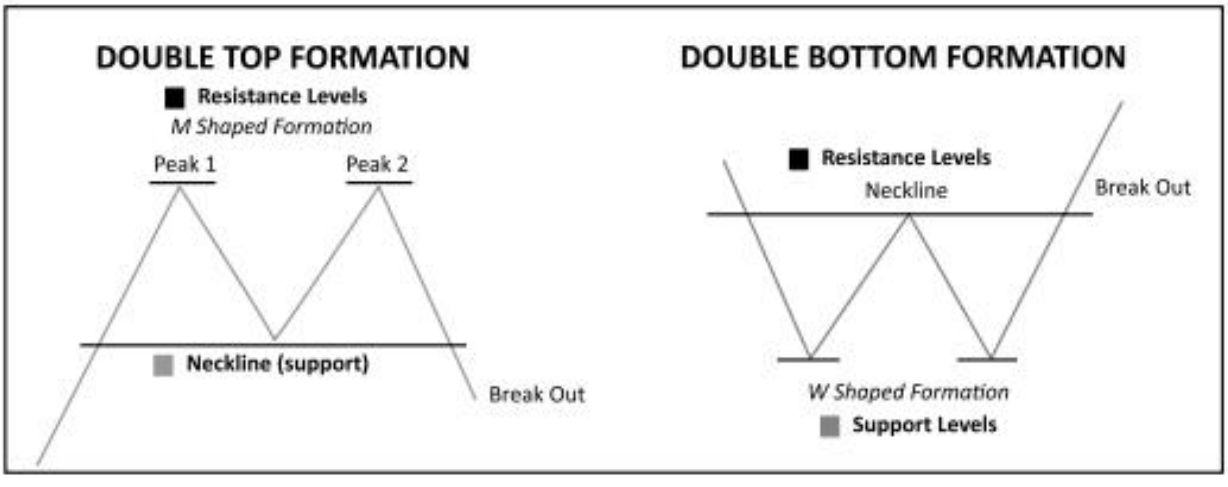


4. *Double Top Formation*

It represents a bearish development, signaling that the price is expected to fall.

5. *Double bottom formation*

It represents a bullish development, signaling that the price is expected to rise.



Limitations of charts

Interpretation of charts is prone to subjective analysis. This factor is a major cause of often contradictory analysisbeing derived from the same charts. Also the changes in charts are quite frequent in the short term perspectiveleading to a host of buy and sell recommendations which are not in the best interest of the investor. Another disadvantage is that decisions are made on

the basis of chart alone and other factors are ignored.

2. TECHNICAL INDICATORS

Apart from the charts, technical analysts use a number of indicators generated from prices of stocks to finalisetheir recommendations. These indicators are often used in conjunction with charts. Some of the important

indicators are the Advance Decline Ratio, the Market Breadth Index and Moving Averages.

(a) Advance-Decline Ratio

It is the ratio of the number of stocks that increase to the number of stocks that have declined. If the ratio is morethan one, the trend is assumed to be bullish. If the ratio starts declining, a change of trend is signaled.

(b) Market Breadth Index

This index is a variation of the Advance-Decline Ratio. This index is computed by taking the difference betweenthe number of stocks rising and the number of stocks falling. If during a month, 400 out of 1000 stocks in the market have risen and 300 have declined while 300 have remained unchanged, then market breadth wouldbe calculated as

= 2(400–300)/300. The figure of each time period is added to the previous period. If market breadth is increasingalong with rise in stock indices, it confirms the bullish trend and vice cersa.

(c) Moving Averages

A moving average is the average of share values of a set of consecutive number of days. If we have to calculate50 days moving average, we calculate the average for days 1–50. Then on day 51, we add the value of day 51and deduct the value of day 1 and so on . Similarly, moving averages for 100 days, 200 days and 300 days canbe calculated. Moving averages provide a benchmark for future valuation. If share value is below the moving average, it has scope for appreciation. If the value is above the moving average, the upside is limited in the near term.

(d) Relative Strength Index

The relative strength index (RSI) is a momentum indicator used in technical analysis. RSI measures the speedand magnitude of a security's recent price changes to evaluate overvalued or undervalued conditions in the price of that security.

The RSI is displayed as an oscillator (a line graph) on a scale of zero to 100. The indicator was developed by J.Welles Wilder Jr. and introduced in his seminal 1978 book, New Concepts in Technical Trading Systems.

The RSI can do more than point to overbought and oversold securities. It can also indicate securities that maybe primed for a trend reversal or corrective pullback in price. It can signal when to buy and sell. Traditionally, an RSI reading of 70 or above indicates an overbought situation. A reading of 30 or below indicates an oversoldcondition.

As a momentum indicator, the relative strength index compares a security's strength on days when prices go up to its strength on days when prices go down. Relating the result of this comparison to price action can give traders an idea of how a security may perform. The RSI, used in conjunction with other technical indicators, canhelp traders make better-informed trading decisions.

The RSI uses a two-part calculation that starts with the following formula:

$$RSI = 100 - \frac{100}{1+RS}$$

$$RS = \frac{\text{Average Gain Per Day}}{\text{Average Loss Per Day}}$$

RS= Relative Strength

The RSI can be calculated for any number of days depending on the wish of the technical analyst and the time frame of trading adopted in a particular stock market. RSI is calculated for 5,7,9 and 14 days. If the period taken is more, the possibility of getting wrong signals is reduced. Reactionary or sustained rise or fall in the price of the scrip is foretold by the RSI.

$$RSI = 100 - \frac{100}{4.335}$$

$$=100 - 18.74$$

$$=81.2$$

Date	***Price (Rs)***	***Gain***	***Loss***
October 1	300	-	-
October 6	304	4	-
October 7	319	15	-
October 8	317	-	2
October 11	319	2	-
October 12	333	14	-
October 13	331	-	2
October 14	332	1	-
October 18	348	16	-
October 19	346	-	2
		52 / 6 =8.67	6/3 = 2

The broad rule is, if the RSI crosses seventy there may be downturn and it is time to sell. If the RSI falls belowthirty it is time to pick up the scrip.

(e) Aroon Indicator

The Aroon indicator is a technical indicator that is used to identify trend changes in the price of an asset, as wellas the strength of that trend. In essence, the indicator measures the time between highs and the time betweenlows over a time period. The idea is that strong uptrends will regularly see new highs, and strong downtrends will regularly see new lows. The indicator signals when this is happening, and when it isn't.

The indicator consists of the "Aroon up" line, which measures the strength of the uptrend, and the "Aroon down"line, which measures the strength of the downtrend. The Aroon indicator was developed by Tushar Chande in 1995.

Formulas of the Aroon Indicator

$$\text{Aroon Up} = \frac{25 - \text{Periods Since 25 period High}}{25} * 100$$

$$\text{Aroon Down} = \frac{25 - \text{Periods Since 25 period Low}}{25} * 100$$

The Aroon calculation requires the tracking of the high and low prices, typically over 25 periods.

1. Track the highs and lows for the last 25 periods on an asset.
2. Note the number of periods since the last high and low.
3. Plug these numbers into the Up and Down Aroon formulas.

The Aroon Up and the Aroon Down lines fluctuate between zero and 100, with values close to 100 indicating astrong trend and values near zero indicating a weak trend. The lower the Aroon Up, the weaker the uptrend andthe stronger the downtrend, and vice versa. The main assumption underlying this indicator is that a stock's price will close regularly at new highs during an uptrend, and regularly make new lows in a downtrend.

The indicator focuses on the last 25 periods, but is scaled to zero and 100. Therefore, an Aroon Up reading above 50 means the price made a new high within the last 12.5 periods. A reading near 100 means a high wasseen very recently. The same concepts apply to the Down Aroon.

When it is above 50, a low was witnessed within the 12.5 periods. A Down reading near 100 means a low was seen very recently.

Crossovers can signal entry or exit points. Up crossing above Down can be a signal to buy. Down crossing below Up may be a signal to sell. When both indicators are below 50 it can signal that the price is consolidating. New highs or lows are not being created. Traders can watch for breakouts as well as the next Aroon crossoverto signal which direction price is going.

(f) Price Rate of Change

The Price Rate of Change (ROC) is a momentum-based technical indicator that measures the percentage change in price between the current price and the price a certain number of periods ago. The ROC indicator isplotted against zero, with the indicator moving upwards into positive territory if price changes are to the upside,and moving into negative territory if price changes are to the downside.

Thus, The Price Rate of Change (ROC) oscillator is an unbounded momentum indicator used in technical analysis set against a zero-level midpoint. A rising ROC above zero typically confirms an uptrend while a falling ROC below zero indicates a downtrend. When the price is consolidating, the ROC will hover near zero. In this case, itis important traders watch the overall price trend since the ROC will provide little insight except for confirming the consolidation.

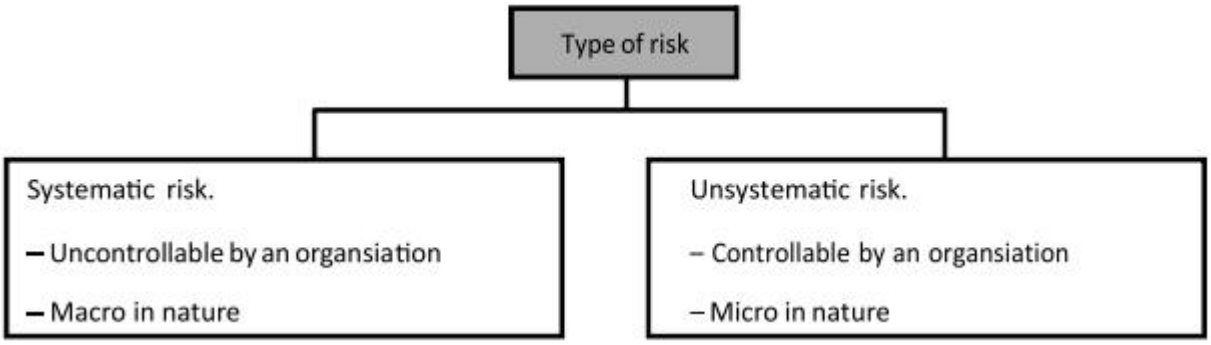
$$ROC = \frac{Closing\ Price_{p} - Closing\ Price_{p-n}}{Closing\ Price_{p-n}} \times 100$$

Closing Price$p$=Closing price of most recent period

Closing Price$p-n$=Closing price n periods beforemost recent period

RISK AND ITS TYPES

Risk in security analysis is generally associated with the possibility that the realized returns will be less than the returns that were expected. In finance, different types of risk can be classified under two main groups, viz.,systematic risk and unsystematic risk.



A. Systematic risk.

B. Unsystematic risk.

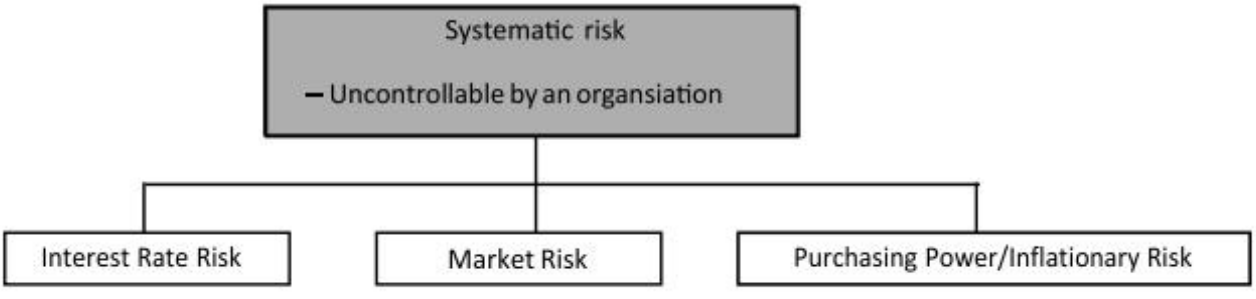
A. Systematic Risk

Those forces that are uncontrollable, external and broad in their effect are called sources of systematicrisk. Systematic risk is due to the influence of external factors on an organization. Such factors are normally uncontrollable from an organization's point of view. Systematic risk is a macro in nature as it affects a large number of organizations operating under a similar stream or same domain. It cannot be planned by the organization.

In this way economic, political and sociological changes are sources of systematic risk. For example, if an economy moves into recession or if there is a political upheaval, it will cause the prices of nearly all the securities, whether bond or equity to decline.

Firms with high systematic risk tend to be those whose sales, profits and stock prices follow the general trend inthe level of economic or stock market activity. These may include companies that deal in basic industrial goodslike automobile manufactures.

The types of systematic risk are depicted and listed below.



1. Interest rate risk,
2. Market risk and

3. Purchasing power or inflationary risk.

Now let's discuss each risk classified under this group.

1.*Interest rate risk*

Interest-rate risk is the variation in the single period rates of return caused by the fluctuations in the marketinterest rate. It particularly affects debt securities as they carry the fixed rate of interest.

2. *Market risk*

Market risk is associated with consistent fluctuations seen in the trading price of any particular shares or securities. That is, it arises due to rise or fall in the trading price of listed shares or securities in the stock market.

3. *Purchasing power or inflationary risk*

Purchasing power risk is also known as inflation risk. It is so, since it emanates (originates) from the factthat it affects a purchasing power adversely. It is not desirable to invest in securities during an inflationary period.

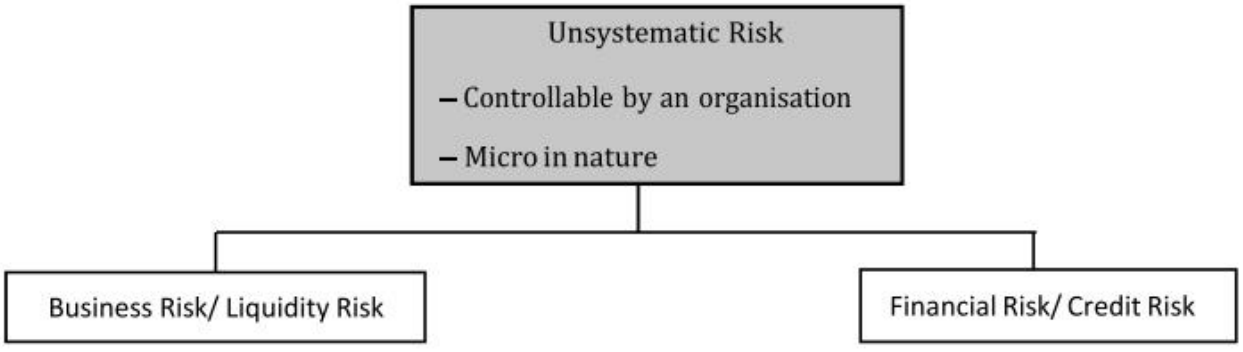
B. Unsystematic Risk

Unsystematic risk is due to the influence of internal factors prevailing within an organization. Such factorsare controllable, internal factors which are peculiar to a particular industry or firm/(s). It may be because of change in management, labour strikes which will impact the returns of only specific firms which are facing the problem.

It is a micro in nature as it affects only a particular organization. It can be planned, so that necessary actions can be taken by the organization to mitigate (reduce the effect of) the risk.

Higher proportion of unsystematic risk is found in firms producing non durable consumer goods. Examples include suppliers of telephone, power and food stuffs.

The types of unsystematic risk are depicted and listed below.



1. Business or liquidity risk,
2. Financial or credit risk

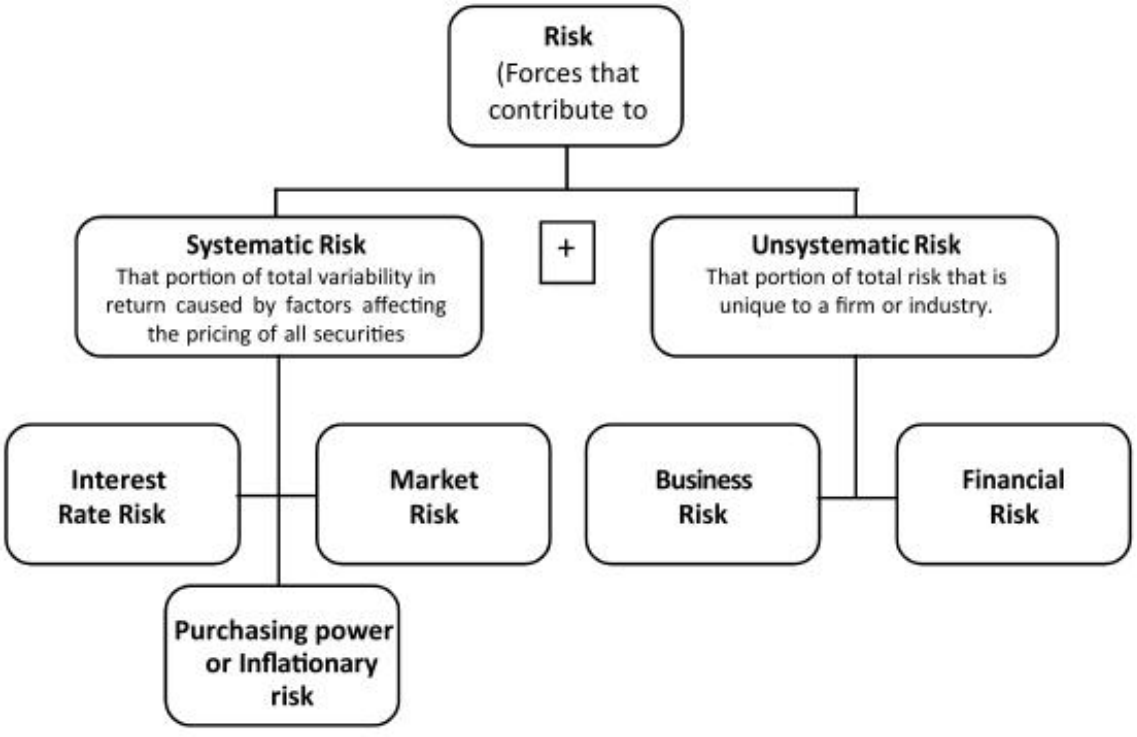
Now let's discuss each risk classified under this group.

1. Business or liquidity risk

Business risk is also known as liquidity risk. It is so, since it emanates (originates) from the sale and purchase ofsecurities affected by business cycles, technological changes, etc.

2. Financial or credit risk

Financial risk is also known as credit risk. It arises due to change in the capital structure of the organization. Thecapital structure mainly comprises of three ways by which funds are sourced for the projects.



RETURN OF THE SECURITY

Return is the primary motivating force that drives investment. It represents the reward for undertaking investment. One of the important property of a security that the investors are concerned with is the return that can be expected from holding a security. Earning a return on an investment requires a passage of time. After some time has passed, one may make an objective measurement of the rate of an investment return that has been achieved. The word

"return" can be misleading, since no single measure of return can answer all possible questions regarding results. The reasons lie in the fact that taxes, inflation, commissions, and the timing of cashflows all play major roles in "correct" calculation of returns.

The return of an investment consists of two components:

Current Return – The first component that comes to mind when one is thinking about return is the periodic cashflow (income), such as dividend or interest, generated by the investment. Current return is measured as the periodic income in relation to the beginning price of the investment.

Capital Return – The second component of return is reflected in the price change called the capital return – it issimply the price appreciation (or depreciation) divided by the beginning price of the asset. For assets like equitystocks, the capital return predominates.

Thus, the total return for any security is defined as:

Total return = Current return + Capital return

The current return can be zero or positive, whereas the capital return can be negative, zero or positive.

MEASURING RETURN

Total return, or holding period return (r), is perhaps the best unique, rational and comparable measures ofresults, no matter what type of asset is under discussion. Holding period return is the total return received fromholding an asset or portfolio of assets over a period of time, generally expressed as a percentage. Holdingperiod return is calculated on the basis of total returns from the asset or portfolio – i.e. income plus changes in value. It is particularly useful for comparing returns between investments held for different period of time.

Holding Period Return (HPR) and **annualized HPR** for returns over multiple years can be calculated as follows:Holding Period Return = Income + (End of Period Value – Initial Value) / Initial Value

Annualized HPR = $\{[(\text{Income} + (\text{End of Period Value} - \text{Initial Value})] / \text{Initial Value} + 1\}^{1/n} - 1$, where n = number ofyears.

Returns for regular time periods such as quarters or years can be converted to a holding period return throughthe following formula:

$(1 + HPR) = (1 + r1) \times (1 + r2) \times (1 + r3) \times (1 + r4)$ where r1, r2, r3 and r4 are periodic returns. Thus,

Example 1:

$$HPR = [(1 + r1) \times (1 + r2) X \ldots (1 + rn)] - 1$$

r = % return per

periodn = number

of periods

Mr. A invested Rs. 10,000 in shares of XYZ Company 10 years ago, and that your shares (including reinvesteddividends) are currently worth Rs. 23,800. Using this information, calculate total investment return of Mr. A.

$$\text{Total investment return} = \frac{\text{Rs.23,800} - \text{Rs.10,000}}{\text{Rs.10,000}} = 1.38 \text{ (or } 138\%)$$

So, total return over a decade has been 138%. Since we're considering a 10-year period, we will use (1/10) i.e. 0.1as power to calculate the annualized return:

Annualised return = $(1 + 1.38)^{0.1} - 1 = 0.0906$

Translated to a percentage, this shows that Mr. A's 10-year investment in XYZ Company produced an annualizedreturn of 9.06%.

Often, it is necessary to adjust the return for taxes which makes a difference to the total returns. Let us take asimple example to illustrate these point.

Portfolio Information		
Beginningvalue		`1,00,000
Cash flows		
Dividends received	`7,500	
Capital appreciation	`12,500	
Endingvalue		`1,20,000
Total Return	[(1,20,000/1,00,000)]-1 = **20%**	

Suppose the investor has a tax rate of 30%. The Rs.7,500 in dividends yields only Rs.5,250 after taxes (Rs.7500
.70), and the capital gains is only Rs.8,750 after taxes (Rs.12,500.70). So, after-tax

return equals[(1,00,000+5,250+ 8,750)/1,00,000]-1= 14%

High nominal returns may also reflect high inflation rate. Suppose that during the performance measurementperiod a 10 percent return was required just to maintain purchasing power. After-tax real return equals

[(1,00,000+5,250+ 8,750)/1,00,000(1.10)]-1= 3.6364%

So, the rate of return to this portfolio is either 20% or 14% or 3.6364%. for a tax exempt investor the 20% returnis appropriate. For a taxable investor, the return is only 14%. Inflation affects

both equally.

Example 2: Three years ago, Fred invested $10,000 in the shares of ABC Corp. Each year, the company distributed dividends to its shareholders. Each year, Fred received $100 in dividends. Note that since Fred received $100 in dividends each year, his total income is $300. Today, Fred sold his shares for $12,000, and hewants to determine the HPR of his investment.

Solution: Using the HPR formula, we can find the following:

$$\text{Holding Period Return (HPR)} = \frac{\$300 + \$12000 - \$\,10000}{\$10000} = 0.23 \text{ or } 23\%$$

Example 3: What is the HPR for an , who bought a stock a year ago at $50 and received $5 in dividends overthe year, if the stock is now trading at $60?

Solution:

$$\text{Holding Period Return} = \frac{5 + (60 - 50)}{50} = 30\%$$

Example 4: Which investment performed better: Mutual Fund X, which was held for three years and appreciatedfrom $100 to $150, providing $5 in distributions, or Mutual Fund B, which went from $200 to $320 and generated
$10 in distributions over four years?

Solution:

$$\text{HPR for Fund X} = \frac{5 + (150 - 100)}{100} = 55\%$$

$$\text{HPR for Fund Y} = \frac{10 + (320 - 200)}{200} = 65\%$$

Note: Fund B had the higher HPR, but it was held for four years, as opposed to the three years for which Fund Xwas held. Since the time periods are different, this requires annualized HPR to be calculated, as shown below.

Calculation of Annualized

HPRAnnualized HPR for

Fund X:

$= (0.55 + 1)^{1/3} - 1 = 15.73\%$

Annualized HRP for Fund Y:

$= (0.65 + 1)^{1/4} - 1 = 13.34\%$

Thus, despite having the lower HPR, Fund X was the superior investment.

APPROACHES TO VALUATION OF SECURITY

Security analysis begins with assessing the intrinsic value of security. There are three main schools of thought onthe matter of security price evaluation. Advocates of different schools can be classified as (1) Fundamentalists;
(2) Technicians; and (3) efficient market advocates. Let us compare these different perspectives in summary formbefore describing them in detail.

(1) **The Fundamental Approach:** The Fundamental approach suggests that every stock has an intrinsic value.Estimate of intrinsic worth of a stock is made by considering the earnings potential of firm which depends

upon investment environment and factors relating to specific industry, competitiveness, quality of management,operational efficiency, profitability, capital structure and dividend policy. The earning potential is converted intothe present value of the future stream of income from that stock discounted at an appropriate risk related rate of interest. Security analysis is done to compare the current market value of particular security with the intrinsicor theoretical value. Decisions about buying and selling an individual security depends upon the comparison.If the intrinsic value is more than the market value, the fundamentalists recommend buying of the security and vice versa.

(2) **Technical Approach:** The technical analyst endeavours to predict future price levels of stocks by examiningone or many series of past data from the market itself. The basic assumption of this approach is that history tends to repeat itself and the price of a stock depends on supply and demand in the market place and has littlerelationship with its intrinsic value. All financial data and market information of a given security is reflected in the market price of a security. Therefore, an attempt is made through charts to identify price movement patternswhich predict future movement of the security. The main tools used by technical analysis are: (1) The Dow Jones theory which asserts that stock prices demonstrate a pattern over four to five years and these patterns are mirrored by indices of stock prices. The theory employs two Dow Jones averages —

the industrial average and the transportation average. If industrial average is rising, then transport average should also rise. Simultaneousprice movement is the main prediction which may show bullish as well as bearish results. Chart Patterns are used along with Dow Jones Theory to predict the market movements.

(3) **Efficient Capital Market Theory :** The theory is popularly known as "Efficient Capital Market Hypothesis: (ECMH). The advocates of this theory contend that securities markets are perfect, or at least not too imperfect.The theory states that it is impossible to beat the market because stock market efficiency causes existing shareprices to always incorporate and reflect all relevant information. It is based on the assumption that in efficient capital markets prices of traded securities always fully reflect all publicly available information concerning those securities. Market efficiency was development in 1970 by the economist Eugene Fama, whose theory ofefficient market hypothesis stated that it is not possible for an investor to outperform the market because all available information built in to all stock prices. For market efficiency, there are three essential conditions; (i) all available information is cost free to all market participants; (ii) no transaction costs; and (iii) all investors similarlyview the implications of available information on current prices and distribution of future prices of each security.

It has been empirically proved that stock prices behave randomly under the above conditions. These conditionshave been rendered unrealistic in the light of the actual experience because there is not only transaction cost involved but traders have their own information base. Moreover, information is not costless and all investors do not take similar data and interpretation with them.

Efficient Market Hypothesis has put to challenge by the fundamental and technical analysts to the extent that random walk model is valid description of reality and the work of chartists is of no real significance in stock priceanalysis. In practice, it has been observed that markets are not fully efficient in the semi-strong or strong sense.

Inefficiencies and imperfections of certain kinds have been observed in the studies conducted so far to test theefficiency of the market. Thus, the scope of earning higher returns exists by using original, unconventional andinnovative techniques of analysis. Also, the availability of inside information and its rational interpretation can lead to strategies for deriving superior returns.

In short, if these theories are taken in their strongest forms, fundamentalists say that a security is worth the present value (discounted) of a stream of future income to be received from the security; technicians assert that the price trend data should be studied regardless of the underlying data; efficient market theorists contend thata share of stock is generally worth whatever it is selling for.

There are four confusing terms which are appearing at this juncture-face value, book value; market value and intrinsic value. Let us first clarify all them.

Face value of the security is the denominating value. It is also called the nominal value. When we

say that authorized share capital of a company is ` 200 lac divided into 20 lac shares of ` 10 each, we mean that the face value or the nominal value of the share is `10/- each.

The book value may be much more than the face value. Let us assume that the shares of `10/- each are issued at `30/- each. The issuer is charging a premium of `20/- for the intrinsic value equalization. The issuer normallycharges premium for the following attributes:

- Long years of establishment and profitable track record.
- Leadership position in the market.
- Potential for continued growth in the future.
- Existence of free reserves with the issuer which makes the book value higher than the face value.

Case Study

Let us clarify the concept of book value a little further. Assuming that a company has been incorporated with an authorized capital of 2 crore shares of ` 10/- each and the company operates profitably for three years, thebroad financial position of the company shall be as under:

(`*In lacs*)

Item	***Year 1***	***Year 2***	***Year 3***
Income	600	1,200	2,400
Expenditure	800	1,000	1600
Profit/Loss	(200)	200	800
Equity Capital	2,000	2,000	2,000
Free Reserves	– 200	0	800
Face Value/share	10	10	10
Book Value/share (Share capital + free reserves)	9	10	14

Book value of the share of the company became less than face value at the end of the first year due to the lossincurred by it. The book value was equal to the face value at the end of the second year due to recoupmentof the loss. At the end of the third year the book value become ` 14/- due to building up of reserves. If, after theend of the third year the issuer wishes to come up with an offering of additional shares, the offer price will not be less than `14.

In actual market conditions does the book value track the market value? We may observe the trend of few company

Sl. No.	***Name of the Company***	***Face ValuePer Share***	***Book Value***	***Market Value(As on 30September)***

(1)	*(2)*	*(3)*	*(4)*	*(5)*
1	HB Ltd.	1	13.8	168.70
2	FI Ltd.	10	136.3	250.50
3	IT Ltd.	5	314.3	3411.30

Sl. No.	*Name of the Company*	*Face ValuePer Share*	*Book Value*	*Market Value(As on 30September)*
4	ITB Ltd.	10	175.8	349.80
5	BIS	10	299.3	229.70
6	RP Ltd.	10	20.4	22.60
7	RL Ltd.	10	138.2	562.60
8	IDD Ltd.	10	101.9	144.85
9	MTGL Ltd.	10	151.2	109.50
10	SC Ltd.	2	61.4	210.70
11	RLD Ltd.	5	190.5	821.15
12	HCT Ltd.	2	60.5	205.90
13	HPC Ltd.	10	173.8	172.45
14	CIP Ltd.	10	152.8	946.35
15	NES Ltd.	10	27.5	565.85
16	HH Ltd.	2	34.3	248.75
17	TISC Ltd.	10	93.6	116.50
18	LCET Ltd.	10	77.1	129.15
19	T&L Ltd.	10	133.0	167.00
20	BA Ltd.	10	283.2	380.05
21	BHL Ltd.	10	182.6	160.15
22	HIND Ltd.	10	621.5	522.10
23	ZTE Ltd.	1	99.2	57.50
24	BSS Ltd.	10	194.3	216.20
25	GRA Ltd.	10	295.3	309.00
26	GSIM Ltd.	10	75.3	367.15
27	GLX Ltd.	10	155.14	163.00
28	ASC Ltd.	10	171.17	138.15
29	CAS Ltd.	10	32.1	189.80
30	CIG Ltd.	10	18.2	131.20

We note that the market value is not equal to the book value for shares of any of the leading companies of the country. In fact, there is wide divergence between these two. The divergence is mostly on the upper side exceptin some cases. We can conclude, therefore, that book value is not a perfect indicator of the intrinsic value of a security. At best it can be an indicator of the floor value or base value below which the market value in normal circumstances should not slide. Book value is a historic indicator. It depicts what the company has earned andsaved in the past. It does not reflect the future earning potential of the company.

Having considered that the book value is not an appropriate measure for ascertaining the real or intrinsicvalue of a security, let us take up a more rigourous process of evaluating securities called fundamental analysis.

FUNDAMENTAL APPROACH TO VALUATION

The investor seeks to arrive at the real value or the intrinsic value of a security through the process of security analysis. This value is arrived at by using a number of tools of financial analysis and it approximates the level at which the demand and supply of stock of the security would be in equilibrium leading to stability of prices. Price of the security below and above this level would tend to be unstable.

Money has a "time value." the powerful tools of compounding and discounting can help us build a theoretical framework of valuation of bonds and stocks. Bond values are reasonably easy to determine. As long as abond is not expected to go into default, the value of the bond is made up of present values of annual interest payments plus the principal amount to be recovered at maturity or sooner. Valuation of equity is different because earnings and dividend streams are uncertain as to timing of receipt and the amount of dividend.The value of an equity stock at any moment in time can be thought of as the discounted value of a series of uncertain future dividends that may grow or decline at varying rates over time.

It is easiest to start with equity valuation where the expected holding period is one year. The benefit any investor receives from holding an equity stock consists of dividends plus any change in price during the holdingperiod. Suppose we buy one share of SBI at the beginning of the year for Rs. 500. We hold the stock for one year. Rs.20 in dividends is collected at year-end, and the share is sold for Rs.530. the rate of return achieved isthe composite of dividend yield and change in price (capital gains yield). Thus, we get

Dividend yield = D/P= 20/500 = .04 Capital gains yield = 530-500/500= .06

The total rate of return achieved is .04+.06=.10 or 10 percent. How might we express this same notion in termsof present values? Thus:

$$P0 = \frac{D1}{(1+r)} + \frac{P1}{(1+r)}$$

where:

D1 = dividend to be received at the end of year 1

r = investor's required rate of return or discount rate P1 = selling price at the

end of year 1P0 = selling price today

Therefore,

$$500 = \frac{₹\ 20}{(1+r)} + \frac{530}{(1+r)}$$

Will r = .10 balance the equation? At a required rate of return of 10 percent, the dividend is worth `18.18 (`20*.909) and selling price has a present value of ` 481.8182 (`530 *.909) (see present value table). The combined present value is `500.

Should a rate of return of 15 percent have been required, the purchase price would have been too high at

` 500. (the dividend of `20 and selling price of `530 remains constant). To achieve a 15% return, the value of the stock at the beginning of the year would have had to be

P0 = (`20/1.15) + (`530/1.15)

= `17.39 + 460.87

= `478.26

An alternative approach would be to ask the question: at what price must we be able to sell the stock at the endof one year (if purchase price is `500 and the dividend is `20) in order to attain a rate of return of 15 percent?

`500 = (`20/1.15) + (P1/1.15)

`500 = `17.39 + .87 P1

`554.72 = P1 (selling price)

Now let us look at a multiple year holding period. In most cases dividends will grow from year to year. We can similarly add the present value of all dividends to be received over the holding period and the present value of the selling price of the stock to the end of the holding period to arrive at the present value of the stock.

To simplify, let us assume that dividends will grow at the constant rate into the indefinite future. Under this assumption the value of a share is

$$P_0 = \frac{D(1+g)}{(1+r)^1} + \frac{D(1+g)^2}{(1+r)^2} + \frac{D(1+g)^3}{(1+r)^3} + \frac{+D(1+g)^n}{(1+r)^n}$$

where n approaches infinity, this equation reduces simply to

$$P_0 = \frac{D1}{r - g}$$

This model states that the price of a share should be equal to next year's expected dividend divided bythe difference between the appropriate discount rate for the share and its expected long term growth rate.
Alternatively, this model can be stated in terms of the rate of return on an

equity share asr = (D1/P0) + g

Illustration: An investor is holding 1000 shares of Right Choice Ltd. The current rate of dividend paid by the company is `5/- per share. The long term growth rate is expected to be 10% and the expected rate of return is19.62%. We need to find out the current market price of the share:

Solution

$$P_0 = \frac{D0\,(1+g)}{r - g}$$

$$= \frac{5(1 + 0.10)}{.1962 - .10}$$

$$\frac{5 \times 1.1}{0.0962} = \frac{5.5}{0.0962} = ₹57.17$$

The real value or intrinsic value is valid for a given set of conditions. These conditionalities include the national and international economic situation, industry specific and company specific circumstances. The first three conditionalities are viewed from a macro perspective in order to even out the effect of minor happenings. The last conditionality is observed at the micro level because at this level, even relatively smaller happenings can disturb the demand supply equilibrium.

ALTERNATIVE APPROACHES TO VALUATION

1. Random walk theory

In the Fundamental Analysis, factors such as economic influences, industry factors and particular company information are considered to form a judgment on share value. On the other hand, price and volume informationis analyzed in Technical Analysis to predict the future course of share values. There is another approach which negates both Fundamental and Technical analysis. This approach has been based upon the research aimed attesting whether successive price changes are independent in different forms of market efficiency.

According to the theory, share prices will rise and fall on the whims and fancies of manipulative individuals.As such, the movement in share values is absolutely random and there is no need to study the trends and movements prior to making investment decisions. No sure prediction can be made for further movement or trendof share prices based on the given prices as at a particular moment. The Random Walk Theory is inconsistentwith technical analysis. Whereas, it states that successive price changes are independent, the technicians claimthat they are dependent. But believing in random walk does not mean that one should not believe in analyzing stocks. The random walk hypothesis is entirely consistent with an upward and downward movement in price, asthe hypothesis supports fundamental analysis and certainly does not attack it.

One of the advantages of this theory is that one is not bothered about good or bad judgement as shares are picked up without preference or evaluation. It is easier for believers in this theory to invest with confidence. Thesecond advantage is that there is no risk of being ill informed while making a choice as no information is soughtor concealed.

Random walk theory implies that short term price changes i.e day to day or week to week changes are randombut it does not say anything about trends in the long run or how price levels are determined.

2. Efficient – Market Theory

Efficient Market Hypothesis accords supremacy to market forces. A market is treated as efficient when all known information is immediately discounted by all investors and reflected in share prices. In such a situation, the only price changes that occur are those resulting from new information. Since new information is generated on a random basis, the subsequent price changes also happen on a random basis. Major requirements for an efficient securities market are:

- Prices must be efficient so that new inventions and better products will cause a firms' securities pricesto rise and motivate investors to buy the stocks.

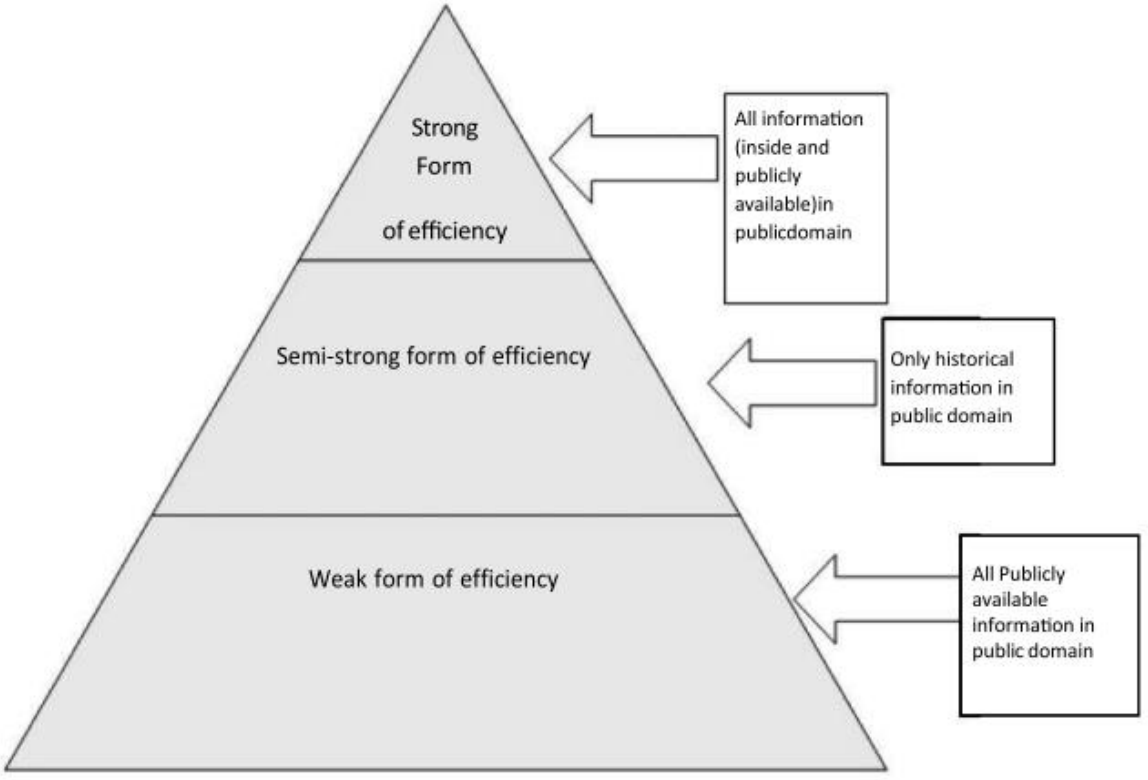
- Information must be discussed freely and quickly across the nations so that all investors can react tothe new information.
- Transaction costs such as brokerage on sale and purchase of securities are ignored.
- Taxes are assumed to have no noticeable effect on investment policy.
- Every investor has similar access to investible funds at the same terms and conditions.
- Investors are rational and make investments in the securities providing maximum yield.

Research studies devoted to test the random walk theory on Efficient Capital Market Hypothesis (ECMH) are put into three categories i.e.

(a) the strong form,

(b) the semi-strong form, and

(c) the weak form theory.



(a) ***The Strong Form of Efficiency:*** This test is concerned with whether two sets of individuals – one having inside information about the company and the other uninformed could generate random effect in price movement. The strong form holds that the prices reflect all information that is known. It contemplates that even the corporate officials cannot

benefit from the inside information of the company. The marketis not only efficient but also perfect. The findings are that very few and negligible people are in sucha privileged position to have inside information and may make above-average gains but they do not affect the normal functioning of the market.

(b) ***Semi-strong form of Efficiency:*** This hypothesis holds that security prices adjust rapidly to all publiclyavailable information such as functional statements and reports and investment advisory reports,etc. All publicly available information, whether good or bad is fully reflected in security prices. The buyers and sellers will raise the price as soon as a favourable price of information is made availableto the public; opposite will happen in case of unfavourable piece of information. The reaction is almostinstantaneous, thus, printing to the greater efficiency of securities market.

(c) ***The Weak Form theory:*** This theory is an extension of the random walk theory. According to it, the current stock values fully reflect all the historical information. If this form is assumed to be correct, thenboth Fundamental and Technical Analysis lose their relevance. Study of the historical sequence of prices, can neither assist the investment analysts or investors to abnormally enhance their investmentreturn nor improve their ability to select stocks. It means that knowledge of past patterns of stock pricesdoes not aid investors to make a better choice. The theory states that stock prices exhibit a random behaviour.

In this way, if the markets are truly efficient, then the fundamentalist would be successful only when (1) he hasinside information, or (2) he has superior ability to analyse publicly available information and gain insight into

the future of the company. The empirical evidence of the random walk hypothesis rests primarily on statistical tests, such as runs test, correlation analysis and filter test. The results have been almost unanimously in supportof the random walk hypothesis, the weak form of efficient market hypothesis.

3. Capital Asset Pricing Mode (CAPM)

CAPM explains the relationship between the Expected Return, Non-Diversifiable Risk (Systematic Risk) and the valuation of securities. Under CAPM price of a security is calculated with the help of expected return from security.

Formula for Computing Expected Return: E(RP) = Rf +(Rm –Rf {ß} Where E(RP) = Expected Return

on Portfolio RF = Risk Free Rate of Interest/ Return ß = Portfolio Beta

RM = Expected Return on Market Portfolio

Example 1: Using the following information calculate expected return:

Current yield on a U.S. 10-year treasury is 2.5%

The average excess historical annual return for U.S.

stocks is 7.5%The beta of the stock is 1.25

Solution: Expected return = Risk Free Rate + [Beta x Market Return

Premium]Expected return = 2.5% + [1.25 x 7.5%]

Expected return = 11.9%

Example 2: Winner Corporation stock will pay a dividend of $1.32 next year. Its current price is $24.625 per share. The beta for the stock is 1.35 and the expected return on the market is 13.5%. If the riskless rate is 8.2%,what is the expected growth rate of Winner Corporation?

Solution: Using the capital asset pricing model

(CAPM), E(Ri) = r + i [E(Rm) − r]

We first find the expected rate of return as:

E(Ri) = 0.082 + 1.35 [0.135 − 0.082] = 0.15355 = R

The expected rate of return E(Ri), for a security is also its required rate of return R by the investors. Using the growth model for a stock

$$P_0 = \frac{D_1}{R - g}$$

we get, R − g = D_1/P_0, or g = R −

D_1/P_0, which gives g = 0.15355 −

1.32/24.625 = 0.1.

Thus the growth rate is 10%

Example 3: Peak Services Ltd. common stock has a = 1.15 and it expects to pay a dividend of $1.00 after oneyear. Its expected dividend growth rate is 6%. The riskless rate is currently 12%, and the expected return on themarket is 18%. What should be a fair price of this stock?

Solution: E(Ri) = r + i [E(Rm) − r]

we get E(Ri) = 0.12 + 1.15 [0.18 − 0.12] = 0.189

Thus, the expected return on the stock is 0.189, and the expected growth rate is 0.06.

$$P_0 \quad \frac{1}{0.189 - 0.06} = \$7.75$$

Example 4: Wonderful Oil stock currently sells at $120 a share. The stockholders expect to get a dividend of $6next year, and they expect that the dividend will grow at the rate of 5% per annum. The expected return on themarket is 12% and the riskless rate is 6%. Wonderful Oil announced that it has won the multimillion dollar navycontract, and in response to the news, the stock jumped to $125 a share. Find the beta of the stock before andafter the announcement.

Solution: Using Gordon's growth model, $P_0 = D_1 / R - g$, we get $R = D_1/P_0 + g$, which is also the expected returnon the stock, E(R). But by CAPM,

$E(Ri) = r + i\,[E(Rm) - r]$

we get

$$\beta = \frac{E(R_i) - r}{E(R_m) - r}$$

$$\text{Thus, } \beta = \frac{D_1 / P_0 + g - r}{E(Rm) - r}$$

$$\frac{D_1 / P_0 + g - r}{E(Rm) - r}$$

$$\beta = \frac{6/120 + 0.05 - 0.06}{0.12 - 0.06} = 0.667, \text{ before.}$$

$$\text{And } \beta = \frac{6/125 + 0.05 - 0.06}{0.12 - 0.06} = 0.633, \text{ after.}$$

Note : Detailed discussion on CAPM model is given in Portfolio Management

CHAPTER - 15
OPERATIONAL APPROACH TO FINANCIAL DECISION

Introduction

One of the three strategic dimensions to achieve competitive advantage in industry, together with product differentiation and focus or niche, according to Michael E. Porter's theory of generic competitive strategies, is "Cost Leadership." Cost leadership refers to delivering services or producing items at the lowest possible cost while retaining quality for more competitive pricing. It is crucial for an entity to fit into one of the three competitive strategy dimensions in a business environment where every entity strives to obtain the top position not only in domestic but also in the global competitive market. If an organisation has a strong Cost and Management Accounting system in place, it can attain cost leadership, another topic related to Cost and Management Accounting. This chapter will cover a variety of cost accounting topics as well as how they are used in manufacturing and service environments.

An overview of Costing

Any system for allocating expenses to a business component is known as costing. Costing is frequently used to create costs for customers, distribution channels, personnel, geographical regions, goods, product lines, processes, subsidiaries, and whole businesses. Planning and managing a company's operating expenses is the process of costing. In order to budget, anticipate, and monitor costs more accurately, it also involves gathering, evaluating, and reporting cost information. Cost is the price paid, which is typically calculated based on the resources given up to accomplish a specific goal. It is a price paid in exchange for certain commodities or services. Not all costs are expenses. While some expenditures are expenses, others are assets. Costs have expired (been used up).

ICWAI, India defines cost as "measurement in monetary terms, of the amount of resources used for the purpose of production of goods or rendering services"

Cost refers to the amount of payment made to acquire any goods and services. In a simpler way, the concept of cost is a financial valuation of resources, materials, risks, time and utilities consumed to purchase goods and services. From an economist's point of view, the cost of manufacturing any goods and services is often said to be the concept of opportunity cost.

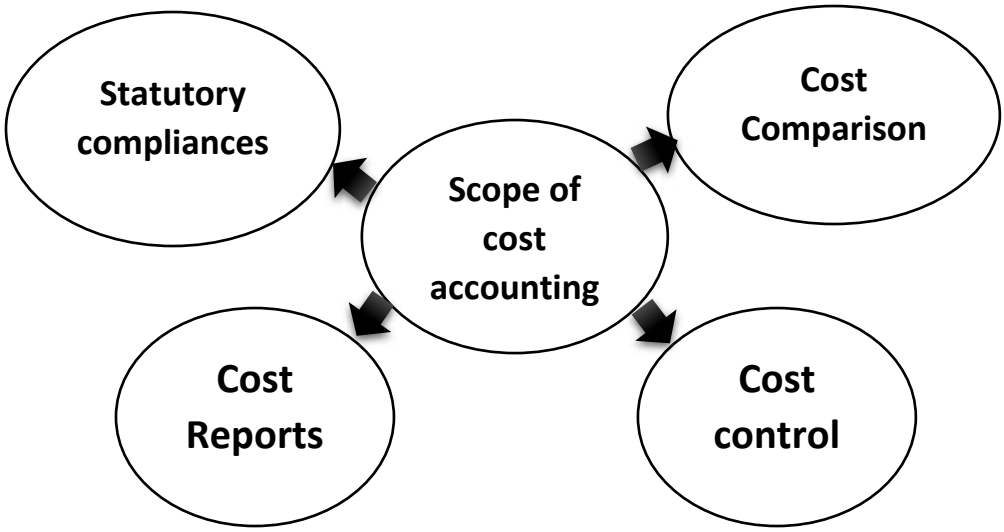
The concepts, practices, procedures, and processes used in a firm to plan and regulate how its resources are used are included in the definition of cost accounting. The application of costing and cost accounting principles, methodologies, and techniques to the science, art, and practice of cost control and the determination of profitability is how CIMA (London) defines it. It also comprises the dissemination of data obtained from it for managerial decision-making.

Cost accounting is therefore the science, the art, and the practice of a cost accountant. It is a science in that it is a body of methodical knowledge that a cost accountant must possess in order to carry out his tasks and responsibilities in a professional manner. It is an art since it calls for a cost accountant's expertise and talent to apply cost accounting principles to a variety of managerial issues, such as price fixing, cost control, etc.

Nature and Scope of Costing

Costing is the process of determining costs, according to the C.I.M.A., London. It discusses methods and procedures for estimating costs as well as the guiding concepts and regulations governing how much goods and services should cost. Cost accounting is a technique for cost accounting. Analyzing the costs related to a good or activity is only one aspect of cost accounting. It considers a number of factors, such as different cost structures, possible business opportunities, budget planning, profitability analysis, and more. In this context, "scope" refers to the area of activity. Calculating the cost of a specific good or activity is referred to as cost accounting. Both internal and external reports reporting can benefit from the data it gives. Cost information is presented in detail in internal reporting.

Cost Analysis



NATURE OF COSTING

1. **Cost Accounting is a Branch of Knowledge-**Though cost accounting is considered as a branch of financial accounting, it is one of the important branches of knowledge. It is an organized body of knowledge consisting of its own principles, concepts and conventions. These principles and rules vary from industry to industry.
2. **Cost Accounting is a Branch of Knowledge-**Though cost accounting is considered as a branch of financial accounting, it is one of the important branches of knowledge. It is an organized body of knowledge consisting of its own principles, concepts and conventions. These principles and rules vary from industry to industry.
3. **Cost Accounting is an Art-** Cost accounting is an art in that it calls on the ability and expertise of a cost accountant to apply the concepts, procedures, and methods of cost accountancy to specific management issues. These issues include determining cost control, determining profitability, and other issues.
4. **Cost accounting is a profession-** In recent years, cost accounting has emerged as one of the crucial and most difficult occupations. These two facts make this opinion clear. First, the establishment of numerous professional organisations, including the National Association of Accountants (NAA), the Institute of Cost and Management Accountants in the United Kingdom, the Institute of Cost and Works Accounts in India, and similar organizations in developed and developing nations, has increased public awareness of the costing profession. Second, many students have enrolled in these institutions in order to gain expensive degrees and membership necessary for supporting themselves.
   (a) Costing methodology and process: Costing methodology consists of two separate processes.
      - Cost collection and classification based on numerous factors.
      - Apportionment and allocation of costs that cannot be directly attributed to production. Costing as a process is concerned with the regular determination of cost using the official approach.

   (b) Cost estimation is done in three parts.
      - Expenditure analysis and data collecting,
      - Production measurement at various stages
      - Compensating for production costs to accomplish the initial step. Different systems, including Historical, Estimated, and Standard Cost, have been created in costing. Costing has created a variety of techniques for achieving the second phase, including work costing, contract costing, single or output costing, etc. for completing the final phase, finally. Important methods have been established in costing, including absorption costing, marginal costing, and standard costing.

Objectives of Costing

Facts are collected into statistics.

1. **Ascertainment of Cost**

   The first and most significant goal of costing is cost determination. In order to ensure that all costs are included in the price of the products, techniques, and costing process employed, it is important to ascertain the cost of each product, process, or operation.

   It is beneficial to do preliminary research and implement a system for recording costs in order to determine the cost of management with the assistance of the costing department. Materials, labour, and other expenses are maintained in a correct and thorough manner (referred to as covered heads).As a result, the management gathers cost information on a regular basis, which is then used to establish the selling price. Therefore, the costs and sales are equal. This matching procedure assists in determining and raising the product's profitability. Importantly, costing gives managers a way to determine costs as well as a foundation for determining the profitability of any services or products being provided.

2. **Cost Control**

   Cost estimation alone is insufficient. Naturally, it is insufficient because the cost dictates the selling price, which in turn decides the profitability. As a result, "the lower the cost, the larger to profit" is the standard that everyone tries to adhere to. It's crucial to keep costs under control in order to bring about this norm's fundamental goal of lower prices for goods and services. A comparison is conducted after budgets have been created, standards have been established, and actual have been determined. Corrective action is conducted if any discrepancy between the actual, the budget, and the standards is found. As a result, managers can increase their income or lower the selling price while also helping to control costs. As a result, the customer can gain from higher quality, which can increase consumer loyalty to the brand and business.

3. **Guidelines for Management**

   The devoted servant of managers in a company is costing. In all practical respects, it supports managerial decision-making. Managers can work toward efficiency for the entire organisation with the use of cost data that comes from costing. Cost information offers organisational recommendations for different managerial choices. For instance, the utilisation of cost data might direct the launch of a new product line, reveal areas of untapped capacity, or draw attention to growth prospects.

Types of Costing

Cost can be defined as the amount (measured in terms of money) paid for goods and services received (or to be received).Accountants and managers use many different concepts of cost, each usually for a different purpose.

a) It is the classification of cost that indicates to managers how the term is being used and whether they can do anything about the cost or not.
b) Important types of costs are explained below
c) Costs are broadly classified into four types: fixed cost, variable cost, direct cost, and indirect cost.

- **Variable Cost:** A variable cost changes in direct proportion to a change in the level of activity.
- **Fixed Cost:** These costs do not change in total as activity changes.
- **Direct Cost:** A direct cost is a cost that can be traced to specific segments of operations.
- **Indirect Cost:** An indirect cost is a cost that cannot be identified with specific segments of operations. Common costs are shared by multiple segments.
- **Relevant Costs :** All those costs which influence a choice of alternatives in a particular situation (decision to be taken) and are also affected by that decision are said to be relevant costs of that decision
- **Irrelevant Costs :** All those costs which remain the same and are not affected by the decision whatever alternative is chosen are said to be irrelevant costs for that decision
- **Sunk Costs:** Sunk costs are the historical costs that arise due to decisions made in the past and cannot be changed by any decision made in future. Example: investments in Plant & Machinery is a prime example of sunk cost; in decisions relating to replacement of old machine, the written down value of old machine adjusted for its recoverable value is a sunk cost as it has been incurred in past and cannot be changed by future decision. Since sunk costs cannot be altered in future, they are always irrelevant costs in future decision making.
- **Shut down Costs:** These are the unavoidable fixed costs which continue to be incurred even when a plant is temporarily shut down. Example: rent, insurance and depreciation of building, salaries of permanent staff etc. Managers must take into account shutdown costs while considering shutdown or continue decisions.
- **Imputed/Hypothetical/Notional Costs:** These are the costs for which neither any transaction has taken place nor any cash outlay is there but it represents a sacrifice

or resource use capable of being measured in monetary terms. Example: a producer is doing production in his own premises for which no rent is paid but which has a market value of Rs. 15,000 per month, he can record Rs. 15,000 per month as notional factory rent while determining the cost of production of output.

- **Out of Pocket Cost / Explicit Costs:** These are those costs that require cash outlay due to a particular managerial decision. It represents both present and future outflow of cash due to a decision.

Advantages of Costing

Costing gives useful cost information. As a result, it is crucial in managerial decision-making. A sound costing system is also important in order to provide high-quality services. The costing department has a significant impact on the benefits managers gain from costing, notably in the following dimensions:

1. **Measurement and Improvement of Efficiency:** The chief advantage to be gained is that Cost Accounting will enable a concern to, first of all, measure its efficiency and then to maintain and improve it. This is done by suitable comparisons and analysis of the differences that may be observed. Example- if materials spent upon a pair of shoes in 2001 comes to Rs. 100 and for a similar pair of shoe the amount is Rs. 120 in 2002. It is an indication of decline in efficiency. Of course, the increase may only be due to increase in price of materials; it may also be due to greater wastage in use of materials or inefficiency at the time of buying so that unnecessary high prices were paid.
2. **Profitable and Unprofitable Activities:** It will throw light upon those activities which bring profits and those activities which result in losses. This will be done only if the cost of each product or each job is ascertained and compared with the price obtained.
3. **Fixation of Prices:** In many cases a firm is able to fix a price for its products on the basis of the cost of production. In such a case, price cannot be properly fixed if no proper figures of cost are available. In case of big contracts, no quotation can be made unless the cost of completing that contract can be ascertained. If prices are fixed without costing information, it is possible that the price quoted may either be too high, in which case orders cannot be obtained, or it may be too low, in which case an order will result in a loss. It is a mistake on the part of any management to believe that mere increase in sales volume will result in profits; increased sales at prices lower than the cost may well lead the concern to the bankrupt court. Only Cost Accounting will reveal what price will be profitable.
4. **Guide in Reducing Prices:** In certain periods it becomes necessary to reduce the price even below the total cost. This will be so when there is a depression or slump. Costs, properly ascertained, will guide management in this direction.
5. **Information for Proper Planning:** For a proper system of Costing, it is necessary to have detailed information about the facilities available about machine and labour

capacity. This helps in proper planning of work so that no section is overworked and no section remains idle.

6. **Control over Materials etc. :** Information about availability of stocks of various materials and stores must be constantly available if there is a good system of Cost Accounting. This helps in two ways. Firstly, production can be planned according to the availability of materials and fresh stocks can be arranged in time when old stocks are exhausted. Secondly, loss due to carelessness or pilferage or any other mischief will be known and, therefore, put down.
7. **Decision Regarding Machine vs. Labour :** Some of the important questions before management can be solved only with the help of information about costs. For example, if there is the problem of replacement of labour by machinery, Cost Accounting will at least guide management in finding out what the cost of production will be if either machinery or labour is used.
8. **Expansion in Production:** Sometimes it is necessary to decide whether production of one product or the other is to be increased. This problem can also be solved only if proper information about costs is available.
9. **Reasons for Losses Detected:** Exact causes of existence of profits or losses will be revealed by a system of Cost Accounting. For example, a concern may suffer not because the cost of production is high or prices are low but because the output is much below the capacity of the concern. It is only Cost Accounting which will reveal this reason for loss. It also helps in distinguishing between expenditure and loss which is necessary and that which is unnecessary, that is to say, between normal and abnormal losses.
10. **Helps in Taking Decisions:** Cost Accounting inculcates the habit of making calculations with pencil and paper before taking a decision. It will certainly check recklessness. Also some of the silly mistakes that sometimes occur can be avoided if there is a good Cost Accounting system. To give an instance, a well-known firm once quoted for supply of mosquito nets to the Government at a very low price. It was only after the order was obtained that the firm found that, by mistake, the price of materials was not included in the quotation.
11. **Check on Accuracy of Financial Accounts:** A good system of Cost Accounting affords an independent and most reliable check on the accuracy of financial accounts. This check operates through reconciliation of profits shown by Cost Accounts and by Financial Accounts. On the basis of various advantages of Cost Accounting, it can be easily said that 'a good system of costing serves as a means of control over expenditure and helps to secure economy in manufacture'.

Limitation of Costing

1. **Expensive:** The organization of the costing system and highly compensated cost accountants require further spending before installing it, though, care must be taken to make sure that the savings outweigh the cost of the accounting system.

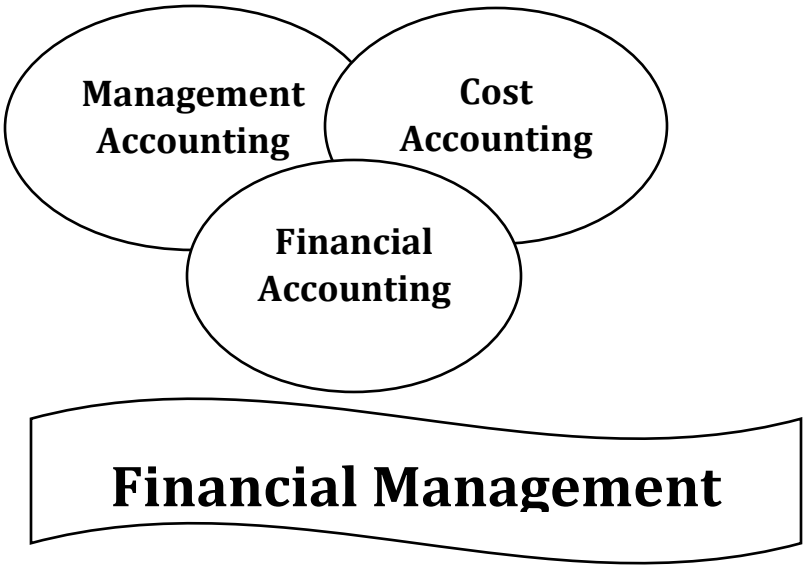
2. **More Difficult:** The cost accounting system includes a lot of processes in determining cost, such as gathering and classifying expenses, allocating and apportioning expenses, etc. These procedures are regarded as difficult and demand a number of forms and paperwork to prepare the reports. Accounts will take longer to prepare as a result of this.
3. **Limited Applicability:** It is impossible for all business companies to employ the same costing methods and techniques. Everything relies on the type of business it is and the products it produces. The results of the business are misled if the incorrect technique and procedure are employed.
4. **Inappropriate:** Cost accounting systems are only appropriate for large-scale businesses; they are not ideal for small-scale businesses because they are more expensive.
5. **Lack of Uniformity:** The biggest drawback of the cost accounting method is its lack of uniformity. It does not adhere to any standard process. It is feasible for two cost accountants of comparable competence to get different conclusions using the same data. As a result, it is said that all outcomes from cost accounting are only approximations.
6. **Lack of Accuracy -** Cost Accounting accuracy varies. When estimating costs for a certain circumstance, some assumptions are always made.

Basic Principles of Costing

1. **Cause-and-effect relationships:** For each expense component, a cause-and-effect link needs to be defined. Each cost should be as closely tied to its root cause as feasible, and its impact on the various departments should be determined. Only units that travel through the departments at which a cost has been incurred should share that cost.
2. **Previous Costs That Could Not Be Collected in the Past Should Not Be Included in Future Costs:** Recovering past costs that could not be recovered in the past should not be done since it will not only skew the results of the future period's actual operations but also other statements.
3. **Charge of Cost Only Upon Incurrence:** Only costs that have been legitimately incurred should be included in unit costs. For instance, unit costs shouldn't be included in selling costs while an item is still being produced.
4. **Abnormal Costs Are Excluded from Cost Accounts:** When calculating the unit cost, all expenses incurred for unusual causes (such as theft or negligence) shouldn't be taken into account. If done thus, it will skew expense estimates and mislead management, leading to poor choices.
5. **Double Entry Principles Preferably Should Be Obeyed:** Cost ledgers and cost control accounts should, to the greatest extent possible, be maintained using double entry methods to reduce the likelihood of any error or mistake. By doing this, the accuracy of cost sheets and cost statements that are created for cost estimation and cost control would be guaranteed.

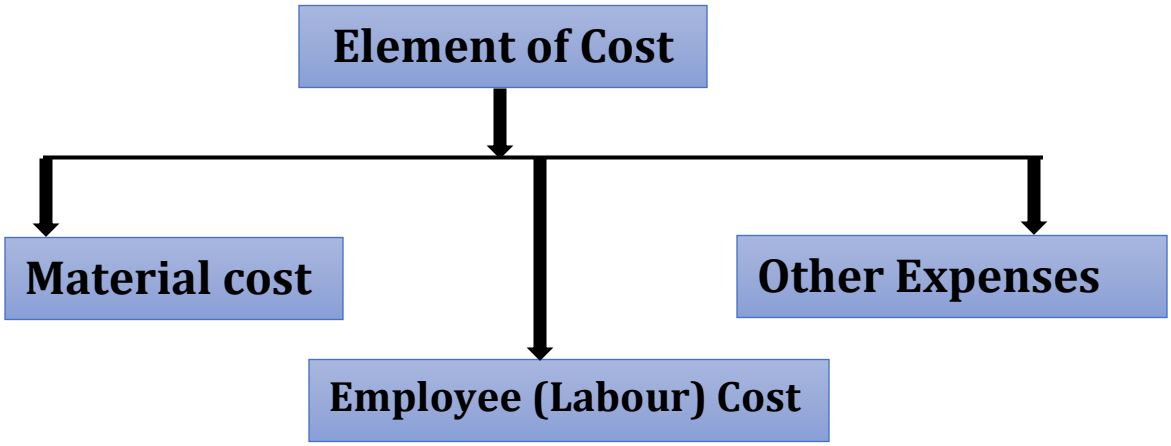
Relationship of Cost Accounting, Management Accounting, and Financial Accounting and Financial Management

Different fields including Cost Accounting, Management Accounting, Financial Accounting, and Financial Management are closely related to one another.
These fields can occasionally interact and depend on one another.



CLASSIFICATION OF COSTS

It refers to the categorization of expenses based on their shared traits. The following categories are crucial for classifying costs: I By Nature or Element; (ii) By Functions; and (iii) By Variability or Behaviour (iv) By Capability (v) By Regularity (vi) By Costs for Managerial Decision Making.



Material cost: The price of the materials needed to produce a good or render a service is referred to as the material cost. All indirect materials required in the production process, such as cleaning supplies, are not included in the material cost.

Employee (Labour) Cost: The cost of labor is the sum of all wages paid to employees, as well as the cost of employee benefits and payroll taxes paid by an employer. The cost of labor is broken into direct and indirect (overhead) costs.

Other Expenses: Expenditure other than material and labour is the third element of cost. It is defined by I.C.M.A. as- "The cost of service provided to an undertaking and the notional cost of the use of owned assets".

CONCEPT # 1: MARGINAL COSTING

Definition: Marginal Costing is a costing technique wherein the marginal cost, i.e. variable cost is charged to units of cost, while the fixed cost for the period is completely written off against the contribution.

The term **marginal cost implies the additional cost involved in producing an extra unit of output**, which can be reckoned by total variable cost assigned to one unit. It can be calculated as:

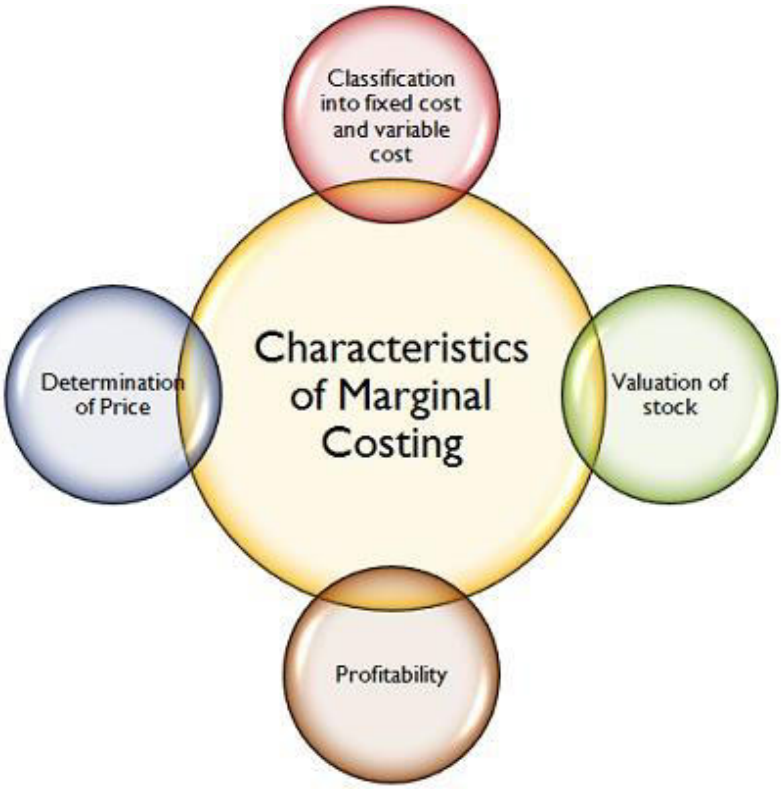
Marginal Cost = Direct Material + Direct Labor + Direct Expenses + Variable Overheads

Marginal costing is the ascertainment of marginal cost and the effect on profit of changes in volume or type of output by differentiating between fixed costs and variable cost. In marginal costing, costs are classified into fixed and variable costs.

The concept of marginal costing is based on the behaviour of costs that vary with the volume of output. Marginal costing is known as 'variable costing', in which only variable costs are accumulated and cost per unit is ascertained only on the basis of variable costs. Sometimes, marginal costing and direct costing are treated as interchangeable terms.

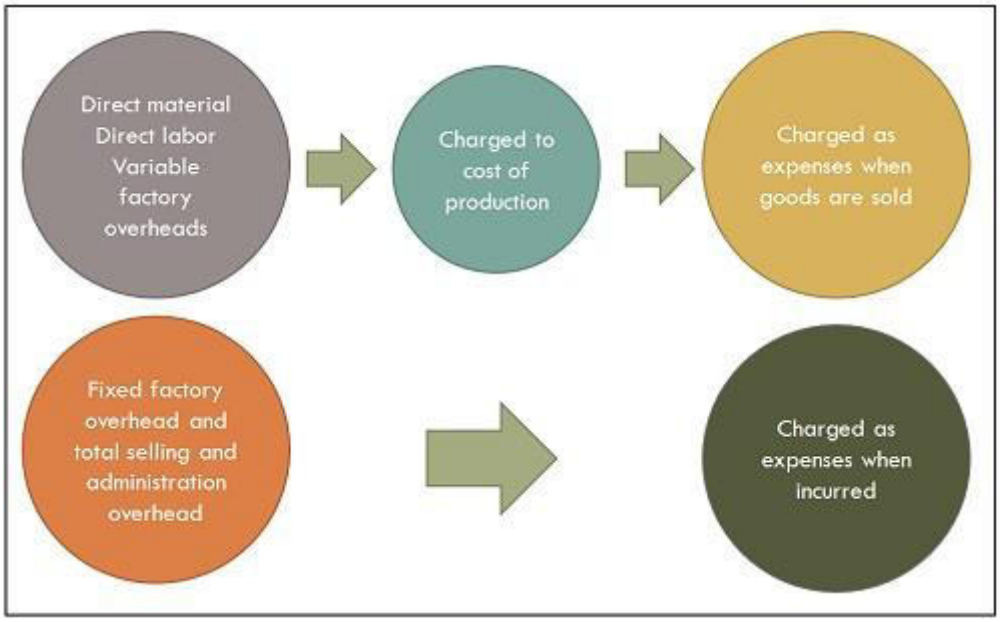
The major difference between these two is that, marginal cost covers only those expenses which are of variable nature whereas direct cost may also include cost which besides being fixed in nature identified with cost objective.

CONCEPT # 2: CHARACTERISTICS OF MARGINAL COSTING



- **Classification into Fixed and Variable Cost**: Costs are bifurcated, on the basis of variability into fixed cost and variable costs. In the same way, semi variable cost is separated.
- **Valuation of Stock**: While valuing the finished goods and work in progress, only variable cost are taken into account. However, the variable selling and distribution overheads are not included in the valuation of inventory.
- **Determination of Price**: The prices are determined on the basis of marginal cost and marginal contribution.
- **Profitability**: The ascertainment of departmental and product's profitability is based on the contribution margin.

CONCEPT # 3: MARGINAL COSTING APPROACH



The difference between product costs and period costs forms a basis for marginal costing technique, wherein only **variable cost is considered as the product cost while the fixed cost is deemed as a period cost**, which incurs during the period, irrespective of the level of activity.

CONCEPT # 4: FACTS CONCERNING MARGINAL COSTING

- **Cost Ascertainment**: The basis for ascertaining cost in marginal costing is the nature of cost, which gives an idea of the cost behavior that has a great impact on the profitability of the firm.
- **Special technique**: It is not a unique method of costing, like contract costing, process costing, batch costing. But, marginal costing is a different type of technique, used by the managers for the purpose of decision making. It provides a basis for understanding cost data so as to gauge the profitability of various products, processes and cost centers.
- **Decision Making**: It has a great role to play, in the field of decision making, as the changes in the level of activity pose a serious problem to the management of the undertaking.

Marginal Costing assists the managers in taking end number of business decisions, such as replacement of machines, discontinuing a product or service, etc. It also helps the management in ascertaining the appropriate level of activity, through break even analysis, that reflect the impact of increasing or decreasing production level, on the company's overall profit.

CONCEPT # 5: USES OF MARGINAL COSTING

Areas where marginal costing technique is used

Marginal costing helps the management in decision-making in respect of the following vital areas:

1) **Make or Buy decision:** The decision is to be taken whether to manufacture a product or component within the organization or buy it from outside supplier.
2) **Expand or contract:** When capacity is limited, additional machinery is acquired and component is produced, if it is cheaper compared to buying it from outside.
3) **Comparing machines and hand labour:** Products manufactured by hand labour max be cheaper. But, Machines may produce the products on a mass scale. Taking the interest as opportunity cost and depreciation into consideration, the total cost per unit of output may still be lower than that of the hand product. Then, installation of machines will be profitable. Likewise, decisions may be taken by the management.
4) **Replacement of existing machinery by new and improved ones:** The differential cost or savings in the cost and incremental revenue will play an important role in taking such decisions.
5) **Diversification of products:** management may think of introducing a product to utilizes the idle capacity or capture a new market provided it fetches the profit after meeting the variable cost and specific fixed costs, if any, relating to the new product.
6) **Product mix, profit planning and profit maximization:** A product which is incurring losses or having low P/V ratio is discontinued and another product with high P/V ratio is introduced so that such product-mix will improve the profitability. To achieve this objective, the factors such as, selling price, sale volume, cost control, product-mix, etc, are to be studied carefully and decision is to be taken.
7) **Price:** In order to earn foreign exchange and goodwill in the foreign market, any price over and above the marginal cost is generally accepted though it is very much lower than the indigenous prices.
8) **Suspending activities,** i.e. closing down the factory for a temporary period or to run the operations at a loss.
9) Determination of selling price, sales volume and desired profit.

10) Determination of optimum output level.

11) Decision making and profit maximization based on the key factor.

12) Cost control and to find out break even point.

CONCEPT # 6: LIMITATIONS OF MARGINAL COSTING

Following are the limitations of marginal costing:

1) **Difficulty in classifying fixed and variable cost** : It is difficult to classify exactly the expenses into fixed and variable cost category. Most of the expenses are neither totally variable nor wholly fixed.

2) **Scope for low profitability**: Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits.

3) **Faulty valuation**: Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position fixed overheads have to be included in work-in-progress.

4) **Unpredictable nature of Cost** : Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static throughout is not correct. Fixed cost may change from one period to another.

5) **Marginal costing ignores time factor and investment**: The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

CONCEPT # 7: CONTRIBUTION

From this approach, it is not possible to identify an amount of net profit per product, but it is possible to identify the amount of contribution per product towards fixed overheads and profits. The contribution is the difference between sales volume and the marginal cost of sales.

Contribution is a pool of amount from which total fixed costs will be deducted to arrive at the profit or loss.

CONCEPT # 8: CONTRIBUTION VS PROFIT

Contribution	Profit
Contribution is the difference between sales and variable cost.	Profit is the sales value less total cost.
It included fixed cost and profit C = F + P	It does not include fixed cost.
Contribution analysis requires knowledge of break-even concept.	It does not require any such concept.
If we divide fixed cost by contribution per unit, we get BEP in units.	If we divide profit by contribution per unit, we get MOS in units.
Contribution above BEP is profit.	Profit is expected only after covering variable cost and fixed cost

CONCEPT # 9: PROFIT VOLUME RATIO

The profit volume ratio (P/V Ratio) is the relationship between contribution and sales. It is also termed as contribution to sales ratio.

Significance of P/V Ratio:

- P/V Ratio is considered to be the basic indicator of the profitability of the business.
- The higher the PV Ratio, the better it is for a business. In the case of a firm enjoying steady business conditions over a period of years, the PV Ratio will also remain stable and steady.
- If PV Ratio is improved, it will result in better profits.

Improvement of P/V ratio:

- PV Ratio can be improved by the following means.
- By reducing the variable cost.
- By increasing the selling price.
- By increasing the share of products with higher P/V Ratio in the overall sales mix.

Uses of P/V ratio:

1) To compute the variable costs for any volume of sales.
2) To measure the efficiency or to choose a most profitable line. The overall profitability of the firm can be improved by increasing the sales/output of a product giving a higher P/V ratio.
3) To determine break-even point and the level of output required to earn a desired profit.
4) To decide more profitable sales-mix.

CONCEPT # 10: MARGIN OF SAFETY

Definition: Margin of Safety (MOS) is defined as **the excess of actual or projected sales over break-even sales** that can be expressed in monetary terms or units, or as a percentage of total sales.

The margin of Safety implies the sales point over and above the break-even point that results in profit. Break-even point (BEP), is the point wherein total cost and total revenue are at equilibrium and profit is zero. It can be calculated as:

Margin of Safety = Total Sales – Break even sales

Another way to calculate the margin of safety if to find out the difference between budgeted and break-even sales (in units) and then multiply the result by the contribution per unit. This is because, at BEP, fixed overheads are absorbed and any further contribution, will amount to profit. It can be computed as:

$$Margin\ of\ Safety\ = \frac{Profit}{PV/\ Ratio}$$

The Margin of Safety is vital to the company, as a reduced activity level, will lead to losses. The size of the margin of safety is an indicator of company's financial health, i.e. **low margin**

of safety represent high fixed overheads, and profits are not earned, until and unless the activity level so high that it covers fixed costs.

On the other hand, **high margin of safety represents that the break-even point is highly less than the actual sales**. Therefore, even if there is a decrease in sales, the business will be able to earn profits. So, the higher the margin, the greater are the chances to make profits or responsive to any sudden decline in company's revenue, thus reducing the risk of losses in business.

CONCEPT # 11: WAYS TO IMPROVE MARGIN OF SAFETY

- **Increase contribution per unit**: One of the most important ways to improve the margin of safety is to improve marginal contribution per unit, which is possible by increasing the selling price (if market conditions are favourable) and lowering the variable cost per unit of the product. Change in product mix can also help to improve contribution.
- **Lowering Break-even Output**: Margin of safety can be improved by lowering the break-even output, and this can only be possible if the fixed overheads are reduced.
- **Increasing sales volume**: The easiest technique to increase the margin of safety is to sell as much as the company can if there is underutilised capacity.

The **margin of Safety shows the amount by which drop in sales can be tolerated by the company before losses actually start incurring**. When the margin is high, decrease in sales will not influence the business profit, while when it is low, a slight decline in sales, abruptly affect the entire business.

CONCEPT # 12: BREAK-EVEN ANALYSIS

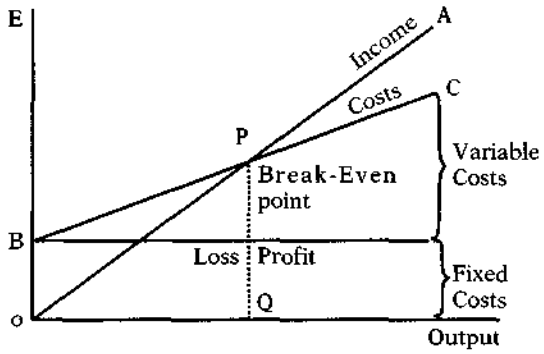
Definition: The **Break-Even Analysis** is a method adopted by the firms to determine that how much should be produced or sold at a minimum to ensure that the project does not lose money. Simply, the minimum quantity at which the loss can be avoided is called as a breakeven point. The Break Even Point can be calculated in rupee or units.

BEP (Rs.) = Fixed Cost / Contribution Margin Ratio

BEP (units) = Fixed Cost / Contribution per unit

CONCEPT # 13: BREAK-EVEN CHART

In its simplest form, the break-even chart is a graphical representation of costs at various levels of activity shown on the same chart as the variation of sales with the same variation in activity. The point at which neither profit nor loss is made is known as the "break-even point" and is represented on the chart below by the intersection of the two lines:

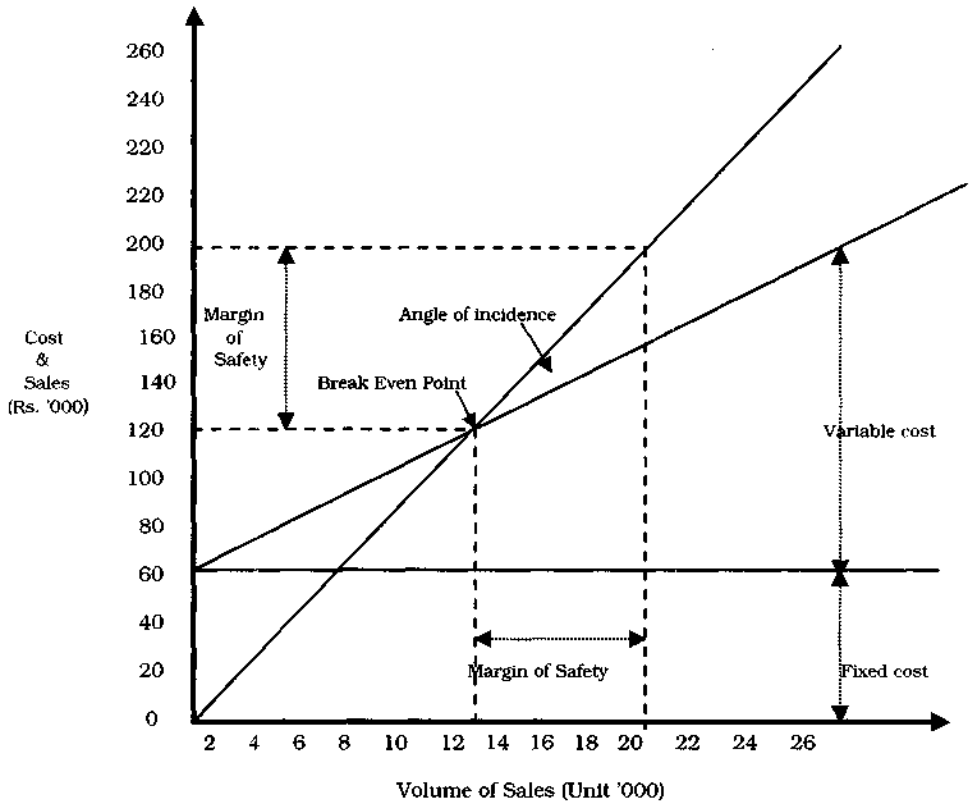


Cash Break Even Chart: In cash break-even chart, only cash fixed costs are considered. Noncash items like depreciation etc. are excluded from the fixed cost for computation of breakeven point. It depicts the level of output or sales at which the sales revenue will equal to total cash outflow. It is computed as under:

Cash BEP (Units) = Cash Fixed Cost/Contribution per unit

CONCEPT # 14: ANGLE OF INCIDENCE

It is the angle of intersection between the sales and the total cost lines. It indicates the profit earning capacity of the concern at a certain level of sales production. The larger the angle of incidence the more is the profit earning capacity and vice versa. It also provides an indication as to what extent the output and sales price may be varied to attain a desire level of profit. It gives an easy and clear idea to the profitability under different levels of activities and also for different product mix and is a simple visual aid to find out profit earning capacity without going in for any calculation.



CONCEPT # 15: RELATIONSHIP BETWEEN: ANGLE OF INCIDENCE, BREAK-EVEN LEVEL AND MARGIN OF SAFETY

Angle of Incidence: It is the angle of intersection between the sales and the total cost lines. It indicates the profit earning capacity of the concern at a certain level of sales production. The larger the angle of incidence the more is the profit earning capacity and vice versa. It also provides an indication as to what extent the output and sales price may be varied to attain a desire level of profit.

Break Even Level: It is that level of sales at which the sales revenue exactly equals total costs. In other words, it is level of activity at which the firm neither earns a profit nor suffers a loss.

Margin of Safety: It is the difference between actual sales and break-even sales. In other words margin of safety is the amount of sales above the break-even point.

Relationship between angle of incidence, break-even level and margin of safety:

1) If the break-even point is low and angle of incidence is large. The margin of safety is large and the business enjoys financial stability. A low break-even point indicates that the business could be run profitably even if there is a fall in sales, unless the sales are very low.
2) If the break-even point is low and angle of incidence is small, the conclusions are the same as in 1 above except that the rate of profit earning capacity is not so high as in 1.
3) If the break-even point is high and angle of incidence is small. The margin of safety is low. The business is very vulnerable, even a small reduction in activity may result in a loss.
4) If the break-even point is high and angle of incidence is large. This shows that the margin of safety is low. The business is likely to incur losses through a small reduction in activity. However, after the break-even point, the business makes the profit at a high rate.

CONCEPT # 16: LIMITATIONS OF BREAK EVEN CHART

The main limitations of break-even chart are as follows:

- The variable cost line need not necessarily be a straight line because of the possibility of operation of law of increasing costs or law of decreasing returns.
- The selling price will not be a constant factor. Any increase or decrease in output is likely to have an influence on the selling price.
- When a number of products are produced, separate break-even charts have to be drawn. This poses a problem of apportionment of fixed expenses to each product.
- Break-even charts ignore the capital employed in business which is one of the important guiding factor in the determination of profitability.
- The preparation of break-even chart presumes that costs can be reliably divided into fixed and variable component. This is very difficult in practice.

CONCEPT # 17: COST VOLUME PROFIT ANALYSIS

Definition: The cost volume profit analysis, commonly referred to as CVP, is a planning process that management uses to predict the future volume of activity, costs incurred, sales made, and profits received. In other words, it's a mathematical equation that computes how changes in costs and sales will affect income in future periods.

CONCEPT # 18: OBJECTIVES OF COST VOLUME PROFIT ANALYSIS

Cost-Volume-Profit analysis is analysis of three variables i.e. cost, volume and profit which explores the relationship existing amongst costs, revenue, activity levels and the resulting profit. It aims at measuring variations of profits and costs with volume, which is significant for business profit planning. CVP analysis makes use of principles of marginal costing. It is an important tool of planning for making short term decisions.

CVP Analysis has the following objectives:

1. It helps to forecast the profit fairly and accurately.
2. It acts as an effective tool of profit planning to the management.
3. It helps in ascertaining the BEP of the product produced and sold.
4. It is very much useful in setting up the flexible budget, which ascertains cost, profit and sales at different levels of activity.
5. It assists the management in the process of performance evaluation for the purpose of control.
6. It helps in formulating the price policies by projecting the effect of different price structures on the costs and profits.
7. It helps in determining the amount of overhead cost to be charged to the product at different levels of operation, as overhead rates are generally predetermined on the basis of a selected volume of production.

CONCEPT # 19: ASSUMPTIONS OF COST-VOLUME-PROFIT ANALYSIS

The following assumptions are made in BEP Analysis:

- All costs are divisible into fixed and variable.

- All fixed costs remain constant at all levels of output within the installed capacity.
- The variable costs vary along with production.
- The selling price is assumed to be constant.
- The volume of production influences the cost.
- There is synchronization between production and sales, which would help deciding the break-even point.

PRACTICAL PROBLEMS

BREAK EVEN/COST VOLUME PROFIT ANALYSIS

Problem No. 1]

Rama Ltd. is selling at present, 8,000 units of a product at a selling price of Rs.20 per unit. The variable cost is Rs.10 per unit and the fixed costs are Rs.60,000 per annum. The firm can use the BE equation to answer the questions namely:

(i) What is the BE sales level for the firm?

(ii) How many units the firm must sell to earn a profit of Rs.40,000.

(iii) What will be the profit if the fixed costs are reduced by Rs.10,000 and the variable costs are reduced by 10%.

(iv) What selling price will give a profit of Rs.40,000 at the sales of 8,000 units.

(v) How much extra sales must be made to meet the extra fixed cost of Rs.5,000.

Answer –

(i) 6,000 unit

(ii) 10,000 unit

(iii) ₹38000

(iv) ₹22.5

(v) 500 units

Problem No. 2]

Following information is submitted to you by XYZ Ltd.

	(Per unit)
	Rs.
Selling price	100
Direct material	40
Direct labour	20
Variable overhead	15
Annual fixed cost:	Rs. 2,00,000

No. of units produced & sold : 12,500

You are required to calculate:

1) Profit for the current year
2) P/V ratio
3) Break even point in value and in units
4) Margin of safety in value and in units

Ans.:

1) 1,12,500
2) 25%
3) Rs. 8,00,000 & 8000 units
4) Rs. 4,50,000 & 4500 units

Problem No. 3]

(a) Given the following, find the margin of safety sales:

(i) Profit earned Rs. 24,000
(ii) Selling price per unit Rs. 10
(iii) Marginal cost per unit Rs. 7

(b) Given the following, calculate P/V ratio and profit when sales are Rs. 20,000:

(i) Fixed cost Rs. 4,000.

(ii) Break-even point Rs. 10,000.

Ans.:

(a) Rs. 80,000 & 8000 units

(b) 40% & Rs. 4,000

Problem No. 4]

The profit volume ratio of X Ltd., is 40% and the margin of safety is also 40%. Work out the following if the sales volume is Rs. 1.50 crore:

(i) Break-even point

(ii) Net profit

(iii) Fixed cost

(iv) Sales required to earn a profit of Rs. 30 lakh.

Ans.:

1) **Rs. 90,00,000**
2) **Rs. 24,00,000**
3) **Rs. 36,00,000**
4) **Rs. 1,65,00,000**

Problem No. 5]

A company produces a single product and sells it at Rs. 200 each. The variable cost of the product is Rs. 120 per unit and the fixed cost for the year is Rs. 96,000.

Calculate:

(i) P/V ratio

(ii) Sales at break-even point

(iii) Sales units required to earn a target net profit of Rs. 1,20,000.

(iv) Sales units required to earn a target net profit of Rs. 1,00,000 after income tax, assuming income tax rate to be 50%.

(v) Profit at sales of Rs. 7,00,000

Ans.:

1) **40%**
2) **Rs. 2,40,000**
3) **2700 units**
4) **3700 units**
5) **Rs. 1,84,000**

Problem No. 6]

Dinesh Ltd. has provided following information:

Sales price	:	Rs. 20 per unit
Variable cost	:	Rs. 14 per unit
Fixed overheads	:	Rs. 7,92,000 p.a.

How many units must be sold to earn 10% on sales?

Ans.: 1,98,000 units

Problem No. 7]

The following data is obtained from the records of an industrial unit:

Sales of 4,000 units @ Rs. 25 each		1,00,000
Material consumed	40,000	
Variable overheads	10,000	
Labour charges	20,000	
Fixed overheads	18,000	88,000
Net Profit		12,000

You are required to calculate:

(i) The number of units by selling which the company will neither lose nor gain anything.

(ii) The sales needed to earn a profit of 20% on sales.

(iii) The extra units which should be sold to obtain the present profit if it is proposed to reduce the selling price by 20%

(iv) The selling price to be fixed to bring down its break-even point to 500 units under present conditions.

Ans.:

1) **2400 units**
2) **Rs. 1,80,000**
3) **8000 units**
4) **Rs. 53.5**

Problem No. 8]

An analysis of Matrix Ltd. reveals the following information

	Variable cost % of Sales	**Fixed cost Rs.**
Direct materials	32.8%	-
Direct labour	28.4%	-
Factory overheads	12.6%	1,89,900
Distribution overheads	4.1%	58,400
General administration overheads	1.1%	66,700

Budgeted sales are Rs. 18,50,000

You are required to determine:

(i) Break-even sales value.

(ii) Profit at the budgeted sales value

(iii) Profit, if actual sales

a) Drop by 10% and

b) Increase by 5% from the budgeted sales.

Ans.:

1) **Rs. 15,00,000**
2) **Rs. 73,500**
3) **(a) Rs. 34,650**
   (b) Rs. 92,925

Problem No. 91

Your company manufacturing a single product sells it at a price of Rs. 80 per unit. The variable cost per unit is Rs. 48 and the annual fixed cost amounts to Rs. 18 lakh. Based on these data, you are required to work out the following.

(i) Present P/V ratio and break-even sales.

(ii) Increase in the volume of sales required if the profit is sought to be increased by Rs. 3,60,000.

(iii) Percentage increase/decrease in sales volume:

a) to off-set an increase of Rs. 4 per unit in variable cost and

b) an increase in selling price by 10% without affecting the quantum of existing profit.

Ans. :

1) **40%, Rs. 45,00,000**
2) **Rs. 9,00,000**
3) **(a) 14.29%**
   (b) 20%

Problem No. 10]

	Sales (Rs.)	Profit (Rs.)
Period 1	10,000	2,000
Period 2	15,000	4,000

You are required to calculate:

a. P/V ratio

b. Fixed cost

c. Break-even sales volume

d. Sales to earn a profit of Rs. 3,000 and

e. Profit when sales are Rs. 8,000

Ans.:

(a) 40%

(b) Rs. 2,000

(c) Rs. 5,000

(d) Rs. 12,500

(e) Rs. 1,200

Problem No. 11]

The following costs of and sales of a manufacturing company for the first half and second half of 2006-2007 are given:

		(Rs.)
	First half	Second half
Sales	24,00,000	30,00,000
Total costs	21,80,000	26,00,000

You are asked to determine:

(i) Contribution/sales ratio of the firm

(ii) Annual fixed costs

(iii) Break-even point

(iv) Margin of safety as percentage of sales

Ans.:

(i) 30%

(ii) Rs. 10,00,000

(iii) Rs. 33,33,333

(iv) Rs. 20,66,667

Problem No. 12]

A company has two plants at Locations I and II, operating at 100% and 75% of their capacities respectively. The company is considering a proposal to merge the two plants at one location to optimize available capacity. The following details are available in respect of the two plants, regarding their present performance/operations:

	Location I	**Location II**
Sales	200	75
Variable cost	140	54
Fixed cost	30	14

For decision making purposes you are required to work out the following information:

a. The capacity at which the merged plant will break-even.

b. The profit of the merged plant working at 80% capacity.

c. Sales required if the merged plant is required to earn an overall profit of Rs. 22 lakhs.

Ans.:

(a) Rs. 150L

(b) Rs. 26.4L

(c) Rs. 225L

Problem No. 13]

Two plants manufacturing the same product decide to merge. Particulars of operation of the two plants before the merger were as follows:

	Plant A	**Plant B**
Capacity utilized	80%	60%
Sales	Rs. 4.80 Crores	Rs. 2.40 Crores
Variable cost	3.52 Crores	1.80 Crores
Fixed cost	0.80 Crores	0.40 Crores

You are required to work out:

(i) Break even capacity of the merged plant.

(ii) Profit earned at 75% capacity of the merged plant.

(iii) Sales required to earn a profit or Rs. one crore.

Ans.:

(i) 4.61538 crore

(ii) .75 crore

(iii) Rs. 8.46154 crore

Problem No. 14]

Two manufacturing companies which have the following operating details decided to merge:

	Company-I	**Company-II**
Capacity utilization (%)	90	60
Sales (Rs. in lakhs)	540	300
Variable costs (Rs. in lakhs)	396	225
Fixed costs (Rs. in lakhs)	80	50

Assuming that the proposal is implemented, calculate:

(i) Break-even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales turnover of the merged plant to earn a profit of Rs. 75 lakh.

(iv) When the merged plant is working at a capacity to earn a profit of Rs. 75 lakh, what percentage increase in selling price is required to sustain an increase of 5% in fixed overheads?

Ans.:

(i) 501.75L , 45.61%

(ii) Rs. 98L

(iii) Rs. 791.23L

(iv) .8215%

Problem No. 15]

A company has annual fixed cost of Rs. 1,40,00,000. In the year 2007-2008, sales amounted to Rs. 6,00,00,000 as compared with Rs. 4,50,00,000 in the preceding year. Profit in 2007-2008 is Rs. 42,00,000 more than that in 2006-2007. On the basis of the above information, answer the following:

(i) At what level of sales, the company would have break even?

(ii) Determine profit/loss on a forecasted sales volume of Rs. 8,00,00,000.

Ans.:

(i) Rs. 5,00,00,000

(ii) Rs. 84,00,000