



**Dr. B.R. AMBEDKAR
OPEN UNIVERSITY**

**MBA-7
Financial
Management**

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BLOCK 1 INTRODUCTION TO FINANCIAL MANAGEMENT

The objective of this block is to introduce you to the basics of Financial Management. This block helps you to understand the importance and functions of Financial Management. This block has three units.

The first unit explains the objective, importance and role of Financial Management. The finance functions are explained in detail.

The second unit discusses the financial needs of an organisation. The methods of raising finance to meet short term and long-term needs has been analysed in detail.

The third unit concentrates on capital markets, specialised financial institutions and their role in the supply of finance. Lease financing and foreign sources are also elaborately discussed.

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UNIT 1 FINANCIAL MANAGEMENT : AN OVERVIEW

Objectives :

After going through this unit, you should be able to understand the :

- * meaning, objectives and scope of Financial Management
- * major decisions involved in Finance Function
- * structure and organisation of Finance Department

Structure :

- 1.1 Introduction
- 1.2 Financial Management - Meaning and Importance
- 1.3 Scope of Financial Management
- 1.4 Objectives of Financial Management
- 1.5 Finance Functions
- 1.6 Organisation of Finance Department
- 1.7 Summary
- 1.8 Self-Assessment Exercises
- 1.9 Further Readings

1.1 INTRODUCTION

Finance is regarded as the life blood of a business enterprise. It is the guide for regularising investment decisions and expenditure, and endeavours to squeeze the most out of every available rupee. It is the sinew of a business activity. No business activity can ever be pursued without financial support. Production and distribution of goods and services in fact, will be a mere dream without flow of funds. Financial viability is perhaps the central theme of any business proposition. That's why, it has been rightly said that business needs money to make more money. However, it is also true that money begets more money only when it is properly managed. Hence, efficient management of every business enterprise is closely linked with efficient management of its finances.

1.2 FINANCIAL MANAGEMENT - MEANING AND IMPORTANCE

Financial management involves the management of finance function. It is concerned with the planning, organising, directing and controlling the financial activities of an enterprise. It deals mainly with raising funds in the most economic and suitable manner; using these funds as profitably as possible; planning future operations; and controlling current performance and future developments through financial accounting, cost accounting, budgeting, statistics and other means. It is continuously concerned with achieving an adequate rate of return on investment, as this is necessary for survival and the attracting of new capital. Thus, financial management means the entire gamut of managerial efforts devoted to the management of finance - both its sources and uses - of the enterprise.

The importance of financial management cannot be over emphasised. In every organisation, where funds are involved, sound financial management is necessary. It helps in monitoring the effective deployment of funds in fixed assets and in working capital. As Collins Brooks has remarked "Bad production management and bad sales management have slain in hundreds, but faulty financial management has slain in thousands".

Hence, it can be said that sound financial management is indispensable for any organisation, whether it is profit oriented or non-profit oriented. It helps in profit planning, capital spending, measuring costs, controlling inventories, accounts receivable etc., In addition to the routine problems, financial management also deals with more complex problems like mergers, acquisitions and reorganisations.

1.3 SCOPE OF FINANCIAL MANAGEMENT

Financial management has undergone significant changes over the years as regards its scope and coverage. As such the role of finance manager has also undergone fundamental changes over the years. In order to have a better exposition to these changes, it will be appropriate to study both the traditional concept and the modern concept of the finance function.

Traditional Concept :

In the beginning of the present century, which was the starting point for the scholarly writings on Corporation Finance, the function of finance was considered to be the task of providing funds needed by the enterprise on terms that are most favourable to the operations of the enterprise. The traditional scholars are of the view that the quantum and pattern of finance requirements and allocation of funds as among different assets, is the concern of non-financial executives. According to them, the finance manager has to undertake the following three functions :

- i) arrangement of funds from financial institutions;
- ii) arrangement of funds through financial instruments, viz., shares, bonds, etc.
- iii) looking after the legal and accounting relationship between a corporation and its sources of funds.

The traditional concept found its first manifestation, though not systematically, in 1897 in the book 'Corporation Finance' written by Thomas Greene. It was given further impetus by Edward Meade in 1910 in his book, 'Corporation Finance'. Later, in 1919, Arthur Dewing brought a classical book on finance entitled "The Financial Policy of Corporation."

The traditional concept evolved during 1920s continued to dominate academic thinking during the forties and through the early fifties. However, in the later fifties the traditional concept was criticised by many scholars including James C. Van Horne, Pearson Hunt, Charles W. Gerstenberg and Edmonds Earle Lincoln due to the following reasons :

1. The emphasis in the traditional concept is on raising of funds. This concept takes into account only the investor's point of view and not the finance manager's view point.
2. The traditional approach is circumscribed to the episodic financing function as it places overemphasis on topics like types of securities, promotion, incorporation, liquidation, merger, etc.
3. The traditional approach places great emphasis on the long-term problems and ignores the importance of the working capital management.
4. The concept confined financial management to issues involving procurement of funds. It didnot emphasise on allocation of funds.
5. It blind eye towards the problems of financing non-corporate enterprises has yet been another criticism.

In the absence of the coverage of these crucial aspects, the traditional concept implied a very narrow scope for financial management. The modern concept provides a solution to these shortcomings.

Modern Concept :

The traditional concept outlived its utility due to changed business situations since mid-1950's. Technological improvements, widened marketing operations, development of a strong corporate structure, keen and healthy business competition - all made it imperative for the management to make optimum use of available financial resources for continued survival of the firm.

The financial experts today are of the view that finance is an integral part of the overall management rather than mere mobilisation of the funds. The finance manager, under this concept, has to see that the company maintains sufficient funds to carry out the plans. At the same time, he has also to ensure a wise application of funds in the productive purposes. Thus, the present day finance manager is required to consider all the financial activities of planning, organising, raising, allocating and controlling of funds. In addition, the development of a number of decision making and control techniques, and the advent of computers, facilitated to implement a system of optimum allocation of the firm's resources.

These environmental changes enlarged the scope of finance function. The concept of managing a firm as a system emerged and external factors now no longer could be evaluated in isolation. Decision to arrange funds was to be seen in consonance with their efficient and effective use. This systems approach to the study of finance is being termed as 'Financial Management'. The term 'Corporation Finance' which was used in the traditional concept was replaced by the present term 'Financial Management.'

The modern approach view the term financial management in a broad sense and provides a conceptual and analytical framework for financial decision-making. According to it, the finance function covers both acquisition of funds as well as their allocation.

1.4 OBJECTIVES OF FINANCIAL MANAGEMENT

Financial management, as an academic discipline, is concerned with decision-making in regard to the size and composition of assets and structure of financing. To make wise decisions, a clear understanding of the objectives which are sought to be achieved is necessary. The objectives provides a framework for optimum financial decision making. Let us now review the well known and widely discussed approaches available in financial literature viz., (a) Profit Maximisation and (b) Wealth Maximisation.

Profit Maximisation:

According to this approach, actions that increase profits should only be undertaken. Here, the term "Profit" can be used in two senses : (1) As owner - oriented concept it refers to the amount and share of national income which is paid to the owners of business, i.e., those who supply equity capital; (2) A variants for the term is profitability. It is an operational concept and signifies economic efficiency. In other words, profitability refers to a situation where output exceeds input, i.e., the value created by the use of resources is more than the total of the input resources. Used in this sense, profitability maximisation would imply that a firm should be guided in financial decision-making by one test - select assets, projects and decisions which are profitable and reject those which are not. In the current financial literature, there is a general agreement that profit maximisation is used in this sense.

The profit maximisation theory is based on the following important assumptions:

- (a) This theory is based purely on the rationality of the individuals and the firms.

- (b) It promotes the use of resources to the best of their advantage of gain maximum out of them.
- (c) It leads to the economic selection of the resources.
- (d) It enhances the National Income of the country through efficient and increased production.

However, the profit maximisation objective has been criticised in recent past. It is argued that profit maximisation is a consequence of perfect competition and in the context of today's imperfect competition, it cannot be taken as a legitimate objective of the firm. It is also argued that profit maximisation, as a business objective, developed in the early 19th century when the characteristic features of the business structure were self-financing, private property and single entrepreneurship. The only aim of the enterprises at that time was to enhance the individual wealth and personal power, which could easily be satisfied by the profit maximisation objective. The formation of joint stock companies resulted in the divorce between management and ownership. The business firm today is financed by owners - the holders of its equity capital and outsiders (creditors) and controlled and directed by professional managers. The other interested parties connected with the business firm are customers, employees, government and society. In this changed business structure, the owner-management of the 19th century has been replaced by professional manager who has to reconcile the conflicting objectives of all the parties connected with the business firm. In this new business environment, profit maximisation is regarded as unrealistic, difficult, inappropriate and immoral.

Apart from the aforesaid objections, the other important technical flaws of this criterion are :

- a. There is a lack of unanimity regarding the concept of profit. There are various terms such as gross profit, net profit, earnings per shares, short-term profit and long-term profit.
- b. Profits while enhancing the national income, may not contribute to the welfare of the poor, because they may lead to concentration of income and wealth.
- c. The assumptions on which it is based are untenable. There exists no perfect competition in the market. Similarly, all countries do not favour the idea of free enterprises economy. There exists certain controls, which will limit the profit maximising capacity of the undertakings.
- d. This theory is also criticised for ignoring the timing of returns and risk. It does not take the returns in terms of their present values.
- e. More so, the term profit is viewed with contempt. Every section of the society feels that they are fleeced by the enterprises. For example, consumers may feel that they are charged high prices.

Hence, the profit maximisation has lost its relevance in the present day circumstances. Many financial experts like Van Horne, Weston and Brigham, Pondy, Gitman, Kuchhal, Khan, and Prasanna Chandra are now advocating for the maximisation of wealth as the objective of the firm.

Wealth Maximisation :

This approach is also known as Value Maximisation or Net Present Wealth Maximisation. Wealth maximisation means maximising the net present value (NPV) of a course of action. The NPV of a course of action is the difference between the gross present value (GPV) of the benefits of that action and the amount of investment required to achieve those benefits. The GPV of a course of action is found out

by discounting or capitalising its benefits at a rate which reflects their timing and uncertainty. A financial action which has a positive NPV creates wealth and therefore, is desirable. A financial action resulting in negative NPV should be rejected. Between a number of desirable mutually exclusive projects, the one with the highest NPV should be adopted. The wealth or NPV of the firm will be maximised if this criterion is followed in making financial decisions.

According to Ezra Solomon, the Wealth Maximisation Approach provides an unambiguous measure of what financial management should seek to maximise in making investment and financing decisions. Using Solomon's symbols and methods, the NPV can be calculated as shown below :

i) $W = V - C$

Where W = Net Present wealth

V = Gross Present Wealth

C = Investment required to acquire the asset.

ii) $V = \frac{E}{K}$

Where E = Size of future benefits available to the suppliers of the input capital.

K = The capitalisation (discount) rate reflecting the quality (certainty/uncertainty) and timing of benefits attached to E.

iii) $E = G - (M+I+T)$

Where G = Average future flow of Gross Annual Earnings expected from the course of action, before providing for maintenance charges, taxes and interest and other prior charges like preference dividend.

M = Average annual re-investment required to maintain G at the protected level.

I = Expected flow of annual payments on account of interest, preference dividends and other prior financial charges.

T = Expected annual outflow on account of taxes.

The operational objective of financial management is the maximisation of 'W'. Alternatively 'W' can be expressed symbolically by a short-cut method:

$$W = \frac{A_1}{(1+k)^1} + \frac{A_2}{(1+k)^2} + \dots + \frac{A_n}{(1+k)^n} - C$$

Where W = Net Present Wealth

A_1, A_2, A_n = Stream of cash flows expected to occur from a course of action over a period of time.

K = Appropriate discount rate to measure risk and timing

C = Initial outlay to acquire that asset or pursue the course of action.

From the above, it is clear that the wealth maximisation criterion is based on the concept of cash flows generated by the decision rather than accounting profit which is the basis of the measurement of benefits in the case of profit maximisation criterion. In addition to this, wealth maximisation criterion consider both the quantity and quality dimensions of benefits.

The wealth maximisation objective is consistent with the objective of maximising the owners' economic welfare. Maximising the economic welfare of owners is equivalent to maximising the utility of their consumption over time. With this wealth maximisation, owners can adjust their funds flow in such a way as to optimise their consumption. The wealth of owners of a company the shareholders is reflected by the market value

of the company's shares. Therefore, the wealth maximisation principle implies that the fundamental objective of a firm should be to maximise the market value of its shares.

The objective of shareholders' wealth maximisation has a number of distinct advantages. It is conceptually possible to determine whether a particular financial decision is consistent with this objective or not. If a decision made by a firm has the effect of increasing the long-term market price of the firm's stock then it is a good decision. If it appears that certain action will not achieve this result then the action should not be taken. The wealth maximisation objective is acceptable as an operationally feasible criterion to guide financial decisions only when it is consistent with the interests of all those groups such as shareholders, creditors, employees, management and the society.

From the above discussion, it can be said that wealth maximisation is the most appropriate and operationally feasible decision criterion for financial management decisions. But, wealth maximisation cannot be achieved by overnight. It takes years of sustained hardwork, combined with patience and perseverance. In the opinion of N.J. Yasaswy even as companies vigorously pursue to maximise their wealth in the long-run, in the short-run they have to focus on four important objectives, viz., Survival, Cash Flow, Break-Even Point and Minimum Profits.

Activity A

List out the reasons for the superiority of the wealth maximisation objective over the profit maximisation objective.

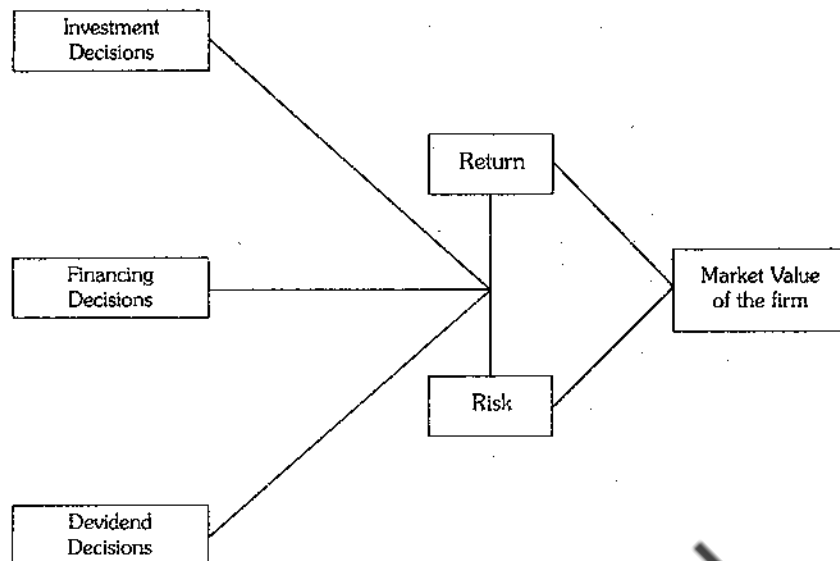
1.5 FINANCE FUNCTIONS

The finance functions are always regarded as important aspects in the management of business enterprise. Irrespective of any difference in structure, ownership and size, the financial organisation of the enterprise ought to be capable of ensuring that the various finance functions - planning and controlling are carried at the highest degree of efficiency. The profitability and stability of the business depends upon the manner in which the finance functions are performed and related with other business functions.

The finance function mainly deals with the following three decisions :

1. Investment Decision.
2. Financing Decision.
3. Dividend Decision.

Each of these functions must be considered in relation to the objective of the firm. The optimal combination of these finance functions will maximise the value of the firm to its shareholders. Fig. 1.1 given below, clearly depicts how the decisions relating to three finance functions lead to the maximisation of the market value of the firm.



1. Investment Decision :

The investment decision relates to the selection of assets in which funds will be invested by a firm. The assets which can be acquired fall into two broad groups: (i) long-term assets which will yield a return over a period of time in future, (ii) short-term or current assets defined as those assets which are convertible into cash usually within a year. Accordingly, the asset selection decision of a firm is of two types. The first of these involving fixed assets is popularly known as 'Capital Budgeting'. The aspect of financial decision-making with reference to current assets or short-term assets is designated as 'Working Capital Management.'

Capital Budgeting : Capital budgeting refers to the decision making process by which a firm evaluates the purchase of major fixed assets, including buildings, machinery and equipment. It deals exclusively with major investment proposals which are essentially long-term projects. It is concerned with the allocation of firm's scarce financial resources among the available market opportunities. It is a many-sided activity which includes a search for new and more profitable investment proposals and the making of an economic analysis to determine the profit potential of each investment proposal.

Capital Budgeting involves a long-term planning for making and financing proposed capital outlays. Most expenditures for long-lived assets affect a firm's operations over a period of years. They are large and permanent commitments, which influence firm's long-run flexibility and earning power. It is a process by which available cash and credit resources are allocated among competitive long-term investment opportunities so as to promote the highest profitability of company over a period of time. It refers to the total process of generating, evaluating, selecting and following up on capital expenditure alternatives. Capital budgeting decision, thus, may be defined as the firm's decision to invest its current funds most efficiently in long term activities in anticipation

of an expected flow of future benefits over a series of years.

Because of the uncertain future, capital budgeting decision involves risk. The investment proposals should, therefore, be evaluated in terms of both expected return and the risk associated with the return. Besides a decision to commit funds in new investment proposals, capital budgeting also involves the question of recommitting funds when an old asset becomes non-profitable. The other major aspect of capital budgeting theory relates to the selection of a standard or hurdle rate against which the expected return of new investment can be assessed.

Working Capital Management : Working Capital Management is concerned with the management of the current assets. The finance manager should manage the current assets efficiently for safe-guarding the firm against the dangers of illiquidity and insolvency. Involvement of funds in current assets reduces the profitability of the firm. But the finance manager should also equally look after the current financial needs of the firm to maintain optimum production. Thus, a conflict exists between profitability and liquidity while managing the current assets. As such, the finance manager must try to achieve a proper trade-off between profitability and liquidity.

Another aspect to which the finance manager of a company has to pay attention is maintenance of a sound working capital position. He often times confronted with excess and shortages of working capital. While an excessive working capital leads to unremunerative use of scarce funds; inadequate working capital interrupts the smooth flow of business activity and impairs profitability. History is replete with instances where paucity of working capital has posed to be the major contributing factor for business failures. Nothing can be more frustrating for the operating managers of an enterprise than being compelled to function in a continuing atmosphere of lack of availability of funds to meet their important and urgent operating needs.

Not only the inadequacy of working capital poses a threat to the finance manager, but also its abundance. Availability of more than required amount of funds causes an unchecked accumulation of inventories. Further, there may be a tendency to grant more and more credit without properly looking into the credentials of the customers. Moreover, idle cash earns nothing and it is unwise to keep large quantities of cash with the firm. Thus, the need to have adequate working capital in a firm need not be overemphasized.

Financing Decision :

In this function, the finance manager has to estimate carefully the total funds required by the enterprise, after taking into account both the fixed and working capital requirements. In this context, the financial manager is required to determine the best financing mix or capital structure of the firm. Then, he must decide when, where and how to acquire funds to meet the firm's investment needs.

The central issue before the finance manager is to determine the proportion of equity capital and debt capital. He must strive to obtain the best financing mix or optimum capital structure for his firm. The use of debt capital affects the return and risk of shareholders. The return on equity will increase, but also the risk. A proper balance will have to be struck between return and risk. When the shareholders return is maximised with minimum risk, the market value per share will be maximised and firm's capital structure would be optimum. Once the financial manager is able to determine the best combination of debt and equity, he must raise the appropriate amount through best available sources.

The following points are to be considered while determining the appropriate capital

structure of a firm :

1. Factors which have bearing on the capital structure.
2. Relationship between earnings before interest and taxes (EBIT) and earnings per share (EPS).
3. Relationship between return on investment (ROI) and return on equity (ROE).
4. Debt capacity of the firm.
5. Capital structure policies in practice.

3. Dividend Decision :

It is a fact that inspite of the various other factors which influence the market value of shares, dividend payment has been considered to be the foremost. In this context, the finance manager must decide whether the firm should distribute all profits or retain them, or distribute a portion and retain the balance. Sometimes, the profits of the company are fully diverted towards its capital expenditure or establishment of new projects so as to minimise further borrowings. While there may be some justification in diverting profits to some extent, the claims of shareholders for dividends cannot be completely overlooked.

The finance manager has to develop such a dividend policy which divides the net earnings into dividends and retained earnings in an optimum way to achieve the objective of maximising the market value of firm. He should also concentrate his attention on issues like the stability of dividend, bonus shares etc.

Activity B

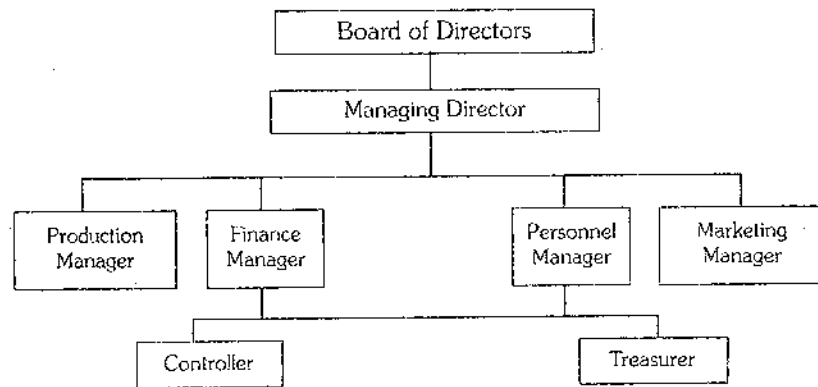
List out the finance functions. State the various factors to be considered in taking decisions relating to the investment in fixed assets.

1.6 ORGANISATION OF FINANCE DEPARTMENT

A well-organised finance department is absolutely essential for the efficient financial management of an enterprise. If finance department does not operate well, the whole organisational activity will be ruined. Hence, it is essential that the finance department should be well organised with nucleus staff from the time of project stage, so that expert guidance and advice regarding the various proposals are available to the management in planning and managing the project.

The finance function, although, is controlled by the top management, there will be a separate team to look after these activities and this function will be sub-divided according to the needs. A common structure of the finance department cannot be evolved as the size of the firm and nature of the business vary, from firm to firm.

A self-explanatory organisation structure of finance department in a large organisation is given below :



- | | Functions : | | Functions: |
|-----|------------------------|----|------------------------|
| 1. | Accounting | 1. | To look after cash and |
| 2. | Cost Accounts | | Bank Accounts |
| 3. | Budgeting | 2. | Investments |
| 4. | Internal Audit | 3. | Tax Matters |
| 5. | Creditors & Collection | 4. | Credit and Collection |
| 6. | Finance Planning | 5. | Insurance |
| 7. | Profit Planning | 6. | Investor Relations |
| 8. | Investment Decisions | | |
| 9. | Protection of Assets | | |
| 10. | Economic Appraisal | | |

The financial activities of an enterprise may be broadly divided into two categories. They are :

- (1) Routine financial matters or day to day financial transactions like custody of cash and bank accounts, collection of loans, payments of cash for transactions etc.
- (2) Special financial functions like (a) Financial Planning and budgeting, (b) Profit analysis, (c) Investment decision, (d) Financial Accounting, (e) Cost Accounting, (f) Internal audit.

The routine matters are, generally, looked after by the Treasurer and special matters by the Controller.

Role of Finance Manager :

The finance manager, who is mainly responsible for managing the finances of a firm, plays a dynamic role in the development of a modern organisation. For the effective conduct of finance function he is responsible for assisting the managers and supervisors in carrying out these activities and for ensuring that their line instructions confirm to the relevant specialist policy. The Finance Manager besides supervising the routine functioning of his department, also keeps the Board of Directors informed on all phases of business activity, including the economic, technological, social, cultural, political and legal environment effecting business behaviour.

The finance manager generally holds one of the senior-most positions in the company, directly reporting to the Managing Director. He is primarily responsible for the entire cost, finance, accounting and taxation departments in addition to the overall administration and secretarial departments. The functions and responsibilities of the finance manager of a company generally include the following :

- i) To determine the extent of financial resources needed, and the way these

needs are to be met;

- ii) To formulate programmes to provide most effective profit volume-cost relationship;
- iii) To analyse financial results of all operations, reporting the fact to the top management and make recommendations concerning future operations;
- iv) To carry out special studies with a view to reducing costs and improving efficiency and profitability;
- v) To examine feasibility studies and detailed project reports mainly from the point of view of overall economic viability of the project;
- vi) To be the principal co-ordinating officer for preparing and operating long-term, annual and capital budgets;
- vii) To lay down suitable purchase procedures to ensure adequate control over all purchases of raw material and equipments, etc.,
- viii) To advise the chief executive on pricing, policies, interdepartmental issues including charging of overheads to jobs, etc;
- ix) To advise on all service matters to staff, such as scale of pay, dearness allowance, bonus, gratuity etc.;
- x) To act as principal officer in-charge of accounts, including cost and stores accounts and internal audit;
- xi) To ensure that annual accounts are prepared in time according to the provisions of the Company Law, and to attend to external audit;
- xii) To be the custodian of the cash and the principal disbursing officer of the enterprise;
- xiii) To be responsible for attending to all tax matters;
- xiv) To ensure that market surveys are carried out by the management;
- xv) To furnish prospective costs of products, to enable the management to determine the optimum product mix; and
- xvi) To prepare various periodic reports to be submitted to various authorities including financial institutions, government.

Activity C

Draw the Organisation chart of the Finance Department of your Organisation or the Organisation with which you are familiar.

1.7 SUMMARY

The subject 'financial management' has undergone many changes due to the continuous work by the researchers in Western Countries as well as in India. The traditional concept of 'Corporation Finance' of 19th century, which considered the provision of funds needed by the enterprise as the main function of the finance manager, was replaced by the modern concept which treats finance as an integral part of the overall management rather than mere mobilisation of the funds. In the present day business environment, the wealth maximisation objective is considered as superior and more relevant to the business enterprises, since the profit maximisation is not an operationally feasible criterion. The finance manager should strive to bring the optimal

combination of the finance functions, viz., investment, financing and dividend, so as to maximise the market value of the firm. To carryout the objective of the finance function a well-organised finance department with nucleus staff is absolutely essential.

1.8 SELF-ASSESSMENT EXERCISES

1. Trace out the origin and development of the subject financial management.
2. The profit maximisation is not an operationally feasible criterion. Do you agree? State your views.
3. What is finance function? Discuss various types of decisions to be taken by the finance manager in the maximisation of market value of the firm.
4. Discuss the role of a finance manager in the modern business organisations.
5. Discuss the problems of a finance manager in the management of finance functions in the Indian context.

1.9 FURTHER READINGS

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UNIT 2 METHODS OF RAISING FINANCE

Objectives

The objectives of this unit are:

- To familiar you with the financial needs of a firm.
- To highlight the financing pattern of working capital needs.
- To discuss the methods of raising short-term finance.
- To discuss the methods of raising long-term finance.

Structure

- 2.1 Introduction
- 2.2 Types of financial needs
- 2.3 Financing pattern of working capital
- 2.4 Methods of raising short-term finance
- 2.5 Methods of raising long-term finance
- 2.6 Summary
- 2.7 Key words
- 2.8 Self-assessment questions
- 2.9 Further readings

2.1 INTRODUCTION

Finance is the process of conversion of accumulated funds for productive use. Every business establishment, needs finance irrespective of its size nature and volume. Financing decision involves the most important and complex areas of functional management. Effective management of financial matters is indispensable to every firm. The finance manager, in order to maximise the wealth of the firm, faces the real challenge for the procurement of necessary funds from the right source and also their effective utilisation in business. This unit deals with the raising of funds aspect only.

2.2 TYPES OF FINANCIAL NEEDS

The need for finance arises in order to fulfill two basic objectives - (i) to set up a manufacturing facility. i.e., to acquire land, buildings, plant and equipments etc., collectively known as fixed assets and (ii) to purchase adequate inventories comprising of raw-materials, stock in progress and finished goods; to retain sufficient cash; and to extend credit to customers; collectively called as current assets. Thus, broadly speaking, a firm needs finance to meet its fixed capital requirements as well as working capital need. These requirements are met from two distinct and major sources of finance : long-term and short-term.

Fixed capital

Fixed capital refers to that part of the total capital of a firm which is represented by investment in fixed assets like land, building, plant, machinery etc. It may also be defined as the investments in durable instruments of production and of goods in use which are only capable of giving up gradually the full yield of use or enjoyment.

Working capital

Generally there are two concepts of working capital, namely, gross working capital and net working capital. While gross concept of working capital refers to the firm's investment in current assets, the net concept refers to the difference between the current assets and current liabilities of the firm. Current assets include inventories, trade debtors, short term loans, advances and investments, cash and bank balances. Similarly, current liabilities include sundry creditors, trade advances, bank short-term borrowings and current provisions.

Long-term finance

The requirements for long-term finance arises to purchase fixed assets and to meet the permanent part of the working capital requirements. These funds are required not only for establishing a new enterprise but also for expanding, diversifying and keeping intact the existing enterprise.

The use of long-term funds in the business involves scientific decision regarding two major aspects : (i) determining the size or amount of long-term funds required and (ii) selecting the appropriate sources. Generally the size of long-term funds requirement depends upon the size of the business, i.e., whether industrial, commercial or service. Similarly the composition of long-term funds refer to the capital structure of a firm and is nothing but a judicious mix of debt and equity.

Broadly speaking there are three fundamental pattern of capital structure:

- (i) Financing of capital requirements exclusively by equity;
- (ii) Financing of capital requirements by equity and preferred stocks; and
- (iii) Financing of capital requirements by equity, preferred stocks, bonds and debentures.

A prudent financial manager tries to make an optimum utilisation of different sources of funds and hence the third technique of financing long-term requirements is very popular.

Short-term finance

By convention all sources of financing that must be repaid within one year are considered to be short-term. Short-term financial decisions are generally concerned with short-lived assets and liabilities. A financial manager responsible for short-term financial decision does not have to look far into the future.

Raising short-term finance for a firm involves two main issues : (i) deciding the amount of short-term finance, (ii) selecting the appropriate sources. While determination of the amount of the short-term finance is guided by the principle of "self-liquidating debt" or principle of 'hedging'; the selection of short-term source is governed by (a) the effective cost of credit, (b) the availability of credit and (c) the influence of the use of a particular credit source on the cost and availability of other sources.

2.3. FINANCING PATTERN OF WORKING CAPITAL

So far as the gross concept of working capital is concerned, working capital refers to the current assets of a firm. Hence financing working capital obviously means financing the current assets of the firm.

To finance its current assets, a firm can adopt three different financing policies, viz., (i) long-term financing or permanent sources of financing; (ii) short-term financing

or temporary sources of financing and (iii) spontaneous sources of financing.

The important sources of long-term financing are : ordinary shares, preference shares, long-term debts, debentures and retained earnings. Similarly, short-term sources of financing include - unsecured bank loans, commercial papers, factoring and secured loans etc. Spontaneous financing refers to the automatic sources of short-term funds such as trade credits, i.e., creditors and bills payable.

Since spontaneous sources of finance are cost-free and arise automatically in the firm's day-to-day operation, every firm would like to finance its current assets from these sources to the maximum extent possible. When the spontaneous sources of finance is insufficient or otherwise is fully exhausted, then the choice left is certainly in between the long-term and the short-term sources of finance. However, to have a better insight into the financing mechanism of current assets, the following three approaches may be carefully studied :

- (i) Matching approach;
- (ii) Conservative approach; and
- (iii) Aggressive approach.

Matching approach (or hedging approach)

The firm can adopt a financial plan which involves the matching of the expected life of assets with the expected life of the source of funds raised to finance assets. For example, a 10-years loan may be raised to finance a plant with an expected life period of 10 years, stock to be in 30 days may be financed with a 30 days bank loan, and so on.

The justification for the exact matching is that since the purpose of financing is to pay for assets, the financing should be relinquished when the asset is expected to relinquish. Using long-term financing for short-term assets is expensive as the funds will not be utilised for the full period. Similarly, financing long-term assets with short-term financing is costly as well as inconvenient as arrangement for the new short-term financing will have to be made on a continuing basis.

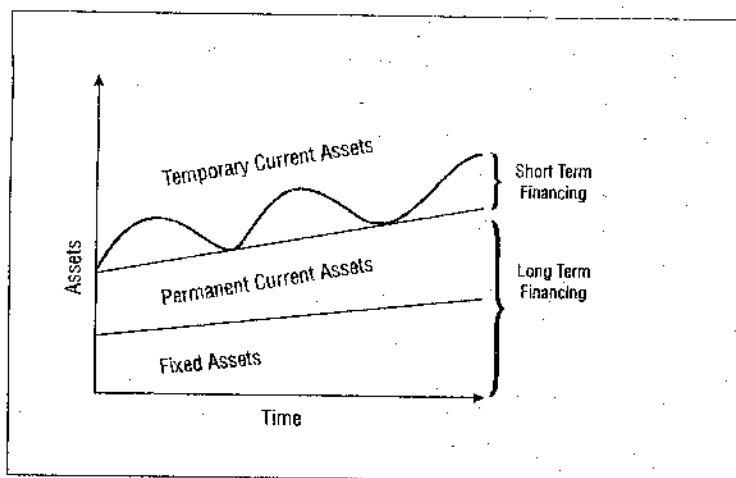


Fig - 1 Financing Under Matching Approach

Thus, when the firm following matching approach long-term financing is used to finance fixed assets and permanent part of current assets and short-term financing is used to finance temporary current assets. A perfect matching is however not always possible due to several reasons.

Conservative approach

The financing policy of the firm is said to be conservative when the firm depends more on long-term funds for its financing needs. Under the conservative approach thus the firm finances its permanent assets and a part of the temporary current assets with long-term financing. When the firm has no temporary current assets, it stores liquidity by investing surplus funds into marketable securities. Fig. 2 represents the conservative financing policy of the firm, where the funds required for 'X' and 'Y', both representing temporary current assets, can be invested in marketable securities. As the conservative approach depends heavily on long-term financing, it is less risky.

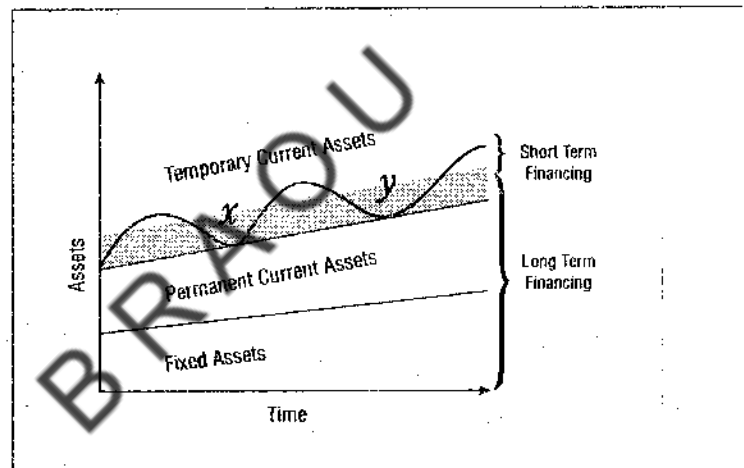


Fig - 2 Financing Under Conservative Approach

Aggressive approach

A firm may be aggressive in financing its assets. An aggressive policy has been referred to a situation where a firm uses more short-term financing for current assets. An aggressive firm finances a part of its permanent current assets with short-term financing. Some extremely aggressive firm also finance a part of their fixed assets from short-term sources. This aggressive activity makes a firm more risky. The aggressive approach is depicted in Fig. 3.

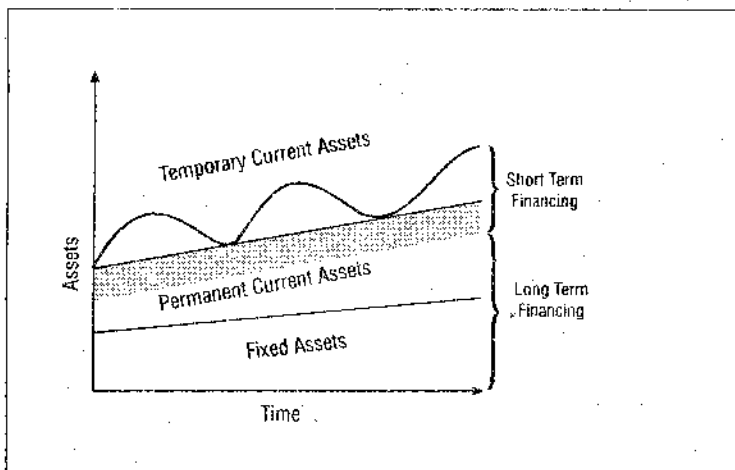


Fig - 3 Financing Under Aggressive Approach

Short-term Vs. Long-term financing

There exists a conflict between the use of long-term and short-term sources of financing the current assets. The choice between any of these however will be based on a risk-return trade off. Since short-term financing is more risky but less costly and long-term financing is less risky but less costly and long-term financing is less risky but more costly, the choice would certainly be for a moderate approach, i.e., by a trade off between short-term and long-term financing.

2.4. METHODS OF RAISING SHORT-TERM FINANCE

There are two basic sources of short-term finances available for the firm. These are : unsecured credits and secured credit loans. Unsecured loans consist of all those sources which have as their security, only the lender's faith in the ability of the borrower to repay the funds when become due. The major unsecured short-term credits are trade credit, unsecured bank loans and commercial paper. Secured loans, on the other hand, are those loans which carry the pledge of specified assets as collateral security in the event of defaults by the borrower for payment of principal or interests. The main suppliers of secured credits are the commercial banks, financial institutions and factors.

Trade credits

Trade credits are the most flexible sources of short-term financing available to the firm. To arrange for credit the firm need only place an order with any of its suppliers. The supplier checks the firms credit and if it is good, send the merchandise. The purchasing firm then pays for the goods in accordance with the supplier's credit terms.

Forms of trade credit

Generally there are three forms of trade credit : (1) the open account which is by far the most common; (2) promissory note; and (3) the trade acceptance popularly known as bills.

Open account credit is ordinarily extended to the buyer, having good reputation and credit worthiness. It does not require the signing of any formal debt instrument acknowledging the debts.

A promissory note is a written instrument signed by the buyer promising to pay a certain sum of money at a specified period of time. It is an interest-bearing negotiable instrument.

A trade acceptance which is nothing but a bill of exchange is a negotiable instrument carrying an unconditional order to pay certain sum of money at a specified future time.

Terms of trade credit

Cash discount, quantity discount and trade discount are the three most commonly used terms found associated with trade credit.

Cash discount is the reduction from the net invoice price which is given for making prompt cash payment.

Quantity discount is a deduction as a percentage from a list price - is given for purchasing certain minimum quantity of a particular item.

Trade discounts are differential discounts given different types of customers - a wholeseller, for example, may be given a larger discount than a retailer.

Advantages of trade credit

- * Firstly, trade credit is easily and conveniently obtained as a normal part of the firms operation.
- * Secondly, no formal agreement is generally involved in extending credit.
- * Thirdly, the amount of credit extended expands and contracts with the needs of the firm.

Bank credit

Short-term unsecured loans extended by banks are generally regarded as self liquidating because the uses to which the borrower puts the funds are expected to generate cash flows sufficient to repay the loan within a year.

Unsecured short-term bank loans may assume three forms such as (1) seasonal line of credit; (2) revolving credit; and (3) transaction loans.

Seasonal Line of credit

A line of credit is simply a formal or informal agreement between a commercial bank and the borrower, relating to the maximum amount of credit the bank is willing to extend over a given number of months in a year. The seasonal business borrowers most frequently request for this line of credit.

Revolving credit

It is a variation of line of credit in as much as it extends beyond a year as against one year in case of line of credit. Besides, revolving credit agreement creates a legal obligation between both the parties. This agreement also offers flexibility to the borrower in using the borrowed funds.

Transaction basis

Yet another form of short-term borrowing from bank is also popular which is obtained on a transaction basis and hence widely recognised as transaction loans. These loans are casually obtained and are obtained for a specific purpose.

Commercial paper

Commercial papers are short-term unsecured promissory notes issued by firms which enjoy a fairly high credit-rating. Generally large firms with considerable financial strengths issue commercial papers. The maturity period of such papers usually varies in between one month to nine months and the interest rates are slightly less than the lending rates of the commercial banks.

In India, however, the RBI has permitted such private and public sector companies including the government companies to issue commercial papers with effect from 1st January 1990 who fulfil the following conditions :

- (i) Minimum tangible net worth of Rs.10 crores and minimum current ratio of 1.33:1 as per latest audited balance sheet.
- (ii) Eligibility for a fund based working capital limit of at least Rs.25 crores.
- (iii) Listing in the Stock Exchange (exempt for Govt. Companies).
- (iv) Top most credit rating.
- (v) Classification under Health Code 1 by financing bank.

The minimum size of the commercial paper in India is Rs.25 lacs, though the amount to be invested by any single investor shall be a minimum of Rs.1.0 crore. The maturity period of such commercial paper is three months at the minimum and six months at maximum. Any person, bank, company, other registered incorporated bodies as well as unincorporated bodies, except non-resident Indians, can invest in commercial papers.

Advantages of commercial paper:

- (i) Commercial paper can be used as a single most short-term sources of finance to meet the firm's large credit requirements.
- (ii) There is no minimum balance fixed for issue of commercial paper.
- (iii) Issue of commercial paper by a firm signifies its credit worthiness.

Account receivables loan

Account receivables are the most prominent liquid asset of a firm. It is for this reason that they are considered by many lenders to be prime collateral for a secured loan. Two basic procedures are however commonly followed for arranging finance on the basis of account receivables. These are : pledging and Factoring.

Pledging

Under pledging agreement, the borrower simply pledges account receivables as collateral for a loan obtained from either a commercial bank or a financial institution. The amount of loan is determined as a percentage of the face value of the receivables pledge. In the pledging agreement, the lender has a lien or legal claim on all the receivables and recourse against the borrower. Recourse here means that if the receivables go bad, the borrower remains liable to the lender for any balance due on the loan.

Factoring

Factoring is an arrangement by which the 'factor' purchases, on a continuing basis,

all the debts of the suppliers of goods and services to trade customers. The function of factoring is to relieve the suppliers of administrative and sales collection tasks so that the firm can concentrate on production and selling activities. Factoring facility best suits the progressive clients with proven track-record of growing rates and profitability.

In the absence of any uniform codified law, factoring has been defined in various countries in different ways depending on trade usage and local customs. The first attempt to define international factoring and draft the uniform rules therefore was made by International Institute for Unification of Private Law (UNIDROIT) during 1988, wherein factoring was defined as an arrangement between a factor and his client which include at least two of the following services :-

- Finance
- Maintenance of accounts
- Collection of debts and
- Protection against credit risks.

However, the above definition was made applicable only to factoring in relation to supply of goods/services across national boundaries. Domestic factoring, in many countries of the world has been defined and interpreted almost on the same lines as above with minor variations keeping in view the local legal structure. Thus, in a full service factoring (i.e., without recourse) parlance, the main functions of a factor can be summarised as follows :

- (i) Providing finance against receivables/eligible trade debts.
- (ii) Undertaking sales ledger administration responsibilities of the client including maintenance of books, accounting, asset management, collection of debts and furnishing information reports to the client.
- (iii) Providing credit insurance facility to the client against possible losses arising from insolvency/bankruptcy/financial inability on the part of the debtor(s).
- (iv) Offering consultancy services in areas of production, finance and marketing.

Advantages of factoring

There are many intrinsic benefits accruing to the client flowing from factoring transactions, the major amidst them being as follows:

- (i) Saving in the time and cost of maintaining own sales ledger administration.
- (ii) Quicker payment by customer(s) resulting in improved cash flow.
- (iii) Availability of more time for quality production and business development.
- (iv) Obtaining off balance sheet finance on more flexible terms resulting in
 - (a) Improvement of return on capital employed.
 - (b) Coping with seasonal and other peak demands for cash.
- (v) Elimination of shock absorption from bad debts.

But, it should also be appreciated that factoring is a high risk venture fraught with dangers like overtrading, mismanagement and even perpetration of possible frauds by way of fictitious, prior duplicate invoicing. Further, not all the companies and transactions are suited for factoring.

Inventory loans

Inventory loans are the second major secured source of short-term loans. These methods include floating or blanket lien, chattel mortgage, field warehouse receipt and terminal warehouse receipt, of which the latter two methods are not popular in India.

Floating lien

Under this agreement the borrower gives the lender a lien against all his inventories. This provides the simplest but least secure form of inventory collateral. The borrowing firm retains full control over the inventories and continues to sell and replace them as it sees fit. Lack of total control over the collateral greatly dilutes the value of this type of security to the lender. Correspondingly loans made with floating liens are generally limited to a relatively modest fraction of the value of the inventories covered by such lien.

Chattel mortgage

The lender can increase his security interest by having specific items of inventory identified in the security agreement, and such an agreement is provided by a chattel mortgage. The borrower retains title to the inventory but cannot sell the specified items without the lenders consent. This type of agreement is very costly to implement, as specific items of inventory must be identified and retained unaffected. It is therefore used only for major items of inventory such as machine tools as similar other capital assets.

Other sources

A. Public deposits In recent years many firms whether large or small have started raising finance through unsecured public deposits basically to meet working capital requirements.

The inherent advantages of public deposits to the borrowing and lending firms may be enumerated as follows:

- (i) The procedure for obtaining public deposits is very simple and are free of restrictive covenants.
- (ii) The rate of interest offered is generally higher than the bank rates.
- (iii) The maturity period is fairly short, thus facilitating early recovery.

B. Inter-corporate deposits These are deposits made by one company with another company normally for a period of 6 months. The inter-corporate deposits can assume three forms : call deposits, three-months deposits and six-month deposits.

Call deposits are the deposits withdrawable by the lender at one day's notice and they carry a maximum of 14 per cent rate of interest. Similarly, three-months deposits carry about 16 per cent rate of interest and are withdrawable after three months from the date of deposit. These three-months deposits are very popular in India. On the other hand, six-months deposits carry 18 per cent rate of interest which is the longest form of inter-corporate deposits are common with and are usually confined to the first class borrowers.

C. Financial institutions Companies with excellent track record and sound credit worthiness also manage to get short-term credit from financial institution like LIC, GIC and UTI. These financial institutions grant loans without any security and on this strength of a demand promissory note. Such loans carry an interest rate of 18 per cent per annum and are given for a one year period with the option of renewal for two more years.

2.5. METHODS OF LONG-TERM FINANCE

There are four sources from which a firm generally obtains its long-term finance. These are : Equity capital, Preference capital, Debenture capital and Term-loans. Each of these four sources has its own merits and demerits.

Equity capital

Equity capital, also called as common stock, is a principal source of long-term finance for a firm. These are the ownership capital and the equity holders are thus the real owner of the business who bear the ultimate risk of ownership.

Issue of equity share capital has many implications both to the firm as well as to the investors or the equity holders. Listed below are some of these implications :

Implications to the firm

(a) Advantages - (i) It presents permanent capital, and hence there is no liability for repayment.

(ii) It does not involve fixed obligation for payment of dividends; hence can increase retained earnings and consequently internal funds.

(iii) It increases the credit worthiness of the firm, for other things remaining constant, larger the equity base, higher the ability of the firm to obtain credit.

(b) Disadvantages - (i) The cost of equity capital is high, in some cases highest too.

(ii) The rate of return required by equity holders is generally higher than the rate of return required by other investors.

(iii) Equity dividends are payable from post-tax earnings and are not tax deductible payments.

(iv) The cost of issuing of equity capital is higher than that of debt capital.

Implications to the equity holders

(a) Advantages - (i) Equity stock holders enjoy the controlling power of the firm.

(ii) Liability of equity stock holders is limited to the extent of their capital contribution.

(iii) Equity dividends get preferential tax treatment.

(b) Disadvantages - (i) Equity stock holders enjoy the lowest priority as they have only a residual claim over income as well as assets of the company.

(ii) Equity stock prices generally fluctuate and therefore investment in equity is risky.

(iii) Equity stock holders cannot participate in the company's dividend decision.

Preference capital

Preference capital is another important source of long-term finance of a company. It is hybrid kind of security, possessing some characteristics of equity and some of debt. Legally, it is part of a company's equity base - preference dividends are not tax-deductible expense to the business, and unless the company's charter or the contract with the preferred stock holders runs to the contrary, owners of preferred stock have almost the same rights as equity stock holders have.

Preferred stock carries a specified dividend rate. This fixed rate plus the preferred holder's prior claims to income and assets however make it resembles with debt. The limited claims on corporate earnings possessed by creditors and preferred stock holders provide the equity stock holders with an opportunity to gain (or lose) from the use of financial leverage in the corporate capital structure.

Depending upon the types such as cumulative or non-cumulative, participative or non-participative, redeemable or irredeemable etc., the preferred stocks too have many implications to the firm as well as to the investors.

Implications to the firm

(a) Advantages - (i) There is no legal obligation to pay dividend. A firm does not face bankruptcy or legal action if it skips payment of preference dividend.

(ii) Preference capital is generally treated as part of net worth. Hence it increases credit worthiness of the firm.

(iii) Preference stock holders do not, under normal circumstances carry the voting right; hence there is no dilution of control.

(b) Disadvantages - (i) Raising finance through preferred stock is costly in comparison to debt capital.

(ii) Skipping the payments of preference dividends may adversely affect the image of the firm in the capital market.

(iii) Non-payment of preference dividend is likely to create some controlling problems too.

Implications to the stock holders

(a) Advantages - (i) It earns stable dividend.

(ii) A part of the preference dividend is tax-deductible.

(b) Disadvantages - (i) Preference stock holders are vulnerable to arbitrary managerial actions.

(ii) Price fluctuation of preference shares is greater than that of debentures.

Debenture capital

Debenture is one of the frequently used methods of raising long-term funds by a firm. It is a written instrument signed by the company under its common seal acknowledging the debt due by it to its holders. It carries a fixed rate of interest and the interest is payable irrespective of whether the company earns profit or not. The interest paid on debenture is chargeable against profit and hence is a tax-deductible. Capital collected through issue of debentures can be secured, unsecured, convertible, non-convertible, redeemable and irredeemable.

Funds raised through issue of debentures in the pattern of financing has got wider and deeper significance. Recourse to debt generally tends to reduce the cost of capital and consequently help and improve the overall return of the company. Debt is considered a cheaper source of financing not only because it is less expensive in terms of interest cost and issuance cost than any other form of security but essentially due to the availability of tax benefits. Faced with alternative methods of long-term financing, the finance manager should favour the use of long-term debt if he is satisfied that sales and earnings of the company are relatively stable and will remain so in the ensuing

years.

The implications of debenture capital to the firm and the investors may be outlined as follows :

To the firm

- (a) Advantages - (i) It is a cheaper source of raising funds.
- (ii) It increases value of the firm.
- (iii) It does not affect the controlling process of the firm.
- (b) Disadvantages - (i) Raising funds through issue of debentures is risky unless the firm's earnings are stable.
- (ii) There exists a legal binding on the firm to pay interest on debentures.

To the debenture holders

- (a) Advantages - (i) Debenture holders have priority of claim to income and assets over stock holders.
- (ii) Debenture holders are assured of a fixed return.
- (b) Disadvantages - (i) Debenture holders do not have controlling power.
- (ii) Debenture holders do not have voting rights.

Term loans

Term loans represents yet another source of debt finance which is generally repayable after one year but within ten years. They are utilised to finance the acquisition of fixed assets and working capital margin. Term loans differ from short-term bank loans in as much as the latter are utilised to finance short-term working capital needs and are liquidated within a year.

Term loans typically represent secured borrowings. The interest on term loans is a statutory obligation and is payable irrespective of the financial condition of the firm.

The principal amount of a term loan is generally repayable over a period of six to eight years after an initial grace of one to two years. So far as the mode of repayment is concerned, term loans provided by financial institutions are repayable in equal semi-annual instalments, whereas those granted by commercial banks are repayable in equal quarterly instalments.

Financial institutions in order to protect their interest very often impose certain restrictions on the borrowers which may include formation of the board of directors and the management set-up according to their satisfaction. Besides, financial institutions, in certain cases, also dictate the convertibility clause of the term loans.

Term loans generally include borrowings from banks, financial institutions, Government and Semi-Government bodies and public deposits.

2.6 SUMMARY

A firm's need for finance arises because of fixed capital and working capital requirements. The requirement of finance can be met out of long-term sources and short-term sources. Long-term fund is required for financing fixed assets and permanent portion of working capital while short-term fund is required for financing the working capital.

Generally financing of working capital is made through both long-term and short-term sources. However, there are three distinct approaches namely, the hedging approach, the conservative approach and the aggressive approach which guide the firms in their working capital financing decision. Hedging approach, also called as matching approach, emphasises the exact matching of the expected life of assets with the expected life of the sources of funds raised. Thus short-term assets are financed by short-term sources. Under conservative approach the firm finances its permanent assets and a part of temporary current assets from long-term sources. In aggressive approach the firm finances even a part of its fixed assets from short-term sources.

There are two basic sources of short-term financing :

Unsecured and Secured. Among unsecured sources included are the trade credits, unsecured bank credit and commercial paper. Similarly secured sources generally include account receivable loan (including pledging and factoring), inventory loans, public deposits, intercorporate deposits and loan from other financial institutions.

Trade credit can be obtained through open account or by agreeing to pay under promissory note or by accepting a trade bill. Similarly, bank credit can be obtained on the basis of seasonal line of credit, revolving credit agreement and transaction loan. Another important unsecured sources is commercial paper which is issued by private sector companies. Account receivable loans can be obtained by pledging or arranging a factor for collection of book debts. Inventory loans can be obtained by a floating lien on the inventory or by chattel mortgage arrangement. Public deposits, intercorporate deposits and short-term loans from financial institutions like LIC, GIC and UTI etc., augment strongly to the secured source of short-term financing.

Equity capital, preference capital, debenture capital and term loans figure prominently among the long-term sources of finance.

Equity capital is the owned capital of the company. This capital is provided by the owners of the company. The equity holders enjoy voting rights and also bear the ownership risk. Preference capital on the other hand is a hybrid source of capital consisting some characteristics of equity and some of debenture capital. Suppliers of preference capital enjoy preferential rights over equity holders for payment of dividends. Moreover, they have preferential rights over assets of the firm in case the firm goes into liquidation. Debenture capital is a loan capital provided by the creditors at a predetermined rate of interest. Interest on debentures is payable irrespective of the financial condition of the firm.

Long-term funds can also be acquired from financial institutions in the form of term loans. Term loans generally include borrowing from financial institutions, banks, government and semi-government agencies, and deposits from general public. The loans thus obtained usually carry a fixed rate of interest and are repayable after one year but before ten years.

2.7 KEY WORDS

'Working Capital' is the capital required to meet the day-to-day obligations of the firm.

'Gross Working Capital' is the total investment in the current assets of the firm.

'Net Working Capital' is the difference between current assets and current liabilities of the firm.

'Open Account' is an account maintained for allowing credit to customers with good reputation - without formally acknowledging any debt through debt instrument.

'Trade acceptance (bill)' is a form of negotiable instrument accepted by the buyer to pay a certain sum of money after a specified time. This can be discounted before its maturity through banks.

'Line of Credit' is an agreement to pay a certain sum of money to the borrower by the bank for a number of months in a year to meet its seasonal requirements without creating any legal obligation.

'Revolving Credit' is the credit extended to the borrower by the bank for more than one year with some legal obligations.

'Transaction Loan' is the loan obtained by the borrower for a specified purpose.

'Commercial Paper' is a short-term unsecured promissory note issued by considerably high credit-rating companies to attract funds at a cheaper rate than the bank rates.

'Pledging' is a process of keeping accounts receivables as collateral security with the suppliers of funds.

'Factor' is a party or person or institution who undertakes the risk of collecting book debts of the client company for consideration of an agreed commission.

'Lien' is the pledging of inventories or merchandise as security for obtaining loan from the lender.

'Chattel Mortgage' is an agreement by which the borrower gets loan by pledging specific inventories as security.

2.8 SELF-ASSESSMENT QUESTIONS

- 1) Give an overview of the different sources of financing a business enterprise.
- 2) Why do business enterprises need finance? what are the different sources of such finance?
- 3) What is working capital of a firm? How are the working capital needs of a firm met with?
- 4) What is the importance of short-term funds to a firm? How the firm raises such short-term funds?
- 5) How are the long-term funds raised by a firm?
- 6) Make a comparative study of the relative merits and demerits of raising different long-term sources of funds by a firm.
- 7) Give some examples of the latest innovations in the financial markets for raising short-term sources of finance.

2.9 FURTHER READINGS

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UNIT 3 SOURCES OF RAISING FINANCE

Objectives

The main objectives of this unit are to familiarise you with :

- * Capital Market as a source of corporate finance.
- * Specialised Financial Institutions as a source of corporate finance.
- * Leasing as a source of corporate finance.
- * Foreign sources of financing the corporate sector.
- * Retained profits as a source of corporate finance.

Structure

3.1. Introduction.

3.2. Capital Market.

- 3.2.1. Classification of Capital Market.
- 3.2.2. Capital Market in India.
- 3.2.3. Capital Market Instruments.

3.3. Specialised Financial Institutions.

- 3.3.1. Development Banks.
- 3.3.2. Investing Institutions.

3.4. Leasing.

- 3.4.1. Leasing Concept.
- 3.4.2. Types of Leasing.
- 3.4.3. Indian Scenario.

3.5. Foreign Sources.

- 3.5.1. Need for Foreign Capital.
- 3.5.2. Types of Foreign Capital.
- 3.5.3. Foreign Capital and Indian Scenario.

3.6. Retained Profits.

- 3.6.1. Concept.
- 3.6.2. Need and Importance.
- 3.6.3. Determinants of Retained Earnings.

3.7. Summary.

3.8. Key Words.

3.9. Self-assessment Questions.

3.10. Further Readings.

3.1 INTRODUCTION

A firm can meet its financial requirements from a variety of sources which may broadly be divided into (i) Capital Market, (ii) Specialised Financial Institutions, (iii) Leasing, (iv) Foreign Sources and (v) Retained Profits. Each of these five sources of finance has its own strengths and weaknesses and hence the finance manager of the firm faces rather a formidable challenge as to the selection of the particular source or sources of finance which is/ are most suitable to the firm. While a scientific and rational selection of the right source(s) of finance will result in a smooth sail of the firm to its destiny, a faulty selection will necessarily endanger its very survival. Hence, the finance manager, while keeping the firm's objective in one hand and its financial requirements and managerial policies on the other, has to make a judicious selection of the particular source(s) of finance which will put the firm on the right track.

3.2 CAPITAL MARKET

Capital Market is the most vital limb of the financial market of a country. The financial market consists of both the capital market and the money market. However, it is the capital market from which the corporate firms raise a substantial part of their financial requirements.

Defined as a complex of institutions, instruments and practices which establish a link between the demand for and the supply of different types of capital funds, the capital market facilitates the movement of the stream of command over the capital to the point of highest yield. It is concerned with the supply of long-term funds for productive use by industrial and commercial undertakings. It facilitates the transfer of funds from those who have funds to those who need funds. The flow of funds may come from industrial and commercial undertakings, Government and Semi-Government bodies and other organisations who raise their capital by issuing securities like shares, debentures, bonds and certificates.

3.2.1. Classification of Capital Market

Capital market can be classified in many ways. Sectoral classification and the functional classification are however prominent among them. According to sectoral classification, a capital market can be organised or an unorganised one. On the other hand, a capital market can be a primary market or a secondary market, as far as the functional classification is concerned.

Organised

Organised market refers to the regular financial institutions organised on modern lines and consist mainly of commercial and co-operative banks and non-banking financial institutions like the IFCI, IDBI, ICICI etc.,

The organised market has two components - short-term market, also called as the money market and the long-term market popularly known as the capital market. Under the short-term market included are the commercial and cooperative markets, the call money market, the bill market, the collateral loan market, and the gilt-edged market. Similarly, long-term capital market includes the new issue market, the stock market, the private loan/bond market together with the development banks.

Unorganised

Unorganised market refers to the indigenous system of financial institutions such as rural and urban money lenders and indigenous bankers who do not have

regular recourse either to deposits from the public or to borrowings from banks. The peculiarity of indigeneous bankers lies with the fact that they provide only seasonal finance especially for producing and marketing of crops.

Primary Market

Primary markets are those where securities are offered for the first time to potential investors. A new issue of equity stock by a company is an example of primary market transaction. Primary market transaction increases the total stock of financial assets outstanding in the company. Prices and yields at which securities are sold in the primary capital market are closely related to the prices and yields on similar obligations traded in secondary capital market.

Secondary Market

Secondary markets are those where currently outstanding securities of companies are traded. For example, if the first buyer of the stocks of a company XYZ subsequently sells it, he does so in the secondary market. Thus all transactions after the initial purchases of securities take place in the secondary market. In this process therefore the sales do not affect the total stock of financial assets that exist in the economy. The secondary market sets the levels of the prices of already issued securities indicating the yields, interest rates and price-earning levels that must be placed on the new securities in order to float them successfully on the primary market. The secondary market consists of (i) organised stock exchanges and (ii) over the counter markets.

Organised Stock Exchanges

Organised Stock Exchanges are tangible entities. They physically occupy space such as building or part thereof, and outstanding financial instruments are traded on their premises. The mechanism of the stock exchanges are so designed that it provides a free, close, continuous, efficient and relatively inexpensive market for the securities.

Organised stock exchanges perform several functions prominent of which are the following :

- ★ It provides liquidity and smooth flow of funds.
- ★ It ensures continuity of prices and provides for healthy speculations.
- ★ It facilitates open market appraisal and ensures faithful market quotations for the securities.
- ★ It mobilises and directs the flow of capital.
- ★ It facilitates new issues and accelerates the process of capital formation together with economic growth.

Over the Counter Market

Over the counter markets include all security markets except the organised stock exchanges. In other words, over the counter markets do not provide actual physical facilities for conducting securities transaction in any one place; they are rather made up of a complex network of brokerage houses and dealer offices located throughout the country and linked together by the various standard means of communications. Some even call the 'over the counter market' as over the telephone market.

3.2.2 Capital Market in India

The Indian capital market has a history of a century and a half. Private trading in shares and stocks, government bonds and the securities of the East-India Company is reported to have taken place from 1830 onwards. By 1850, the share brokers in Bombay started meeting at regular intervals to trade in shares. Eventually the Bombay

Stock Exchange came into being in 1875 which became not only the first stock exchange of India but also of the entire Asia. The Calcutta and Madras stock exchanges were the second and third to join the Indian Stock Exchanges Club. And at present India is having 22 recognised stock exchanges.

Recent Developments

In a view to bring about a major reform in the financial sector the Government of India has taken a number of steps which include, among others, establishment of SEBI and of course very recently the NSE in order to streamline the capital market activities in the country. The following paragraphs give a brief outline of these two organisations which are expected to play a very dominating role in the development of the country's capital market.

Securities and Exchange Board of India (SEBI)

The Securities and Exchange Board of India was established in 1987 in order to regulate the Indian capital market in one hand and to protect the investors interest in the other. With the implementation of Narasimha Committee Report, however, the Government of India has assigned a greater role to SEBI enhancing its scope of operation by making an amendment to its Act (SEBI Act) in 1992. With this amendment the SEBI has now become an autonomous body with more power and role to regulate and control the country's securities market including mutual funds and business and foreign capital investment in the country. The Board has also been empowered to take necessary steps to prevent inside trading, to promote investors' education, to regulate take-over of corporate bodies, to undertake market research, to regulate collective investment schemes and last but not the least to regulate the primary as well as the secondary market as a whole.

National Stock Exchange (NSE)

In a view to strengthen the Indian capital market further, the Government of India has set up the National Stock Exchange (NSE) which has become operational with effect from 20th June, 1994. The NSE is having a totally automatic trading system with a nation-wide network. Contrary to the regional based trading operation of other local stock exchanges, the NSE will have a totally transparent trading system wherein script will be traded on the screen and not on the floors as are generally found in the local stock exchanges.

As far as the area of operation is concerned, besides covering the normal areas, NSE will cover certain segments which other stock exchanges do not cover at present. The debt market, for example, is one of such areas which the local stock exchanges do not cover but the NSE is going to cover basically for the financial institutions. The NSE will have a national trading through a V-Sat based system and the price differences which generally exist for the same scrip in different stock exchanges will now be bridged through this mechanism.

The NSE has started its debut with the listing of 268 issues of securities and with a total initial market capitalisation of Rs.1,38,600 crores. Although NSE has started with the trading in the wholesale debt market segment as a primary step, it will cover the capital market and the retail debt market segments later when active trading interest develops among the members of the NSE. Not only the investors but also the local stock exchanges are expected to be benefited by the NSE.

3.2.3 Capital Market Instruments

Corporate firms raise huge funds by issuing securities in the capital market. These securities generally include equity shares, preference shares and debentures. With the changing market environment and investors' choice and perception, however, certain new instruments have also emerged in the capital market. In this connection mention may be made of instruments like Non-voting equity shares, zero coupon bonds, dollar denominated convertible Eurobonds/GDRs, mortgage-backed securities, secured premium notes, convertibles, mutual funds, financial futures and option contracts and swaps. Floating rate notes (FRNs), industrial revenue bonds (IRBs), clip and strip bonds (also called as coupon notes), dual convertible bonds, commodity bonds, indexed rate notes, income share notes, stepped coupon bonds, dual option warrants and extendable notes, are yet some of the new instruments which have either entered the capital market or are about to enter.

3.3 SPECIALISED FINANCIAL INSTITUTIONS

In addition to the capital market, firms can also approach the financial institutions for satisfying their long-term financial needs. Financial institutions while themselves raising resources from a large number of small investors, make the funds available to business concerns thereby reducing their burden in raising resources directly from the small investors. Thus, financial institutions act as a channel through which scattered savings are collected and then invested in business firms.

In India we have a number of financial institutions operating in the capital market which directly or indirectly extend financial assistance to the needy firms. These institutions may broadly be divided into three categories, viz., commercial banks, development banks and investing institutions.

This section, however, deals with the development banks and the investing institutions which are considered to be the wings of specialised financial institutions.

3.3.1 Development Banks

Development banks are the financial institutions which supply capital, knowledge and expertise to the business firms. In India a number of development banks are operating both at the national as well as state level. These institutions are specialised in providing long-term funds, entrepreneurial and managerial assistance to the needy and deserving firms.

Given below is the present structure of different developmental financial institutions operating in the country.

At the National Level

1. Industrial Finance Corporation of India (IFCI)
2. Industrial Credit and Investment Corporation of India (ICICI)
3. Industrial Development Bank of India (IDBI)
4. Industrial Reconstruction Bank of India (IRBI)
5. Shipping Credit and Investment Company of India (SCICI)
6. Tourism Finance Corporation of India (TFCI)
7. Small Industries Development Bank of India (SIDBI)

At the State Level

1. State Financial Corporations (SFCs)
2. State Industrial Development Corporations (SIDCs)
3. State Small Industries Development Corporations (SSIDCs)

8. Risk Capital and Technology Finance Corporation (RCTFC)
9. Technology Development and Information Company of India (TDICI)

Discussions here, however, are confined to the leading development banks at the national and state level.

Industrial Finance Corporation of India (IFCI)

Set up in 1948 by the Special Act of Parliament, the IFCI was the first national level development bank which extends medium and long-term loans to industrial concerns especially the limited companies in the private, public or joint sector. IFCI provides financial assistance by granting term loans, underwriting the issues of shares and debentures and by directly subscribing to the securities of such industrial concerns. The corporation also helps the business firms in raising share capital from the capital market and also in procuring term loans from other financial institutions. IFCI independently meets the financial needs of medium and large projects costing up to Rs.5 crores. It, however, makes a joint financing with other all-India financial institutions to projects costing over Rs.5 crores. Generally, IFCI grants loan for a period of 12 to 15 years which may extend up to a maximum of 25 years. In a view to help the firms in raising funds from the market, the corporation has assumed the role of merchant banking from 1982 and further that with effect from May 1988 it has undertaken leasing business. It is, however, important to note here that the government of India has granted the IFCI the full status of a public limited company with effect from July, 1993.

Industrial Credit and Investment Corporation of India Ltd. (ICICI)

The ICICI was set up in 1955 as a part of the government effort to build necessary financial infrastructure for industrial development in the country. The main object of the corporation is to meet the long-term and medium term financial requirements of the private sector industry in India through rupee and foreign currency loans underwriting and direct subscription to capital issues and guarantee of loans. In addition to this the corporation provides necessary assistance for the creation, expansion and modernisation of industrial units in the private sector. The loans granted by ICICI are repayable within a period of 15 years and the minimum amount of loan advanced is Rs.5 lac. Like IFCI, the ICICI has also assumed the role of merchant banking and further that the corporation extends venture capital for projects involving development and/or commercialisation of new technologies.

Industrial Development Bank of India (IDBI)

The IDBI was established in 1964 with a view to making it an apex bank in the structure of industrial financing institutions in the country. Although the basic objectives of establishing IDBI are manifold, may divide them into three major categories, namely, financing function, promotional function and coordinating function.

As far as the financial functions are concerned IDBI assists all deserving projects irrespective of their size, nature and status by granting term loan and advances, subscribing to purchasing or underwriting the issue of shares and debentures and guaranteeing deferred payment due from industrial concerns to third parties. Similarly as an indirect financier, IDBI's assistance include refinancing of industrial loans provided by commercial banks and SFCs, refinancing of medium-term export credit granted by commercial banks, rediscounting of bills and providing financial assistance to term financing institutions by subscribing to shares and debentures issued by them.

The IDBI is authorised to perform promotional activities for industrial development especially in the backward areas. These promotional activities include balanced regional development, creation of new classes of entrepreneurs and improvements in formulation, appraisal and implementation of projects.

IDBI coordinates the functions and operations of all the financial institutions including the IFCI, ICICI, LIC and UTI into a single integrated financial structure so that each may contribute towards the industrial development.

State Financial Corporation (SFCs)

SFCs form an integral part of the structure of development financing institutions in India. They strive to promote small and medium enterprises in their respective states thereby bringing about balanced regional growth, catalysing greater investment, generating larger employment and aiding wider ownership of industry.

At present there are 18 SFCs, 17 of which were set up under the SFCs Act, 1951. SFCs provide assistance to industries by way of term loans, direct subscription to equity and debentures, discounting of bills and guarantees.

State Industrial Development Corporations (SIDCs)

SIDCs were established in the sixties and early seventies under the Companies Act as wholly-owned State Government undertakings for promotion and development of medium and large industries. There are 26 SIDCs operating in India at present. Besides providing assistance to industrial projects by way of term loans, underwriting and direct subscription to securities and guarantees, SIDCs undertake a variety of promotional activities such as preparation of feasibility reports, entrepreneurship development programmes, etc., The activities of some SIDCs also include participation in risk capital.

State Small Industries Development Corporations (SSIDCs)

The SSIDCs were set up under the Companies Act, 1956 as State Government undertakings to perform important functions for the development of small, tiny and cottage industries in their respective jurisdiction. These functions include, among other, extending seed capital assistance, providing managerial assistance.

3.3.2 Investing Institutions

Investing institutions represent those financial intermediaries which mobilise savings from different section of the society mainly through the sale of their securities and channelise these savings in productive channels mainly through investment in shares and debentures of industrial firms. Included under the investing institutions are the different investment companies in the private sector, the UTI, the LIC and the GIC.

Investment Companies

There are as many as 560 private sector investment companies belonging to different business houses in India at present. These companies seldom mobilise funds. They simply assist only those organisations in which the concerned business house has vested interest by investing in the equity shares of such organisations.

Life Insurance Corporation of India (LIC)

LIC was constituted under the LIC Act in 1956 after taking over life insurance business from private companies to carry on the business of life insurance and deploy the funds in accordance with the plan priorities. Although the Corporation primarily aims at life insurance business, still its role in the capital market can hardly be overemphasised.

Mentioned below are some of the specific objectives vis a vis functions of LIC.

- * To invest its mobilised funds in the shares of promising industrial enterprises.
- * To underwrite new issues and to grant loans for the corporate firms.
- * To invest in Government securities.
- * To maintain close interactions with other financial institutions like IDBI, IFCI, ICICI and UTI in matters of its investment programmes.
- * To underwrite securities of industrial concerns.
- * To directly subscribe to the securities and bonds of financial institutions including the SFCs.
- * To give priority to firms engaged in infrastructural development as far as allocation of its mobilised fund is concerned.

Performance

LIC's performance with regard to direct assistance to corporate sector has remained significant both in terms of sanctions and disbursements. Since its inception after the end of March 1992, assistance sanctioned to industries by LIC amounted to Rs.5849.3 crore. While disbursements aggregated to Rs.4318.7 crore. The total investible funds available with LIC stood at Rs.35969.3 crore by the end of March 1992.

Unit Trust of India (UTI)

UTI is a statutory financial institution in the public sector established on February 1 1964 under the UTI Act, 1963. The trust started its operation with effect from July 1 1964 with an initial capital of Rs. 5 crore and with the prime object of mobilising and channelising savings of relatively small investors into industrial securities.

The main objectives of UTI are :

- * To invest in business and industry directly by subscribing to and underwriting of new securities and indirectly by purchasing securities from the stock exchanges.
- * To invest in selected portfolio of securities designed to give the unit holders security of capital, besides giving a reasonable return and capital appreciation.
- * To invest, as a matter of principle, in the securities of more than one companies.
- * To mobilise savings and channelise them into productive investments serving the best interest of the unit holders.

Performance

Aimed at tapping the savings of small investors through sale of units and channelising them into corporate investments, the UTI from its inception has introduced a number of schemes at a regular intervals keeping in view the varied needs of diverse sections of investors. With an amendment to its Act in 23rd April, 1986 the UTI has also started giving assistance to the corporate firms by way of term loans, bill rediscounting, equipment leasing and hire-purchase financing. The trust has witnessed an encouraging growth in terms of sale of units as well as investible funds and unit holding accounts. The total investible funds, for example, available with the UTI at

the end of June, 1992 amounted to Rs.30,550.8 crore and its total investment in the corporate sector as on that date amounted to Rs.22,032.7 crore.

General Insurance Corporation of India (GIC)

GIC was established in 1973 on nationalisation of general insurance companies then operating in the country. GIC and its four subsidiaries viz., National Insurance Company Ltd., Oriental Fire and General Insurance Company Ltd., New India Assurance Company Ltd. and United India Insurance Company Ltd. operate a variety of insurance schemes to suit diverse and emerging needs of the society. The investment policies of GIC and its subsidiaries have been evolved within the ambit of the provision 27 (B) of the Insurance Act, 1938 and the guidelines issued by the Government from time to time. According to Government guidelines 70% of annual accretions to the investible funds are required to be invested in socially-oriented sectors of the economy. GIC started the business of term finance from 1976 in participation with other all-India financial institutions by way of term loans and underwriting/direct subscriptions to shares and debentures of industrial projects.

Performance

The aggregate amount of direct assistance sanctioned by GIC and its subsidiaries to the industrial sector amounted to Rs.2278.5 crores at the end of March, 1992. While the disbursements amounted to Rs.1425.7 crore during the said period. The total amount of investment in all respects, however, stood at Rs.6126.8 crore by the end of March 1992. Of these, investments in shares and debentures of and terms loans to corporate firms in the public sector alone amounted to Rs.2047 crore.

3.4 LEASING

So far we have discussed two major sources - the capital market and the financial institutions - from which business firms can meet their financial requirements. With the changing business environment throughout the world and especially with the changing wave of liberalisation and globalisation of the financial market, a number of newer modes of financing business enterprises have emerged particularly in the recent years both in India and abroad. Among these new forms of financing, mention may be made of leasing and venture capital financing as the most popular modes of long-term financing. This section, however, deals with leasing aspect only.

3.4.1 Concept of Leasing

Leasing is an arrangement under which a company acquires the right to use an asset without owning it. In other words, a lease is a contractual arrangement in which the owner of an asset (called the lessor) grants the use of his property to another party (called the lessee) under certain specified conditions and for a specified period in consideration of periodic rental payments. The title of the property (asset) remains with the lessor but the physical possession and control of the asset passes to the lessee. Thus, leasing provides an alternative to buying an asset to acquire its services.

3.4.2 Types of Lease Financing

Lease financing may assume different forms which may broadly be divided into operating leases and financial leases. By nature operating lease differs from financial lease in so far as the former is a source of short-term financing while the later is a long-term financing source.

Operating Lease.

Operating lease is an agreement in which the lessee acquires the use of assets

on a period to period basis, i.e., operating lease of cancellable at the option of the lessee upon due notice given to the lessor. The chief advantage of this type of lease to the lessee is that he is able to avoid the risk of ownership of the property. However, operating lease is generally more expensive than financial lease.

Financial Lease

Financial lease, also known as capital lease or full-payout lease, is a contractual arrangement in which the lessee agrees to make a series of payments to the lessor for the use of a particular asset by the former owned by the latter. The size of the payments, which may be made monthly, quarterly, bi-annually or annually, is scaled so as to amortize the lessor's investment in the asset, to cover his operating expenses and his desired rate of profit on the lease transaction.

Classification of Financial Lease

Financial lease has again been divided into different subcategories popular among which are the sale and lease back and leveraged lease.

Sale and Lease-back

A sale and lease-back is a special financing lease arrangement in which a firm (say X) sells an asset to another firm (say Y) and simultaneously the two firms enter into a financial lease by which firm 'Y' leases the assets to firm 'X'. Consequently, the selling firm 'X' receives the purchase consideration from 'Y' which increases its liquidity position and at the same time retains the use of the asset in return for periodic lease payment.

Leveraged Lease

In a leveraged lease arrangement, the lessor borrows a portion of the purchase price of the asset from a lender, which is generally a commercial bank or a financial institution or an insurance company, thus adding and involving a third party in the lease agreement. The loan so borrowed is secured by the assets and the lease payments. The lender is paid back from the lease payments, often directly by the lessee, and the surplus left after satisfying the claims of the lender goes to the lessor.

Advantages of Lease Financing

- * Leasing provides additional sources of external debt financing.
- * Leasing offers tax-advantages to the lessee.
- * Leasing strengthens the borrowing capacity of the lessee.
- * Leasing involves lesser restrictive covenants than what would have been in case of term loans.
- * Leasing minimises the risk of obsolescence.

3.4.3. Indian Scenario

Leasing business in India started only in the seventies when the first leasing company of India was promoted by the Chidambaram Group in 1973 in Madras. The Twentieth Century Leasing Company and four other financing companies, namely, Shetty Investment and Finance, Motor and General Finance, Jayabharati Credit and Finance and Sundaram Finance, joined the leasing companies group respectively in 1982 and 1983. By 1987 the total number of leasing companies in India was 500 which later increased to more than 1400 by the end of 1993.

The present pattern of leasing companies in India comprises (i) independent leasing companies like the Twentieth Century Leasing, (ii) Subsidiarised of manufacturing

companies like Tata Industries Ltd., (iii) departments of Central Financial Institutions such as ICICI, IFCI etc., (iv) departments of state level financial institutions.

Today, leasing has emerged as an important supplementary source of finance. Lease financing has gained prominence due to a sudden surge of entrepreneurs. Lease financing is helpful for the establishment of small and medium sized units which generally face financial constraints. Banks, public sector units, hire-purchase companies have all diversified into leasing. The prospects for the leasing industry in India are very bright. This is particularly true in the context of the Government's liberalised economic and industrial policy.

3.5 FOREIGN SOURCES

Foreign capital has got special significance to the Indian industries especially as a means of long-term sources of financing. The Government of India in its different industrial policy resolutions and statements in the planned economy has given importance to this vital source of financing the Indian industries other than the banking business. The increased wave of liberalisation and globalisation of Indian economy has also given importance to this source of financing.

3.5.1 Need for Foreign Capital

- * The need for foreign capital arises due to the inadequacy of domestic funds available to the high priority sectors particularly for the development of infrastructural facilities.

- * Foreign capital is necessary in the areas where new lines of production are to be developed, where special types of experience and technical skills are required where volume of domestic production is small in relation to the demand and there is no reasonable expectation that the indigenous industry can expand to the required level.

- * Foreign capital is necessary to set up joint-enterprises in collaboration with foreign firm in the country.

- * Foreign capital is necessary for under-developed countries to meet the foreign exchange requirements until the countries' export-oriented industries are well developed.

- * The inflow of foreign capital into Indian economy is highly essential in order to tide-over the balance of payments difficulties.

- * Foreign capital is necessary for the overall growth and development of a country especially the under-developed ones

3.5.2 Types of Foreign Capital

Broadly speaking, foreign capital assumes three forms, viz., (i) Direct investment, (ii) equity capital, (iii) loans and grants. India gets foreign capital by way of : (a) direct foreign investments (FDI) by multi-national corporations (MNCs); (b) equity participation in Indian industries and (c) loans and grants on bilateral basis from developed countries and multilateral basis from the Aid India Consortium, the International Bank of Reconstruction and Development (IBRD), the International Monetary Fund (IMF) and other UN agencies.

Foreign Direct Investment (FDI)

FDI mainly refers the investment of long-term foreign capital in the private sector (other than banking). The amount of FDI is generally determined by taking the aggregate of (i) net foreign liabilities of branches of foreign companies operating in India, (ii) foreign held shares including proportionate free reserves and foreign held debentures of Indian joint stock companies and long-term loans obtained by these companies' foreign official institutions. The risk as well as prospective yield is higher in FDI.

Equity Capital

Equity capital comes from private foreign investors by way of investment in the corporate securities. Like FDI, the risk and return on equity investment is also high. The Government's policy regarding the extent of foreign participation in India has remained flexible throughout. The recent changes in the Government's policy in the wake of economic liberalisation even provides hundred percent foreign equity participation in certain specified industrial units.

Loans and Grants

Corporate firms may also raise foreign capital in the form of loans and grants generally from governmental and international investment agencies. TISCO and IISCO, for example, are the two Indian private steel companies to receive loan capital from the international agencies. World Bank Capital is also channeled into the private sector through ICICI.

3.5.3 Foreign Capital and Indian Scenario

Large companies in India from time to time, require foreign currency term-funds to facilitate the import of vital capital goods. In the early eighties, when India's rating in the international credit market stood high, companies with strong finances and acceptable security could get loan from international banks. The acceptable security is nothing but a guarantee given by a bank or a financial institution in India.

By early nineties, however, the scenario changed drastically. Due to reasons like gross mismanagement and structural weakness in the economy, the foreign exchange reserves hit new low, resulting value investment grade. Although the Indian companies were in acute need of foreign currency loans the foreign investment institutions shied away from the economy.

To overcome these difficulties, the Indian industries were left with no alternative other than resorting to Euro-Issues. In May 1992, Reliance Industries became the first company to float a Global Depository Receipts (GDRs) of a gross value of US \$ 150 million. Some Indian firms have also collected foreign capital by way of Euro-convertible Bond (ECB) which is an equitylinked debt security. An ECB holder has the option to covert the ECB into share or depository receipts.

The emerging transparency and decontrols resulted from the economic liberalisation have attracted foreign investors towards Indian industries. Besides the participation of the giant international financial institutions like Morgan Stanley and Jardini Fleming and the willingness by IBM, Ford etc. to invest in India, portrayed a positive picture of India worldwide. The foreign equity investors while appreciating the above developments have already identified huge stake in the emerging Indian capital market.

3.6 RETAINED PROFITS

Retained earning is that part of the total profit of a firm which is not distributed

among the shareholders and is kept aside in the business.

3.6.2 Need and Importance

Retained earnings, a major component of the internal sources, provide funds to finance the firm's long-term growth. It is one of the most significant sources of long-term financing which facilitates the firm to undertake profitable long-term investments. It enables the firm to withstand seasonal reactions and business fluctuations. It provides resistance power for the firm to face depression. It is a very economical method of financing, because the firm need not raise loans or issue additional securities to raise capital for the purpose of expansion, diversification and modernisation of the business. Moreover, retained profits can also be used for redemption of bonds and debentures, and for creation of sinking funds for replacement of assets etc., which will save funds for the company by way of reducing the burden of fixed interest charges. It is a readily available source of capital, generally in the form of liquid assets and inventories, and is most often also used for financing working capital needs. It strengthens the firm's equity base thus enabling it to borrow at better terms.

3.6.3 Determinants of Retained Earnings

There are numerous factors which affect the amount of retained profit and the amount of divisible profit. These factors may be divided into two broad categories - internal and external.

The internal factors include (i) amount of net profit, (ii) working capital requirements, (iii) requirement for replacement and modernisation, (iv) rate of dividend, and (v) the size, nature and age of the firm. On the other hand, the prominent external factors affecting the amount of retained earnings are (i) legal restrictions, (ii) shareholders attitude towards dividend, (iii) corporate taxes, and (iv) cost of debt financing.

Net Profit

The amount of net profit has an important bearing on both dividends as well as retained earnings. Not only that the retained earnings and the amount of dividend are interrelated but also they collectively have a direct relationship with the amount of net profit earned by the firm.

Working Capital Requirements

Working capital requirements of a firm very often affect the volume of retained earnings. Retained earnings being a cheaper and readily available source of finance can be used to meet the seasonal working capital requirements in general without resorting to the costly external source of finance.

Replacement and Modernisation Needs

Although depreciation is provided for the generation of funds for replacement of worn-out and obsolete assets, the funds so obtained at the end of the life of the assets is generally inadequate for the replacement by new assets. The short-fall of the depreciation is most often met by retained earnings.

Rate of Dividend

Dividends represent a distribution of the book surplus, accompanied by distribution of assets or by a change in the form of equities, or an increase in the liabilities of the corporation. The regularity of dividend payments and the stability of its rates are two of the main objectives of the financial management. A stable rate of dividend makes

future financing easier, enhances credit standing of the firm and stabilises the market value of the outstanding securities. The management therefore will not hesitate to use the accumulated reserves in case of need to maintain a stable dividend rate.

Size, Nature and Age of the Firm

The nature of the business, the age and size of the firm and also the growth and prosperity of the firm can affect the amount of retained earnings. As for example, a growth firm should retain all its earnings in the business, a normal firm may or may not retain any of its profits and declining firm should not retain any part of its profit. Similarly old firms with larger earnings experience may follow a liberal dividend policy but the new firms may be required to follow a conservative dividend policy in order to build higher retained profits.

Legal Restrictions

The legal rules act as boundaries within which a firm can operate as far as payment of dividend is concerned. Acting within this boundaries a firm will have to take into consideration many financial variables and constraints in deciding upon the amount of earnings to be retained and the amount to be distributed as dividends. Section 205(1) of the Indian Companies Act, for example, provides that dividend shall be declared or paid only out of the current profit or past year's profits after providing for depreciation. The Central Government, however, can allow any company to pay dividend for any financial year out of the profits of the company without providing for depreciation.

Shareholders Attitude

The shareholder's attitude sometimes affect the firm's dividend policy and consequently the retained earnings. While some shareholders will be interested in a short-term and regular flow of income (dividend) some may also prefer for long-term benefits. The finance manager has to make judicious decision to satisfy the variety needs of the shareholders in one hand and the objective of wealth maximisation on the other.

Corporate Taxes

Dividend and retained earnings are affected by corporate taxes. The undistributed profit, i.e., retained earnings, is subject to tax under Section 104-109 of the Income Tax Act, 1961. The tax on undistributed profits has digressive impact on corporate savings.

Cost of Debt Financing

The external source of financing involves certain cost which always have an inverse relationship with retained earnings and dividend. These costs include interest charges, commissions and brokerage etc. If the cost of raising external sources is high, firms wil obviously prefer to internal financing in which retained earning play a major role.

3.7 SUMMARY

Capital market refers to the complex of institutions, instruments and procedures that facilitate the transfer of long-term funds from the point of low yeild to the point of high yeild.

While the sectoral classification divides a capital market into organised and un-organised, the functional classification divides it into primary and secondary. An organised capital market consists of recognised financial institutions, stock market and over-the-counter exchange whereas money lenders and indogeneous bankers come un-

der the unorganised capital market. Contrary to this, the primary capital market deals with the sale of new securities and the secondary market deals with the outstanding securities.

Specialised financial institutions in India are mainly divided into development banks and investing institutions. These institutions provide term loans to the corporate firms besides underwriting as well as directly subscribing to their securities. They also undertake merchant banking activities including leasing.

Leasing is one of the newer modes of long-term financing of the business. It is an arrangement by which a business firm obtains the right to use an asset without owning it for a consideration of periodic rental payments to the actual owner of the asset.

Foreign sources of capital in the form of direct investment, equity participation and loans and advances have remained a prominent source of finance for the Indian corporate sector. The provision for this source of finance is essentially felt for infrastructural development, technological collaboration, import substitution, balance of payment adjustments and for the overall growth and development of an under-developed economy.

Retained profits is that part of the total profit of a firm which is not distributed among the shareholders. It is a prominent source of internal financing which can be used for the growth, diversification, expansion, and modernisation of a corporate firm. The firm's dividend policy, the shareholders desire, statutory provisions, volume of profits and similar other factors have a great bearing on the amount of retained earnings of a business.

3.8 KEY WORDS

Stock Exchange refers to a market place where corporate securities such as stocks, shares, bonds and debentures are traded.

Over-the-counter Exchange is a loosely organised, nationwide network of thousands of security dealers and dealer houses that make markets for different stocks.

Term Loans are the loans that have maturities of one to ten years and are repaid in periodic instalments over the life of the loan. These loans are generally granted by banks and insurance companies and are usually secured by a chattel mortgage or equipment or a mortgage on real property.

Venture Capital is the capital investment in high risky ventures such as start ups or firms denied with conventional financing with the hope of earning a high rate of return.

Operating Lease refers to a contractual commitment on the part of the firm leasing the asset (the lessee) to make a series of payments to the firm that actually owns the asset (the lessor) for use of the asset. It is a short-term lease arrangement, cancellable with proper notice and is not fully amortized.

Financial Lease is a non-cancellable contractual commitment on the part of the firm leasing the asset to make a series of payments to the firm that actually owns the asset for the use of the asset. It is a long-term and fully amortized lease.

Sale and Lease-back arrangement is the mechanism in which a firm sells an asset to another firm or party who in turn agrees to lease the asset back to the selling firm.

Leveraged Lease is a type of financial lease in which the lessor borrows from a third party lender a part of the purchase price of the leased assets using the lease contract as a security for the amount so borrowed.

Euro Issue refers to the issue of securities listed on a European Stock Exchange to which subscription can come from any part of the world except India.

Global Depository Receipt is basically a negotiable certificate denominated in US dollars, that represents a non-US company's publicly traded local currency (Indian rupee) equity shares.

Euro Convertible Bond is an equity linked debt security with an option on the part of the holder to convert it into a share or Depository Receipt (DR).

3.9 Self-Assessment Questions

- (1) Briefly explain the different sources of long-term financing available to Indian industries.
- (2) Enumerate the role of capital market as source of long-term financing.
- (3) Explain the role of specialised financial institutions in connection with long-term financing for corporate firms.
- (4) Bring out the distinction between investing institutions and development banks and also discuss the former's role in extending long-term finance to business firms.
- (5) Evaluate the potentiality of leasing as a means of corporate finance in India.
- (6) What are the different foreign source of finance available to Indian Industries ? make an assessment of the relative importance of each of them.
- (7) "A firm can hardly overemphasise the importance of internal source as a means of finance" - Give your comments with special reference to retained profit as a component of internal sources.
- (8) Explain the factors which determine the amount of retained earnings of a firm.

3.10 FURTHER READINGS

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BRAOU

BLOCK 2 FINANCIAL AND INVESTMENT ANALYSIS

This block introduces you to some techniques of financial and investment analysis. It has four units.

Unit 4 classifies various types of ratios and attempts to identify ratios which are appropriate for control of different types of activities. How ratios are to be computed and compared against what norms is explained with the help of illustrations.

Unit 5 explains the concepts of financial and operating leverages and examines the relationship between the two. It concludes with an assessment of the risk implications of financial leverage.

Unit 6 deals with the process of budgeting and budgetary control. The importance of budgetary control is highlighted. This is followed by a brief discussion on new developments in the area of budgeting.

Unit 7 underscores the need for proper investment appraisal. The various appraisal techniques are explained with the help of illustrations along with some other related concepts.

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BRAOU

UNIT 4 RATIO ANALYSIS

Objectives

The main objectives of this unit are to.

- provide a broad classification of ratios
- identify ratios which are appropriate for control of activities
- attempt a system of ratios which responds to the needs of control by management.

Structure

- 4.1 Introduction
- 4.2 Classification
- 4.3 The Norms for Evaluation
- 4.4 Computation and Purpose
- 4.5 Managerial Uses of the Primary Ratio
- 4.6 Summary
- 4.7 Key Words
- 4.8 Self Assessment Questions/ Exercises
- 4.9 Further Readings

4.1 INTRODUCTION

You have already been exposed to the 'construction and analysis' of financial statements.

By now you might have acquired some familiarity with financial ratios that provide basic relationships about several aspects of a business. You may have observed that the Financial media (magazines like Fortune India, Business India, Business World, and dailies like Economic Times, Financial Express and Business Standard, among many others) presents many of these ratios to analyse the strengths and weaknesses of individual business firms. Further, the Bombay Stock Exchange makes one of the most exhaustive efforts in the country to analyse financial data of a large number of companies through a set of 21 ratios. An internationally cited use of ratios comes in the ranking of the 500 largest corporations by a financial bi-monthly, viz., Fortune International. This exercise is based on five basic parameters viz., Sales, Assets, Net Income, Stockholders' Equity, and Number of employees. The nine rating measures derived from these parameters are: sales change, profits change, net income as a per cent of sales, net income as a per cent of stockholders' equity, 10-year growth in earning per share, total return to investors (latest year and 10-year average), assets per employee, and sales per employee.

This is not an exhaustive list and you may come across many more sources of published ratios including the individual companies, many of which now provide summarised financial information and ratios for the past five or ten years. The point is that users of ratios are vast, ratios that emerge from financial data are numerous and uses to which these ratios can be put are many.

4.2 CLASSIFICATION

Financial ratios have been classified in a variety of ways. You may find the following broad bases having been employed in current literature:

Primacy Criterion: This distinguishes a measure which could be considered useful for all kinds and sizes of business enterprises, from many other measures which are not so universal in usage. The first one has been called the **Primary Ratio** (viz., the Return on Investment or the ROI) and the other category called **Secondary measures** includes all other ratios. Such measures will essentially vary among firms, and they will select only such of those measures as are relevant for their needs. The British Institute of Management uses this classification for inter-firm comparisons.

Ratios tagged to needs of interest groups: The major interest groups identified for this purpose are:

- a) Management

This classification assumes that 'management group' is different from 'owner group'

Management and operational control: Cost of goods sold and gross margin analysis, profit (net income) analysis, operating expense analysis, contribution analysis and analysis of working capital.

Owners' viewpoint: Net profit to net worth, net profit available (to equity shareholders) to equity share capital, earnings per share, cash flow per share and dividends per share.

Lenders' evaluation: Current Assets to Current Liabilities, Quick Assets (i.e., current assets minus inventories) to Current Liabilities, Total Debt to Total Assets, Long-term Debt to Net Assets, Total Debt to Net Worth, Long-term Debt to Net Worth, Long-term Debt to Net Assets and Net Profit before Interest and Taxes (i.e., NBIT) to Interest.

Fundamental classification: Ratios under this classification are grouped according to a basic function relevant to financial analysis. Four such functional groups have been generally recognised.

a) Liquidity Ratios are ratios which measure a firm's ability to meet its maturing short-term obligations. Examples include the current Ratio and the quick Ratio.

b) Leverage Ratios are ratios which measure the extent to which a firm has been financed by debt. Suppliers of debt capital would look to equity as margin of safety, but owners would borrow to maintain control with limited investment. And if they are able to earn on borrowed funds more than the interest that has to be paid, the return to owners is magnified. (This aspect has been elaborated and illustrated in the next Unit on Financial and Operating Leverage). Examples include debt to total assets, times interest earned, and fixed charge coverage ratios.

c) Activity Ratios are ratios which measure the effectiveness with which a firm is using its resources. Examples include Inventory turnover, Average collection period, Fixed assets turnover, and Total assets turnover.

d) Profitability Ratios are ratios which measure management's overall effectiveness as shown by the returns generated on sales and investment. Examples could be profit (net or gross) margin, Net Profit to total assets or ROI, Net profit after taxes to Net worth.

One more class of ratios is sometimes added to the four groups specified above. This is called the 'Market Value' group of ratios, which relate investors' expectations about the company's future to its present performance and financial condition. Examples would cover Price-earnings (PE) and Market/book-value ratios.

The fundamental classification is probably the most extensively used mode of presenting financial statement analysis.

Activity 1

Table 1 on next page lists 21 ratios being computed by the Bombay Stock Exchange. Tick the broad class to which each of the 21 ratios belongs to in the blank columns of the Table.

You must have begun grouping the ratios on the basis of what you have learnt about them. However, we would help you in this exercise. The very first ratio and for that matter the first three ratios are figured on net worth which is a parameter of great interest to proprietors. Nevertheless, the ratios do not reflect either of the four fundamental roles viz., liquidity, leverage, profitability and activity. Also, they are not primary since they do not measure final profitability of capital (or investment) committed to the firm. Hence, ratios 1 to 3 are secondary and owner-oriented. Of course, they do reveal one fundamental aspect too viz., stability. The Bombay Stock Exchange classifies these ratios under the broad group of 'Stability ratios'.

This exercise at classification has given you an idea about ratios which are relevant for controlling business activities and the ratio in which top management would be particularly interested. Obviously, they are activity ratios which we have classified as 'management-oriented' ratios. The primary ratio which is of universal relevance to

Table 1: Table listing 21 ratios being computed by the Bombay Stock Exchange

Broad Classes of Ratios

Ratios	Primary			Interest Groups			Fundamental		
	Primary	Secondary	Management	Owner	Lender	Liquidity	Leverage	Profitability	Activity
1 Net worth to Total assets									
2 Net block to Net worth									
3 Total liabilities to Net worth									
4 Current Assets to Current liabilities									
5 Quick Assets to Current liabilities									
6 Net Sales to Total assets									
7 Net Sales to Net worth + Debentures									
8 Net Sales to Plant & Machinery at Cost									
9 Sundry Debtors to Average Daily Sales									
10 Net profit to Total Capital Employed.									
11 Net Profit + Debenture Interest to Net worth + Debentures									
12 Net profit to Total assets									
13 Depreciation Reserve to Gross Block									
14 Depreciation Provision to Net Block									
15 Tax Provision to Pre-tax profit									
16 Preference Capital + Debentures to Equity Capital									
17 Debentures to Net worth + Debentures									
18 Preference Capital to Net worth + Debentures									
19 Equity Capital + Reserve to Net worth + Debentures									
20 Times Debenture Interest covered									
21 Times Preference Dividends covered									

top management will be specifically explained regarding its rationale and construction in this unit.

You have noticed that the basic flow of activities of a business firm follows a certain sequence:

Investment decision → financing of investment → acquisition of resources → deployment of resources → disposal of output → reinvestment of surplus.

This sequence needs some explanation. A typical business firm would take a decision to invest after an analysis of the projected inflows and outflows of the project. This will be followed by a plan to finance the project which may be debt finance and/or proprietors' own funds. Finances will then be utilised to build facilities and commercial output will be obtained as per the project schedule (assuming there are no over-runs and delays). Sales revenue will follow the disposal of the output and after meeting all costs and expenses (including tax and finance charges), a decision will be taken to compensate the owners (dividend decision) and reinvest the balance, if any.

You will appreciate that the cycle of business activities commences with the deployment of resources and terminate in the disposal of output. A business would like to have as many such cycles as possible during a time period, say a year. Apart from increasing the number of such cycles during a time period the management would be interested to reduce costs and expenses to the minimum at each stage of the cycle. Accounting ratios which belong to the category of "management-oriented activity ratios" enable business firms to exercise control over operations. The next section of this unit focuses attention on these ratios.

4.3 THE NORMS FOR EVALUATION

You may just be wondering as to how we control activities through ratios. The answer is not difficult to seek. Ratios that we have identified for control of activities measure relationships between key elements at any point of time. Such a measure is then compared with some 'norm' and the causes for deviation investigated. An action-plan is then prepared and implemented to remove the cause(s). For example, Bombay Dyeing reports 89 days of inventories held on an average against net sales during the year 1985 (See: Fortune India, Sept., 1986, p. 82). Now, how do we judge if the figure of '89 days' is just about okay for a firm like 'Bombay Dyeing'? The following appear to be the ways for evaluating this figure:

a) Against a trend over time: The following data may be observed for Bombay Dyeing:

Year	Average No. of days of inventory*
1981	90
1982	118
1983	115
1984	107
1985	89

$$\text{*Average No. of days} = \text{Net sales} \div \frac{\text{Opening inventory} + \text{Closing inventory}}{2/365}$$

b) Against an average of some past period: The relevant data for Bombay Dyeing may be evaluated on the basis of the mean of average number of days viz., $90 + 118 + 115 + 107 + 89/5 = 519/5 = 104$ days approximately.

c) Against an industry average: A certain number of firms chosen (randomly or otherwise) from textile industry, to which Bombay Dyeing belongs, may be used to compute the industry average as a norm. Thus, data relating to average number of days of inventory of, say, 20 textile units of the size and type of Bombay Dyeing may be averaged for a particular year for which Bombay Dyeing's ratio is being evaluated. Period averages for firms may also be used to obtain a grand mean for evaluation.

d) Against an average of a cross-section sample: The Reserve Bank of India publishes financial statistics of joint stock companies. Their sample for the period 1980-81 to 1982-83 included 1651 public limited companies (with paid-up capital

or Rs. 5 lakhs and above). Year-wise averages for corporate sector as a whole are available. In a similar manner, the ICICI publishes elaborate data on financial performance of companies assisted by them. The latest study pertains to the year 1984-85 and includes 417 companies in different industry groups. This sample covers around 50 per cent of the total private corporate sector in terms of paid-up capital. Year-wise average for industry groupings are available.

Activity 2

The ICICI Study on Financial Performance (1984-85, Table I-D5, pp. 74-75) presents the following data with regard to inventory turnover of 43 textile companies:

Year	Inventory as % of sales		
	34 composite mills	9 spinning mills	Total 43 mills
1980-81	24.8	25.1	24.8
1981-82	26.5	24.2	26.3
1982-83	26.4	24.2	26.1
1983-84	26.0	22.9	25.6
1984-85	24.4	23.7	24.3

Comment on the suitability of the given data to evaluate the inventory position of Bombay Dyeing in the year 1985.

4.4 COMPUTATION AND PURPOSE

A summary of management-oriented activity ratios is given below. This describes the ratios and also their main purposes.

Activity Ratios (Secondary Group)

Ratio	Computation Method	Purpose(s)
I Cost of Goods Sold and Gross Margin Analysis		
1 Cost of Goods sold	Cost of Goods sold/ Net Sales	Provide an idea of 'gross margin' which in turn would depend on relationship between prices, volumes and costs.
2 Gross Margin	Net sales—Cost of goods sold/net sales	
II Profit Analysis		
3 Net Margin	Net Profit/Net Sales	Reflects management's ability to operate business to recoup all costs & expenses (including depreciation, interest and taxes) and also to provide a compensation to owners.
4 Operating margin	Net operating Income before Interest & Taxes/Net sales	Provides a view of operating effectiveness.
5 Post-tax margin	Net Profit after tax but before Interest*/Net Sales	Shows after-tax margin to both owners and lenders.

* The numerator for post-tax margin may be obtained by adding back to net profit the after-tax cost of interest on debt which is pre-tax interest times (1-tax rate).

Ratio	Computation Method	Purpose(s)
III Expense Analysis		
6 Operating Ratio	Operating expenses/ Net sales	Reflects the incidence of operating expenses (which are defined variously for different costing systems).
IV Contribution Analysis		
7 Total contribution	Net sales—directly variable costs/Net Sales	Indicates the total margin provided by operations towards fixed costs and profits of the period.
V Management of Capital		
8 Gross Assets turnover	Net Sales/ Total assets	Effectiveness of the use of all assets viz., current and non-current.
9 Net Assets turnover	Net Sales/Total assets—current liabilities	Effectiveness of assets employed on the assumption that current liabilities are available to the business as a matter of course, and will effectively reduce the assets required to be employed.
10 Inventory turnover	Net Sales or Cost of Goods Sold/Average Inventories	Shows the number of times inventory replenishment is required during an accounting period to achieve a given level of sales.
11 Receivables turnover	Net Sales/average receivables	Amount of trade credit allowed and revolved during a year to achieve a level of sales.
12 Average collection period	$\frac{\text{Average Receivables}}{\text{Net Sales}} \times 365$	Evaluates the effectiveness of the credit period granted to customers.

Activity 3

State whether the following statements are True or False:

- Cost of goods sold + Gross Margin = Net Sales ☐ True ☐ False
- Net margin is the only measure of profitability of a manufacturing firm ☐ True ☐ False
- Net operating Income (NOI) is the same as Earnings before Interest and Taxes (EBIT) ☐ True ☐ False
- The numerator of the ratio called 'Post-tax margin' is obtained as follows:
Net profit after interest, depreciation and taxes + Interest (1-tax rate) ☐ True ☐ False
- In calculating the operating ratio, all firms employ a standard definition of operating expenses ☐ True ☐ False
- The ratio called 'total contribution' can also be calculated as follows:
Fixed costs/Net sales—variable costs ☐ True ☐ False
- Net assets turnover is calculated by Net sales/
Net Fixed Assets + Net Current Assets + Other assets ☐ True ☐ False
- In computing the inventory turnover ratio, cost of goods sold is a better numerator than net sales ☐ True ☐ False
- The ratio called 'Average collection period' evaluates all aspects for credit policy ☐ True ☐ False
- Net sales are gross sales as reduced by returns, rebates and excise duty ☐ True ☐ False

You have been through a review of the select ratios which focus managerial attention on some of the critical aspects of a firm's activities. You may acquire a greater degree of confidence in the use of the ratios summarised above if you review their construction process also. What, therefore, follows is real-life data relating to a well-known company in the paper industry. You have to calculate the twelve ratios tabulated in this section of the unit.

Activity 4

Compute the twelve activity ratios for the three years with the help of the following information which has been extracted from the annual accounts of Orient Paper and Industries Ltd. Also offer your comments. On the basis of the limited information available with you, what areas would you identify for control?

	Years ending on 31st March			
	1982	1983	1984	1985
(Amount in Rs. Crores)				
Balance Sheet (Select items)				
1 Current Assets		38.28	39.74	52.23
2 Of which Inventories	17.89	21.70	22.33	26.37
2A Of which S. Debtors	6.91	10.17	10.49	10.93
3 Net Fixed Assets		47.68	47.18	50.08
4 Total Assets		90.26	91.21	106.60
5 Current Liabilities		41.95	43.87	45.02
Profit & Loss Statement (Select Items)				
6 Net Sales		95.09	113.60	155.29
7 Cost of goods sold		80.88	93.12	130.65
8 Directly variable expenses (Wages, salaries and direct manufacturing expenses)		61.79	73.20	101.41
9 Interest		4.81	4.54	5.44
10 Operating Profit (after depreciation and interest)		.17	.39	2.60
11 Non-operating profit		4.34	2.49	3.27
12 Pre-tax profit		4.51	2.88	5.87
13 Provision for taxes		—	—	.80
14 Net Profit		4.51	2.88	5.07

4.5 MANAGERIAL USES OF THE PRIMARY RATIO

The return on investment has been aptly regarded as a primary ratio because it specifies the relative net profit earned on the capital employed. This is one single measure where the final outcome of all business activities gets recorded. It provides not only a vehicle for measuring relative business efficiency but also focuses attention on whether an adequate return has been earned in accordance with the expectations of the investors on the capital contributed by them.

In many cases it becomes necessary to disaggregate an organisation into divisions and the return on divisional investment can be employed to gauge the divisional performance.

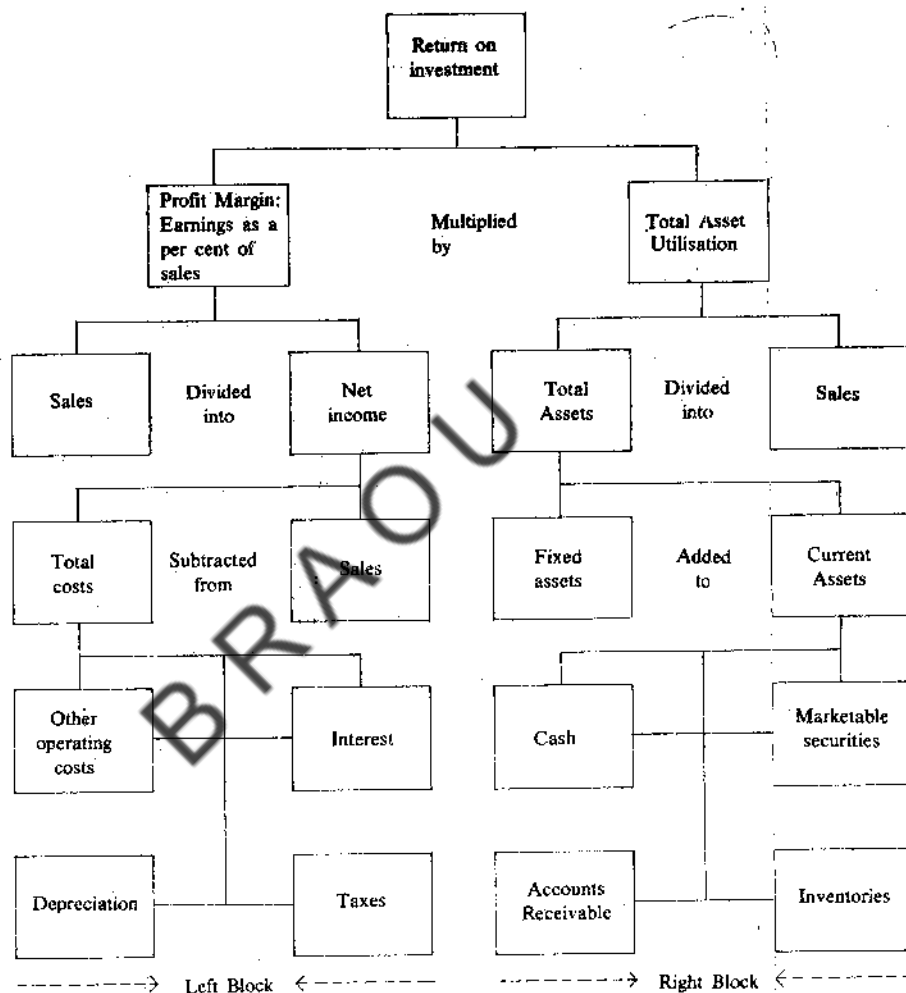
However, it may be stated that the concept of ROI (Return on Investment) is not free from ambiguity. This is primarily due to the fact that numerator and denominator of this ratio i.e. 'return' and 'capital' are subject to differing interpretations. As standard definitions of these two basic terms do not exist as yet, the firms define the terms according to their own thinking. While some firms may define 'investment' quite broadly, others may define it narrowly. As a consequence of this, variations of ROI are found in 'practice', e.g.; ROA (i.e. Return on Assets).

You will appreciate these variations better as you go along with the discussion and the illustrations regarding the analysis of ROI.

You may note that the use of ROI which in fact is a combination of some other ratios was pioneered by Du pont. That is why it is sometimes known as the Du pont system of Financial control.

The Du pont chart is presented in Figure I and it may be of interest to you to note the manner in which the various key elements converge into a single measure viz., the Return on Investment. The right block charts out the investment made in various assets and the left block depicts the earnings and costs flowing in and out of the utilisation of these assets. Both the net income and total assets are then related to sales to finally yield the single measure which peaks the pyramid viz., the ROI.

You will notice that Cash, Accounts Receivable, Marketable Securities and Inventories shown on the right block at the bottom are added up as current assets which then are added (leftward) to fixed assets. This aggregates into total assets which are then divided (rightward) into sales to produce a ratio shown as Total Asset Utilisation or Total Assets Turnover. A similar kind of measure based on income emerges from the left block. The bottom four boxes at left sum up Interest, Taxes, Depreciation and other operating costs into Total Costs which are then deducted (rightward) from Sales to yield Net Income. The Net Income is divided (leftward) into sales to generate a ratio known as the Net Margin. The two penultimate measures viz., Total Asset Utilisation and Net Margin are then multiplied together to figure out the Return on Investment at the top box of the chart.



The return on investment may be expressed as a relationship in the following formula:

$$\text{ROI} = \text{Total Asset Turnover} \times \text{Net Margin}$$

$$\text{or } \frac{\text{Net Income}}{\text{Total Assets}} = \frac{\text{Sales}}{\text{Total Assets}} \times \frac{\text{Net Income}}{\text{Sales}}$$

You may further notice that total assets may be financed partly by owners' funds (known as equity) and partly by borrowed funds (recognised as debt). Given the proportion of assets financed by equity, an appropriate measure of Return on Equity (ROE) may also be derived from the ROI. This will be given by

$$\text{ROE} = \text{ROI} / \text{Proportion of Total Assets financed by Equity}$$

$$= \text{ROI} \div \frac{\text{Equity}}{\text{Total Assets}}$$

$$= \text{ROI} \times \frac{\text{Total Assets}}{\text{Equity}}$$

The term Total Assets/Equity may be recognised as Equity Multiplier and then ROE will be equal to ROI times the Equity Multiplier.

Versions of ROI

A large number of variations of ROI are found in practice, depending upon how 'Investment' and 'Return' are defined. 'Investment' may be defined to include any of the following:

- 1 Gross capital employed Net fixed assets + total current assets + other assets
- 2 Net capital employed Net fixed assets + net current assets + other assets
- 3 Proprietors' net capital employed Total assets—(Current liabilities + long-term borrowing + any other outside funds)
- 4 Average capital employed Opening + closing balances of capital, reserves, accumulated depreciation and borrowings/2

Similarly, 'Return' may be defined to include any of the following:

- 1 Gross profit
- 2 Profits before depreciation, interest and taxes (PBDIT)
- 3 Profits before depreciation, interest and taxes (excluding capital and extraordinary profits): PBDIT*
- 4 Profits before tax (PBT)
- 5 Profits before tax (excluding capital and extraordinary profits): PBT*

The following versions of ROI are used in practice:

- 1 Gross Return on Investment = Gross Profit/Total Net Assets
- 2 Net Return on Investment = Net Profit/Total Net Assets
- 3 Return on Capital Employed = Profit before tax + Interest/Net Worth (ROCE)
+ Interest bearing debt.
- 4 ROI (based on PBDIT) = PBDIT as per cent of average capital employed
- 5 ROI (based on PBT) = PBT as per cent of average of capital and reserves.

Activity 5

The following particulars have been selectively taken from the annual accounts of Raymond Woollen Mills Ltd., for the years 1984, 1985 and 1986:

(Rs. crores)

Particulars	Years ending on March 31		
	1984	1985	1986
Income Statement			
1 Operating profit	18.75	22.78	27.48
2 Interest	6.74	8.90	11.70
3 Gross Profits (1-2)	12.01	13.88	17.70
4 Depreciation	7.66	8.84	8.84
5 Profit before tax (PBT) : (3-4)	4.35	5.04	9.25
6 Tax	0.05	.01	.01
7 Net Profit (5-6)	4.30	5.03	9.24
Balance Sheet			
1 Fixed Assets (gross)	94.61	112.28	162.16
2 Accumulated Depreciation	26.90	34.34	38.26
3 Net fixed assets (1-2 + capital work in progress)	75.16	107.23	127.66
4 Investments	8.48	10.12	12.29
5 Current Assets	42.61	59.97	75.17
6 Current liabilities and Provisions	30.95	36.53	56.30
7 Net Current Assets (5-6)	11.66	23.44	18.87
8 Total Net Assets (3 + 4 + 7)	95.30	140.79	158.82
Financed by			
9 Net worth	33.97	39.41	53.16
10 Borrowings	61.33	101.38	105.66
of which long-term	39.27	71.09	63.61

- a) Compute Gross Return on Investment, Net Return on Investment, and Return on Capital Employed for the three years. What are your conclusions?
- b) Also derive the Return on Equity from the ROI (i.e., Net return on Total Net Assets).

Illustration 1

EVERLIGHT COMPANY LIMITED

Comparative Balance Sheet
December 31, Year 1 and Year 2

	December 31, Year 1	December 31, Year 2
	Rs.	Rs.
Assets		
Cash	1,000	1,200
Bank	6,000	7,500
Accounts Receivable	12,600	14,800
Inventory	18,400	20,500
Repayments	800	850
Land and Building	20,000	24,000
Plant and Machinery	30,000	32,000
	88,800	1,00,850
Liabilities and Shareholders' Equity		
Bills Payable	4,000	7,850
Accounts Payable	6,400	6,000
Other Current Liabilities	2,000	2,200
Debentures (10%)	20,000	18,000
Preference Shares (12%)	10,000	10,000
Ordinary Shares, Rs. 10 each	40,000	50,000
Retained Earnings	6,400	6,800
	88,800	1,00,850

Income and Retained Earnings Statement for the Year Ended December 31, Year 2

Sales Revenue	Rs. 60,000
Less Expenses :	
Cost of Goods Sold	Rs. 28,000
Selling	8,000
Administrative	6,000
Interest	2,000
Income Tax	6,000
Total Expenses	50,400
Net Income	9,600
Less Dividend :	
Preferred	1,200
Ordinary	8,000
	9,200
Increase in Retained Earning for Year 2	400
Retained Earnings, December 31, Year 1	6,400
Retained Earnings, December 31, Year 2	6,800

With the above information, let us compute the following ratios:

- Rate of Return on Assets
- Profit Margin (before interest and related tax effect)
- Cost of Goods Sold to Sales Percentage
- Selling Expenses to Sales Percentage
- Operating Expense Ratio
- Total Assets Turnover
- Accounts Receivable Turnover
- Inventory Turnover
- Rate of Return on Ordinary Share Equity
- Current Ratio
- Quick Ratio
- Long-Term Debt Ratio
- Debt Equity Ratio

(a) Compute the Return on Investment (ROI) for the three years. What are your conclusions?
(b) Also derive the Return on Equity (ROE) from the ROI (i.e., net return on Equity Assets).

- o) Earnings per (Ordinary) Share
 p) Price Earning Ratio
 q) Book Value per Ordinary Share

The income tax rate is 40 per cent. The market price of an ordinary share at the end of Year 2 was Rs. 14.80.

Let us take all these ratios one by one.

- a) Rate of Return on Assets

$$\frac{\text{Rs. } 9,600 + (1 - 40) (\text{Rs. } 2,000)}{.5 (\text{Rs. } 38,800 + \text{Rs. } 1,00,850)} = 11.39 \text{ per cent}$$

- b) Profit Margin Ratio

$$\frac{\text{Rs. } 9,600 + (1 - 40) (\text{Rs. } 2,000)}{\text{Rs. } 60,000} = 18 \text{ per cent}$$

- c) Cost of Goods Sold to Sales Percentage

$$\frac{\text{Rs. } 28,000}{\text{Rs. } 60,000} = 46.67 \text{ per cent}$$

- d) Selling expenses to Sales Percentage

$$\frac{\text{Rs. } 8,000}{\text{Rs. } 60,000} = 13.33 \text{ per cent}$$

- e) Operating Expense Ratio

$$\frac{\text{Rs. } 8,000 + \text{Rs. } 6,000}{\text{Rs. } 60,000} = 23.33 \text{ per cent}$$

- f) Total Asset Turnover

$$\frac{\text{Rs. } 60,000}{.5 (\text{Rs. } 38,800 + \text{Rs. } 1,00,850)} = 63 \text{ times per year}$$

- g) Accounts Receivable Turnover

$$\frac{\text{Rs. } 60,000}{.5 (\text{Rs. } 12,600 + \text{Rs. } 14,800)} = 54.38 \text{ times per year}$$

- h) Inventory Turnover Ratio

$$\frac{\text{Rs. } 28,000}{.5 (\text{Rs. } 18,400 + \text{Rs. } 20,500)} = 1.44 \text{ times per year}$$

- i) Rate of Return on Ordinary Share Equity

$$\frac{\text{Rs. } 9,600 - \text{Rs. } 1,200}{.5 (\text{Rs. } 46,400 + \text{Rs. } 56,800)} = 16.28 \text{ per cent}$$

- j) Current Ratio

$$\begin{aligned} \text{December 31, Year 1} &: \frac{\text{Rs. } 38,800}{\text{Rs. } 12,400} = 3.13 : 1 \\ \text{December 31, Year 2} &: \frac{\text{Rs. } 44,850}{\text{Rs. } 16,050} = 2.79 : 1 \end{aligned}$$

- k) Quick Ratio

$$\begin{aligned} \text{December 31, Year 1} &: \frac{\text{Rs. } 19,600}{\text{Rs. } 12,400} = 1.56 : 1 \\ \text{December 31, Year 2} &: \frac{\text{Rs. } 23,500}{\text{Rs. } 16,050} = 1.46 : 1 \end{aligned}$$

- l) Long-term Debt Ratio

$$\begin{aligned} \text{December 31, Year 1} &: \frac{\text{Rs. } 20,000}{\text{Rs. } 80,400} = 24.86 \text{ per cent} \\ \text{December 31, Year 2} &: \frac{\text{Rs. } 18,000}{\text{Rs. } 84,800} = 21.23 \text{ per cent} \end{aligned}$$

m) Debt Equity Ratio

$$\text{December 31, Year 1 : } \frac{\text{Rs. 20,000}}{\text{Rs. 46,400}} = 43.10$$

$$\text{December 31, Year 2 : } \frac{\text{Rs. 18,000}}{\text{Rs. 56,800}} = 31.69$$

(Equity may or may not include retained earnings. Here, retained earnings have been included.)

n) Times Interest Charges Earned

$$\frac{\text{Rs. 9,600} + \text{Rs. 6,400} + \text{Rs. 2,000}}{\text{Rs. 2,000}} = 9 \text{ times}$$

o) Earnings per Ordinary Share (EPS)

$$\begin{aligned} \text{December 31, Year 2 :} \\ \frac{\text{Rs. 8,400}}{.5 (4000 + 5000)} = \text{Rs. 1.87} \end{aligned}$$

p) Price-Earnings Ratio

$$\text{December 31, Year 2 : } = \frac{14.80}{1.87} = 7.91 \text{ times}$$

q) Book Value per Ordinary Share

$$\text{December 31, Year 1 : } \frac{\text{Rs. 46,400}}{4,000} = \text{Rs. 11.60}$$

$$\text{December 31, Year 2 : } \frac{\text{Rs. 56,800}}{5,000} = \text{Rs. 11.36}$$

Illustration 2

The information contained in Tables 1-4 relate to a company for the years 19 × 7 and 19 × 8; we shall attempt a comprehensive analysis.

Table 1
Megapolitan Company Ltd.
Condensed Balance Sheet for the years ending
December 31, 19×8 and December 31, 19×7

	19×8	19×7	Increase or (Decrease)		Percentage of total Assets	
			Rs.	%	19×8	19×7
ASSETS	Rs.	Rs.				
Current Assets	1,95,000	1,44,000	51,000	35.4	41.1	33.5
Plant and equipment (net)	2,50,000	2,33,500	16,500	7.1	52.6	54.3
Other assets	30,000	52,500	(22,500)	42.9	6.3	12.2
Total	4,75,000	4,30,000	45,000	10.5	100.0	100.0
LIABILITIES & CAPITAL						
Liabilities:						
Current liabilities	56,000	47,000	9,000	(19.1)	11.8	10.9
12% Debentures	1,00,000	1,25,000	(25,000)	(20.0)	21.1	29.1
Total	1,56,000	1,72,000	16,000	(9.3)	32.9	40.0
Shareholders' equity:						
9% preference shares (Rs. 100 each)	50,000	50,000			10.5	11.6
Equity shares (Rs. 10 each)	1,25,000	1,00,000	25,000	25.0	26.3	23.2
Premium on issue of shares	35,000	20,000	15,000	75.0	7.4	4.7
Retained earnings	1,09,000	88,000	21,000	23.9	22.9	20.5
Total shareholders' equity	3,19,000	2,58,000	61,000	23.6	67.1	60.0
Total	4,75,000	4,30,000	45,000	10.5	100.0	100.0

Table 2
Income statement for the years ended December 31, 19 × 8 and December 31, 19 × 7

	19×8	19×7	Increase or (Decrease)		Percentage of net sales	
			Rs.	%	19×8	19×7
	Rs.	Rs.	Rs.			
Net sales	4,50,000	3,75,000	75,000	20.0	100.0	100.0
Cost of goods sold	2,65,000	2,10,000	55,000	26.2	58.9	56.0
Gross profit on sales	1,85,000	1,65,000	20,000	12.1	41.1	44.0
Operating expenses:						
Selling	58,500	37,500	21,000	56.0	13.0	10.0
Administrative	63,000	47,500	15,500	32.6	14.0	12.7
Total	1,21,500	85,000	36,500	42.9	27.0	22.7
Operating income	63,500	80,000	(16,500)	(20.6)	14.1	21.3
Interest expense	12,000	15,000	3,000	(20.0)	2.7	4.0
Income before income taxes	51,500	65,000	(13,500)	(20.8)	11.4	17.3
Income taxes	14,000	20,000	6,000	(30.0)	3.1	5.3
Net Income	37,500	45,000	(7,500)	(16.7)	8.3	12.0

Table 3
Statement of Retained Earnings
for the years ended December 31, 19×8 and December 31, 19 × 7

	19X8	19X7	Increase or (Decrease)	
			Rs.	%
	Rs.	Rs.	Rs.	
Retained earnings, beginning of year	88,000	57,500	30,500	53.0
Net income	37,500	45,000	7,500	(16.7)
	1,25,500	1,02,500	23,000	22.4
Less: Dividends on equity shares	12,000	10,000	2,000	20.0
Dividends on preference shares	4,500	4,500		
	16,500	14,500	2,000	13.8
Retained earnings, end of year	1,09,000	88,000	21,000	23.9

Table 4
Schedule of Working Capital
as at December 31, 19 × 8 and December 31, 19 × 7

	19×8	19×7	Increase or (Decrease)		Percentage of total current items	
			Rs.	%	19×8	19 × 7
	Rs.	Rs.				
Current Assets:						
Cash	19,000	20,000	(1,000)	(5.0)	9.7	13.9
Receivables (net)	58,500	43,000	15,500	36.0	30.0	29.9
Inventories	90,000	60,000	30,000	50.0	46.2	41.6
Prepaid expenses	27,500	21,000	6,500	31.0	14.1	14.6
Total current assets	1,95,000	1,44,000	51,000	35.4	100.0	100.0
Current liabilities:						
Bills payable	7,300	5,000	2,300	46.0	13.1	10.7
Accounts payable	33,000	15,000	18,000	120.0	58.9	31.9
Accrued liabilities	15,700	27,000	(11,300)	(41.9)	28.0	57.4
Total current liabilities	56,000	47,000	9,000	19.1	100.0	100.0
Working capital	1,39,000	97,000	42,000	43.3		

Using the information in the above Tables let us consider analyses that would be of particular interest to:

- Equity shareholders
- Long-term creditors
- Short-term creditors

Equity shareholders : Equity shareholders, present and potential, look primarily to the company's record of earnings. They are therefore interested in relationships such as earnings per share (EPS) and dividends per share. Earnings per share is computed

by dividing the income available for equity shareholders by the number of equity shares outstanding during the year. Any preference dividend must be subtracted from the net income to ascertain the income available to equity shareholders.

			19X8	19X7
			Rs.	Rs.
		Net Income	37,500	45,000
		Less: Preference dividend	4,500	4,500
		Income available to equity shareholders	33,000	40,500
		Equity shares outstanding during the year	12,500	10,000
		Earnings per (Equity) share	2.64	4.05

While dividend may be of prime importance to some equity shareholders, it may not be so for other shareholders. Some shareholders may be interested in receiving a regular cash income, while others may be more interested in securing capital gains through rising market prices. In comparing the merits of alternative investment opportunities, we should therefore relate earnings and dividends per share to the market value of shares. Dividends per share divided by market price per share would give the yield rate on equity shares. Dividend yield is of particular importance to those investors whose objectives is to maximise the dividend income from their investments.

Earnings performance of equity shares is often expressed as price earning ratio by dividing the market price per share by the annual earnings per share. Thus a share selling for Rs. 40 and having earnings of Rs. 5 per share in the year just ended may be stated to have a price-earning ratio of 8 times.

Assuming that the 2,500 additional equity shares issued by the company on January 1, 19X8 received the full dividend of 96 paise in 19X8, and further assuming the prices of the equity shares at December 31, 19X7 and December 31, 19X8 as given in Table 5, earnings per share and dividend yield may be summarised as follows:

Table 5 Earnings and dividends per equity share						
Date	Assumed Market value per share	Earnings per share	Price-earnings ratio	Dividends per share	Dividend yield %	
Dec. 31, 19X7	18	4.05	4.44	1.00	5.56	
Dec. 31, 19X8	14	2.64	5.30	0.96	6.86	

The decline in market value during 19X8 presumably reflects the decrease in earnings per share. The investors evaluating these shares on December 31, 19X8 would consider whether a price earning ratio of 5.30 and the dividend yield of 6.86 represented a satisfactory situation in the light of alternative investment opportunities.

We can also calculate the book value per share.

Table 6 Book value per equity share						
				19X8	19X7	
				Rs.	Rs.	
Total shareholder's equity				3,19,000	2,58,000	
Less: Preference shareholders equity				50,000	50,000	
Equity of ordinary shareholders				2,69,000	2,08,000	
Number of shares outstanding				12,500	10,000	
Book value per equity share				21.52	20.80	

Book value indicates the net assets represented by each equity shares. This information is often helpful in estimating a reasonable price for company shares, especially for small companies whose shares are not publicly traded. However, the market price of the shares of a company may significantly differ from its book value depending upon its future prospects with regard to earnings.

Long-term Creditors: Long-term lenders (or creditors) are primarily interested in two factors:

- 1 The firm's ability to meet its interest requirements.
- 2 The firm's ability to repay the principal of the debt when it falls due.

From the viewpoint of long-term creditors, one of the best indicators of the safety of their investments may be the fact that, over the life of the debt, the company has sufficient income to cover its interest requirements by a wide margin. A failure to cover interest requirements may have serious repercussions on the stability and solvency of the firm. A common measure of the debt safety is the ratio of income available for the payment of interest to the annual interest expenses, called **number of times interest earned**. This computation for Megapolitan Company would be as follows:

Number of Times Interest Earned		19X8	19X7
		Rs.	Rs.
Operating income (before interest and income taxes)	a)	63,500	80,000
Annual interest expense	b)	12,000	15,000
Times interest earned (a÷b)		5.29	5.33

Long-term creditors are interested in the amount of debt outstanding in relation to the amount of capital contributed by shareholders. The debt ratio is computed by dividing long-term debt by shareholders' equity, as shown below:

Debt Ratio		19X8	19X7
		Rs.	Rs.
Long-term debt	a)	1,00,000	1,25,000
Shareholders' equity	b)	3,19,000	2,58,000
Debt ratio (a÷b)		31.35	48.45

From creditors' point of view, the lower the debt ratio (or higher the equity ratio) the better it is. The lower debt ratio means the shareholders have contributed a bulk of funds to the business, and therefore the margin of protection to creditors against a shrinkage of assets is high.

Short-term Creditors: Bankers and other short-term creditors have an interest similar to those of the equity shareholders and debenture holders who are interested in the profitability and long-term stability of a business. Their primary interest, however, is in the current position of the firm, i.e. its ability to generate sufficient funds (working capital) to meet current operating needs and to pay current debts promptly.

The amount of working capital is measured by the excess of current assets over current liabilities. What is important to short-term creditors is not merely the amount of working capital available but more so is its quality. The main factors effecting the quality of working capital are (i) the nature of the current assets comprising the working capital, and (ii) the length of time required to convert these assets into cash. In this context we can calculate the following ratios:

- 1 Inventory turnover ratio
- 2 Account receivable turnover ratio.

Activity 6

In illustration 2 we analysed the financial statements (or information) from the point of view of three groups of people and calculated certain ratios. But these ratios by no means were all inclusive. Certain other ratios, useful for these groups of people, can also be computed. For example, some other ratios useful for equity shareholders (present and prospective) are: Return on investment (ROI), Leverage ratio, and Equity ratio.

In the context of illustration 2:

- a) Calculate and interpret all such ratios; and
- b) Calculate and interpret some ratios for groups of people other than the three above who might be interested in the company, e.g., preference shareholders.

4.6 SUMMARY

A large number of financial ratios are in use. They fulfil a wide variety of objectives and functions. Managers evaluate performance and exercise control, investors match their expectations, and lenders undertake credit approvals with their help.

Control of business activity is crucial for efficiency. Managerial action follows meaningful information flows. Ratios provide a relevant basis, but all ratios may not serve the objective of control. A profit performance measure which is widely prevalent is the Return on Investment, which is considered a primary yardstick for the measurement of operational efficiency. A decomposition of this measure into its key elements as depicted in the Du pont Chart may underline areas which need managerial control for achieving the basic goal of maximising the return on capital employed in the enterprise.

A series of secondary ratios has also been found useful in controlling business activities. Since production and sales are the key parameters in an efficient conduct of business activities, most of these ratios are related in some manner to sales and output. The focus is on revenues and costs and also on the intensity of activity as measured by the various turnover ratios. Going deeper into the conduct of business transactions, a larger number of relationships would be uncovered e.g., stores control, material usage control, labour hours control, machine maintenance, quality control, operating cycle control and so on. But the focus in this unit has been on control of activities through ratios emerging from information externally presented.

4.7 KEY WORDS

Primary Ratio is of primary concern for management because it provides an overall measure of business efficiency and is measured by the much controversial but nevertheless much widely employed Return on Capital Employed.

PEDIT or Profits before depreciation, interest and taxes. This amounts to gross cash flow.

Liquidity Ratios measure the short-term solvency of the firm.

Leverage Ratios measure the long-term solvency of the firm and also provide an idea of the equity cushion for long-term indebtedness.

Activity or Turnover Ratios measure the intensity with which resources of the firm are being utilised.

Average Capital Employed is one-half of the sum total of opening and closing balances of capital, reserves, accumulated depreciation and long-term debt.

Net Total Assets are obtained by deducting current liabilities from total assets.

Equity Multiplier is used to derive the Return on Equity from the Return on Investment, and is computed by dividing Equity into total assets.

Ratio Norm is obtained for different kinds of ratios either as an average over time of the same firm, or an industry average or an average of a cross-section of firms, and is used to evaluate performance and for control purposes.

Average Collection period is obtained by dividing average accounts receivables with net credit sales and multiplying the resultant with 365 days of the year. It suggests the average credit period actually granted during a year.

4.8 SELF-ASSESSMENT QUESTIONS/ EXERCISES

- 1 List the fundamental accounting ratios. Why are they called 'fundamental'?
- 2 What are 'Stability' ratios? Can they be classed as 'fundamental ratios'?
- 3 Enumerate ratios that are appropriate for controlling business activities. What common criterion/criteria bring them together into one category?

The term Total Assets/Equity may be recognised as Equity Multiplier and then ROE will be equal to ROI times the Equity Multiplier.

Versions of ROI

A large number of variations of ROI are found in practice, depending upon how 'Investment' and 'Return' are defined. 'Investment' may be defined to include any of the following:

- | | |
|-------------------------------------|--|
| 1 Gross capital employed | Net fixed assets + total current assets + other assets |
| 2 Net capital employed | Net fixed assets + net current assets + other assets |
| 3 Proprietors' net capital employed | Total assets—(Current liabilities + long-term borrowing + any other outside funds) |
| 4 Average capital employed | Opening + closing balances of capital, reserves, accumulated depreciation and borrowings/2 |

Similarly, 'Return' may be defined to include any of the following:

- Gross profit
- Profits before depreciation, interest and taxes (PBDIT)
- Profits before depreciation, interest and taxes (excluding capital and extraordinary profits): PBDIT*
- Profits before tax (PBT)
- Profits before tax (excluding capital and extraordinary profits): PBT*

The following versions of ROI are used in practice:

- Gross Return on Investment = Gross Profit/Total Net Assets
- Net Return on Investment = Net Profit/Total Net Assets
- Return on Capital Employed = Profit before tax + Interest/Net Worth (ROCE)
+ Interest bearing debt.
- ROI (based on PBDIT) = PBDIT as per cent of average capital employed
- ROI (based on PBT) = PBT as per cent of average of capital and reserves.

Activity 5

The following particulars have been selectively taken from the annual accounts of Raymond Woollen Mills Ltd., for the years 1984, 1985 and 1986:

(Rs. crores)

Particulars	Years ending on March 31		
	1984	1985	1986
Income Statement			
1 Operating profit	18.75	22.78	27.48
2 Interest	6.74	8.90	11.78
3 Gross Profits (1-2)	12.01	13.88	17.70
4 Depreciation	7.66	8.84	8.84
5 Profit before tax (PBT): (3-4)	4.35	5.04	9.25
6 Tax	0.05	.01	.01
7 Net Profit (5-6)	4.30	5.03	9.24
Balance Sheet			
1 Fixed Assets (gross)	94.61	112.28	162.16
2 Accumulated Depreciation	26.90	34.34	38.26
3 Net fixed assets (1-2 + capital work in progress)	75.16	107.23	127.66
4 Investments	8.48	10.12	12.29
5 Current Assets	42.61	59.97	75.17
6 Current liabilities and Provisions	30.95	36.53	56.30
7 Net Current Assets (5-6)	11.66	23.44	18.87
8 Total Net Assets (3 + 4 + 7)	95.30	140.79	158.82
Financed by			
9 Net worth	33.97	39.41	53.16
10 Borrowings	61.33	101.38	105.66
of which long-term	39.27	71.09	63.61

- Compute Gross Return on Investment, Net Return on Investment, and Return on Capital Employed for the three years. What are your conclusions?
- Also derive the Return on Equity from the ROI (i.e., Net return on Total Net Assets).

EVERLIGHT COMPANY LIMITED

Comparative Balance Sheet
December 31, Year 1 and Year 2

	December 31	
	Year 1	Year 2
	Rs.	Rs.
Assets		
Cash	1,000	1,200
Bank	6,000	7,500
Accounts Receivable	12,600	14,800
Inventory	18,400	20,500
Repayments	800	850
Land and Building	20,000	24,000
Plant and Machinery	30,000	32,000
	88,800	1,00,850
Liabilities and Shareholders' Equity		
Bills Payable	4,000	7,850
Accounts Payable	6,400	6,000
Other Current Liabilities	2,000	2,200
Debentures (10%)	20,000	18,000
Preference Shares (12%)	10,000	10,000
Ordinary Shares, Rs. 10 each	40,000	50,000
Retained Earnings	6,400	6,800
	88,800	1,00,850

Income and Retained Earnings Statement for the Year Ended December 31, Year 2

Sales Revenue		Rs. 60,000
Less Expenses :		
Cost of Goods Sold	Rs. 28,000	
Selling	8,000	
Administrative	6,000	
Interest	2,000	
Income Tax	6,000	
Total Expenses		50,400
Net Income		9,600
Less Dividend :		
Preferred	1,200	
Ordinary	8,000	
		9,200
Increase in Retained Earning for Year 2		400
Retained Earnings, December 31, Year 1		6,400
Retained Earnings, December 31, Year 2		6,800

With the above information, let us compute the following ratios:

- Rate of Return on Assets
- Profit Margin (before interest and related tax effect)
- Cost of Goods Sold to Sales Percentage
- Selling Expenses to Sales Percentage
- Operating Expense Ratio
- Total Assets Turnover
- Accounts Receivable Turnover
- Inventory Turnover
- Rate of Return on Ordinary Share Equity
- Current Ratio
- Quick Ratio
- Long-Term Debt Ratio
- Debt Equity Ratio
- Times interest Charges Earned

- o) Earnings per (Ordinary) Share
- p) Price Earning Ratio
- q) Book Value per Ordinary Share

The income tax rate is 40 per cent. The market price of an ordinary share at the end of Year 2 was Rs. 14.80.

Let us take all these ratios one by one.

- a) Rate of Return on Assets

$$= \frac{\text{Rs. } 9,600 + (1 - 40) (\text{Rs. } 2,000)}{.5 (\text{Rs. } 88,800 + \text{Rs. } 1,00,850)} = 11.39 \text{ per cent}$$

- b) Profit Margin Ratio

$$= \frac{\text{Rs. } 9,600 + (1 - 40) (\text{Rs. } 2,000)}{\text{Rs. } 60,000} = 18 \text{ per cent}$$

- c) Cost of Goods Sold to Sales Percentage

$$= \frac{\text{Rs. } 28,000}{\text{Rs. } 60,000} = 46.67 \text{ per cent}$$

- d) Selling expenses to Sales Percentage

$$= \frac{\text{Rs. } 8,000}{\text{Rs. } 60,000} = 13.33 \text{ per cent}$$

- e) Operating Expense Ratio

$$= \frac{\text{Rs. } 8,000 + \text{Rs. } 6,000}{\text{Rs. } 60,000} = 23.33 \text{ per cent}$$

- f) Total Asset Turnover

$$= \frac{\text{Rs. } 60,000}{.5 (\text{Rs. } 88,800 + \text{Rs. } 1,00,850)} = .63 \text{ times per year}$$

- g) Accounts Receivable Turnover

$$= \frac{\text{Rs. } 60,000}{.5 (\text{Rs. } 12,600 + \text{Rs. } 14,800)} = 4.38 \text{ times per year}$$

- h) Inventory Turnover Ratio

$$= \frac{\text{Rs. } 28,000}{.5 (\text{Rs. } 18,400 + \text{Rs. } 20,500)} = 1.44 \text{ times per year}$$

- i) Rate of Return on Ordinary Share Equity

$$= \frac{\text{Rs. } 9,600 - \text{Rs. } 1,200}{.5 (\text{Rs. } 46,400 + \text{Rs. } 56,800)} = 16.28 \text{ per cent}$$

- j) Current Ratio

$$\text{December 31, Year 1 : } \frac{\text{Rs. } 38,800}{\text{Rs. } 12,400} = 3.13 : 1$$

$$\text{December 31, Year 2 : } \frac{\text{Rs. } 44,850}{\text{Rs. } 16,050} = 2.79 : 1$$

- k) Quick Ratio :

$$\text{December 31, Year 1 : } \frac{\text{Rs. } 19,600}{\text{Rs. } 12,400} = 1.56 : 1$$

$$\text{December 31, Year 2 : } \frac{\text{Rs. } 23,500}{\text{Rs. } 16,050} = 1.46 : 1$$

- l) Long-term Debt Ratio

$$\text{December 31, Year 1 : } \frac{\text{Rs. } 20,000}{\text{Rs. } 80,400} = 24.86 \text{ per cent}$$

$$\text{December 31, Year 2 : } \frac{\text{Rs. } 18,000}{\text{Rs. } 84,800} = 21.23 \text{ per cent}$$

m) Debt Equity Ratio

$$\text{December 31, Year 1} : \frac{\text{Rs. 20,000}}{\text{Rs. 46,400}} = 43.10$$

$$\text{December 31, Year 2} : \frac{\text{Rs. 18,000}}{\text{Rs. 56,800}} = 31.69$$

(Equity may or may not include retained earnings. Here, retained earnings have been included.)

n) Times Interest Charges Earned

$$= \frac{\text{Rs. 9,600} + \text{Rs. 6,400} + \text{Rs. 2,000}}{\text{Rs. 2,000}} = 9 \text{ times}$$

o) Earnings per Ordinary Share (EPS)

$$\begin{aligned} \text{December 31, Year 2} : \\ = \frac{\text{Rs. 8,400}}{5 (4000 + 5000)} = \text{Rs. 1.87} \end{aligned}$$

p) Price-Earnings Ratio

$$\text{December 31, Year 2} : = \frac{14.80}{1.87} = 7.91 \text{ times}$$

q) Book Value per Ordinary Share

$$\text{December 31, Year 1} : \frac{\text{Rs. 46,400}}{4,000} = \text{Rs. 11.60}$$

$$\text{December 31, Year 2} : \frac{\text{Rs. 56,800}}{5,000} = \text{Rs. 11.36}$$

Illustration 2

The information contained in Tables 1-4 relate to a company for the years 19 × 7 and 19 × 8, we shall attempt a comprehensive analysis.

Table 1
Megapolitan Company Ltd.
Condensed Balance Sheet for the years ending
December 31, 19×8 and December 31, 19×7

	19×8	19×7	Increase or (Decrease)		Percentage of total Assets	
			Rs.	%	19×8	19×7
ASSETS	Rs.	Rs.				
Current Assets	1,95,000	1,44,000	51,000	35.4	41.1	33.5
Plant and equipment (net)	2,50,000	2,33,500	16,500	7.1	52.6	54.3
Other assets	30,000	52,500	(22,500)	42.9	6.3	12.2
Total	4,75,000	4,30,000	45,000	10.5	100.0	100.0
LIABILITIES & CAPITAL						
Liabilities:						
Current liabilities	56,000	47,000	9,000	(19.1)	11.8	10.9
12% Debentures	1,00,000	1,25,000	(25,000)	(20.0)	21.1	29.1
Total	1,56,000	1,72,000	16,000	(9.3)	32.9	40.0
Shareholders' equity:						
9% preference shares (Rs. 100 each)	50,000	50,000			10.5	11.6
Equity shares (Rs. 10 each)	1,25,000	1,00,000	25,000	25.0	26.3	23.2
Premium on issue of shares	35,000	20,000	15,000	75.0	7.4	4.7
Retained earnings	1,09,000	88,000	21,000	23.9	22.9	20.5
Total shareholders' equity	3,19,000	2,58,000	61,000	23.6	67.1	60.0
Total	4,75,000	4,30,000	45,000	10.5	100.0	100.0

Table 2
Income statement for the years ended December 31, 19 × 8 and December 31, 19 × 7

	19×8	19×7	Increase or (Decrease)		Percentage of net sales	
			Rs.	%	19×8	19×7
	Rs.	Rs.	Rs.			
Net sales	4,50,000	3,75,000	75,000	20.0	100.0	100.0
Cost of goods sold	2,65,000	2,10,000	55,000	26.2	58.9	56.0
Gross profit on sales	1,85,000	1,65,000	20,000	12.1	41.1	44.0
Operating expenses:						
Selling	58,500	37,500	21,000	56.0	13.0	10.0
Administrative	63,000	47,500	15,500	32.6	14.0	12.7
Total	1,21,500	85,000	36,500	42.9	27.0	22.7
Operating income	63,500	80,000	(16,500)	(20.6)	14.1	21.3
Interest expense	12,000	15,000	3,000	(20.0)	2.7	4.0
Income before income taxes	51,500	65,000	(13,500)	(20.8)	11.4	17.3
Income taxes	14,000	20,000	6,000	(30.0)	3.1	5.3
Net Income	37,500	45,000	(7,500)	(16.7)	8.3	12.0

Table 3
Statement of Retained Earnings
for the years ended December 31, 19×8 and December 31, 19 × 7

	19X8	19X7	Increase or (Decrease)	
			Rs.	%
	Rs.	Rs.	Rs.	
Retained earnings, beginning of year	88,000	57,500	30,500	53.0
Net income	37,500	45,000	7,500	(16.7)
	1,25,500	1,02,500	23,000	22.4
Less: Dividends on equity shares	12,000	10,000	2,000	20.0
Dividends on preference shares	4,500	4,500		
	16,500	14,500	2,000	13.8
Retained earnings, end of year	1,09,000	88,000	21,000	23.9

Table 4
Schedule of Working Capital
as at December 31, 19 × 8 and December 31, 19 × 7

	19×8	19×7	Increase or (Decrease)		Percentage of total current items	
			Rs.	%	19×8	19 × 7
	Rs.	Rs.				
Current Assets:						
Cash	19,000	20,000	(1,000)	(5.0)	9.7	13.9
Receivables (net)	58,500	43,000	15,500	36.0	30.0	29.9
Inventories	90,000	60,000	30,000	50.0	46.2	41.6
Prepaid expenses	27,500	21,000	6,500	31.0	14.1	14.6
Total current assets	1,95,000	1,44,000	51,000	35.4	100.0	100.0
Current liabilities:						
Bills payable	7,300	5,000	2,300	46.0	13.1	10.7
Accounts payable	33,000	15,000	18,000	120.0	58.9	31.9
Accrued liabilities	15,700	27,000	(11,300)	(41.9)	28.0	57.4
Total current liabilities	56,000	47,000	9,000	19.1	100.0	100.0
Working capital	1,39,000	97,000	42,000	43.3		

Using the information in the above Tables let us consider analyses that would be of particular interest to:

- Equity shareholders
- Long-term creditors
- Short-term creditors

Equity shareholders : Equity shareholders, present and potential, look primarily to the company's record of earnings. They are therefore interested in relationships such as earnings per share (EPS) and dividends per share. Earnings per share is computed

by dividing the income available for equity shareholders by the number of equity shares outstanding during the year. Any preference dividend must be subtracted from the net income to ascertain the income available to equity shareholders.

	19X8 Rs.	19X7 Rs.
Net Income	37,500	45,000
Less: Preference dividend	4,500	4,500
Income available to equity shareholders	33,000	40,500
Equity shares outstanding during the year	12,500	10,000
Earnings per (Equity) share	2.64	4.05

While dividend may be of prime importance to some equity shareholders, it may not be so for other shareholders. Some shareholders may be interested in receiving a regular cash income, while others may be more interested in securing capital gains through rising market prices. In comparing the merits of alternative investment opportunities, we should therefore relate earnings and dividends per share to the market value of shares. Dividends per share divided by market price per share would give the yield rate on equity shares. Dividend yield is of particular importance to those investors whose objectives is to maximise the dividend income from their investments.

Earnings performance of equity shares is often expressed as price earning ratio by dividing the market price per share by the annual earnings per share. Thus a share selling for Rs. 40 and having earnings of Rs. 5 per share in the year just ended may be stated to have a price-earning ratio of 8 times.

Assuming that the 2,500 additional equity shares issued by the company on January 1, 19X8 received the full dividend of 96 paise in 19X8, and further assuming the prices of the equity shares at December 31, 19X7 and December 31, 19X8 as given in Table 5, earnings per share and dividend yield may be summarised as follows:

Table 5
Earnings and dividends per equity share

Date	Assumed Market value per share	Earnings per share	Price-earnings ratio	Dividends per share	Dividend yield %
	Rs.	Rs.		Rs.	
Dec. 31, 19X7	18	4.05	4.44	1.00	5.56
Dec. 31, 19X8	14	2.64	5.30	0.96	6.86

The decline in market value during 19X8 presumably reflects the decrease in earnings per share. The investors evaluating these shares on December 31, 19X8 would consider whether a price earning ratio of 5.30 and the dividend yield of 6.86 represented a satisfactory situation in the light of alternative investment opportunities. We can also calculate the book value per share.

Table 6
Book value per equity share

	19X8 Rs.	19X7 Rs.
Total shareholder's equity	3,19,000	2,58,000
Less: Preference shareholders equity	50,000	50,000
Equity of ordinary shareholders	2,69,000	2,08,000
Number of shares outstanding	12,500	10,000
Book value per equity share	21.52	20.8

Book value indicates the net assets represented by each equity shares. This information is often helpful in estimating a reasonable price for company shares, especially for small companies whose shares are not publicly traded. However, the market price of the shares of a company may significantly differ from its book value depending upon its future prospects with regard to earnings.

Long-term Creditors: Long-term lenders (or creditors) are primarily interested in two factors:

- 1 The firm's ability to meet its interest requirements.
- 2 The firm's ability to repay the principal of the debt when it falls due.

From the viewpoint of long-term creditors, one of the best indicators of the safety of their investments may be the fact that, over the life of the debt, the company has sufficient income to cover its interest requirements by a wide margin. A failure to cover interest requirements may have serious repercussions on the stability and solvency of the firm. A common measure of the debt safety is the ratio of income available for the payment of interest to the annual interest expenses, called **number of times interest earned**. This computation for Megapolitan Company would be as follows:

Number of Times Interest Earned		19X8	19X7
		Rs.	Rs.
Operating income (before interest and income taxes)	a)	63,500	80,000
Annual interest expense	b)	12,000	15,000
Times interest earned (a—b)		5.29	5.33

Long-term creditors are interested in the amount of debt outstanding in relation to the amount of capital contributed by shareholders. The debt ratio is computed by dividing long-term debt by shareholders' equity, as shown below:

Debt Ratio		19X8	19X7
		Rs.	Rs.
Long-term debt	a)	1,00,000	1,25,000
Shareholders' equity	b)	3,19,000	2,58,000
Debt ratio (a—b)		31.35	48.45

From creditors' point of view, the lower the debt ratio (or higher the equity ratio) the better it is. The lower debt ratio means the shareholders have contributed a bulk of funds to the business, and therefore the margin of protection to creditors against a shrinkage of assets is high.

Short-term Creditors: Bankers and other short-term creditors have an interest similar to those of the equity shareholders and debenture holders who are interested in the profitability and long-term stability of a business. Their primary interest, however, is in the current position of the firm, i.e. its ability to generate sufficient funds (working capital) to meet current operating needs and to pay current debts promptly.

The amount of working capital is measured by the excess of current assets over current liabilities. What is important to short-term creditors is not merely the amount of working capital available but more so is its quality. The main factors effecting the quality of working capital are (i) the nature of the current assets comprising the working capital, and (ii) the length of time required to convert these assets into cash.

In this context we can calculate the following ratios:

- 1 Inventory turnover ratio
- 2 Account receivable turnover ratio.

Activity 6

In illustration 2 we analysed the financial statements (or information) from the point of view of three groups of people and calculated certain ratios. But these ratios by no means were all inclusive. Certain other ratios, useful for these groups of people, can also be computed. For example, some other ratios useful for equity shareholders (present and prospective) are: Return on investment (ROI), Leverage ratio, and Equity ratio.

In the context of illustration 2:

- a) Calculate and interpret all such ratios; and
- b) Calculate and interpret some ratios for groups of people other than the three above who might be interested in the company, e.g., preference shareholders.

4.6 SUMMARY

A large number of financial ratios are in use. They fulfil a wide variety of objectives and functions. Managers evaluate performance and exercise control, investors match their expectations, and lenders undertake credit approvals with their help.

Control of business activity is crucial for efficiency. Managerial action follows meaningful information flows. Ratios provide a relevant basis, but all ratios may not serve the objective of control. A profit performance measure which is widely prevalent is the Return on Investment, which is considered a primary yardstick for the measurement of operational efficiency. A decomposition of this measure into its key elements as depicted in the Du pont Chart may underline areas which need managerial control for achieving the basic goal of maximising the return on capital employed in the enterprise.

A series of secondary ratios has also been found useful in controlling business activities. Since production and sales are the key parameters in an efficient conduct of business activities, most of these ratios are related in some manner to sales and output. The focus is on revenues and costs and also on the intensity of activity as measured by the various turnover ratios. Going deeper into the conduct of business transactions, a larger number of relationships would be uncovered e.g., stores control, material usage control, labour hours control, machine maintenance, quality control, operating cycle control and so on. But the focus in this unit has been on control of activities through ratios emerging from information externally presented.

4.7 KEY WORDS

Primary Ratio is of primary concern for management because it provides an overall measure of business efficiency and is measured by the much controversial but nevertheless much widely employed Return on Capital Employed.

PBDIT or Profits before depreciation, interest and taxes. This amounts to gross cash flow.

Liquidity Ratios measure the short-term solvency of the firm.

Leverage Ratios measure the long-term solvency of the firm and also provide an idea of the equity cushion for long-term indebtedness.

Activity or Turnover Ratios measure the intensity with which resources of the firm are being utilised.

Average Capital Employed is one-half of the sum total of opening and closing balances of capital, reserves, accumulated depreciation and long-term debt.

Net Total Assets are obtained by deducting current liabilities from total assets.

Equity Multiplier is used to derive the Return on Equity from the Return on Investment, and is computed by dividing Equity into total assets.

Ratio Norm is obtained for different kinds of ratios either as an average over time of the same firm, or an industry average or an average of a cross-section of firms, and is used to evaluate performance and for control purposes.

Average Collection period is obtained by dividing average accounts receivables with net credit sales and multiplying the resultant with 365 days of the year. It suggests the average credit period actually granted during a year.

4.8 SELF-ASSESSMENT QUESTIONS/ EXERCISES

- 1 List the fundamental accounting ratios. Why are they called 'fundamental'?
- 2 What are 'Stability' ratios? Can they be classed as 'fundamental ratios'?
- 3 Enumerate ratios that are appropriate for controlling business activities. What common criterion/criteria bring them together into one category?

- 4 Which of the control ratios are more important in your view? Why?
- 5 Point out the major limitation of Return on Capital Employed as a basis for comparing one firm with another.
- 6 What is Return on Equity? Why do we measure it?
- 7 The ratios measuring management's overall effectiveness as shown by the returns generated on sales and investment are
 - a) Leverage ratios
 - b) Profitability ratios
 - c) Activity ratios
 - d) Liquidity ratios
- 8 According to the Du pont analysis, firms dealing with relatively perishable commodities would be expected to have
 - a) High profit margins and high turnover
 - b) Low profit margins and low turnover
 - c) High profit margins and low turnover
 - d) Low profit margins and high turnover
 - e) None of the above
- 9 Inventory turnover is defined as ——— divided by inventories.
 - a) Cost of goods sold
 - b) Accounts receivable
 - c) Gross profit
 - d) Net operating income
- 10 The primary purpose of the current ratios is to measure a firm's
 - a) Use of debt
 - b) Profitability
 - c) Effectiveness
 - d) Liquidity
 - e) None of these
- 11 The Du pont System is designed to help pinpoint the trouble if a firm has a relatively low rate of return on equity. It focuses on the total asset turnover ratio, the profit margin, and the equity/asset ratio.

True ☐ False ☐
- 12 Because inventories are less liquid than other current assets, the quick ratio is regarded as being a more stringent test of liquidity than the current ratio.

True ☐ False ☐
- 13 Other things being constant, (assuming an initial current ratio greater than 1.00) which of the following will **not** affect the current ratio?
 - a) Fixed assets are sold for cash
 - b) Long-term debt is issued to pay off current indebtedness
 - c) Accounts receivables are collected
 - d) Cash is used to pay off accounts payable
 - e) A bank loan is obtained
- 14 The averages collection period is found by dividing ——— with ——— and then dividing average sales per day into accounts ———. The average collection period is the length of time that a firm must wait after making a sale before it receives ———.
- 15 Individual ratios are of little value in analysing a company's financial condition. More important is the ——— of a ratio over time, and a comparison of the company's ratios to ——— ratios.
- 16 Prabhat Industries profit margin is 6 per cent, its total assets' turnover ratio is 2 times, and its equity/total assets ratio is 40%. The company's rate of return on equity is

(a) 5% (b) 7.5% (c) 12% (d) 30% (e) 20%
- 17 If the net profit margin for a firm is 20%, and the ROI is 10%, the total assets turnover ratio must be

(a) 1 (b) 2 (c) .5 (d) .2 (e) Not possible to compute

- 18 Determine the sales of a firm with the financial data given below:

Current ratio 2.7

Quick ratio 1.8

Current liabilities Rs. 6,00,000

Inventory turnover 4 times

a) Rs. 34,00,000

b) Rs. 19,60,000

c) Rs. 21,60,000

d) Rs. 14,20,000

e) Rs. 16,40,000

- 19 Complete the balance sheet and sales data by filling in the blanks using the following financial data:

Debt/Net worth	50%
Acid Test ratio	1.4
Total Asset turnover	1.6 times
Days sales outstanding	
in accounts receivable	40 days
Gross profit margin	25%
Inventory turnover	5 times

Balance Sheet			
	Rs		Rs.
Equity Share Capital	25,000	Cash	
General Reserve	26,000	Accounts receivable	
Accounts Payable		Inventories	
		Plant & Equipment	
Total capital and liabilities		Total assets	
		Sales	
		Cost of goods sold	

- 20 Weldone Co. and Goodluck Co. trade in the same industry but in different geographical locations. The following data are taken from the 19 × 2 annual accounts:

	Weldone Rs.	Goodluck Rs.
Turnover	40,000	60,000
Total operating expenses	36,000	55,000
Average total assets during 19×2	30,000	25,000

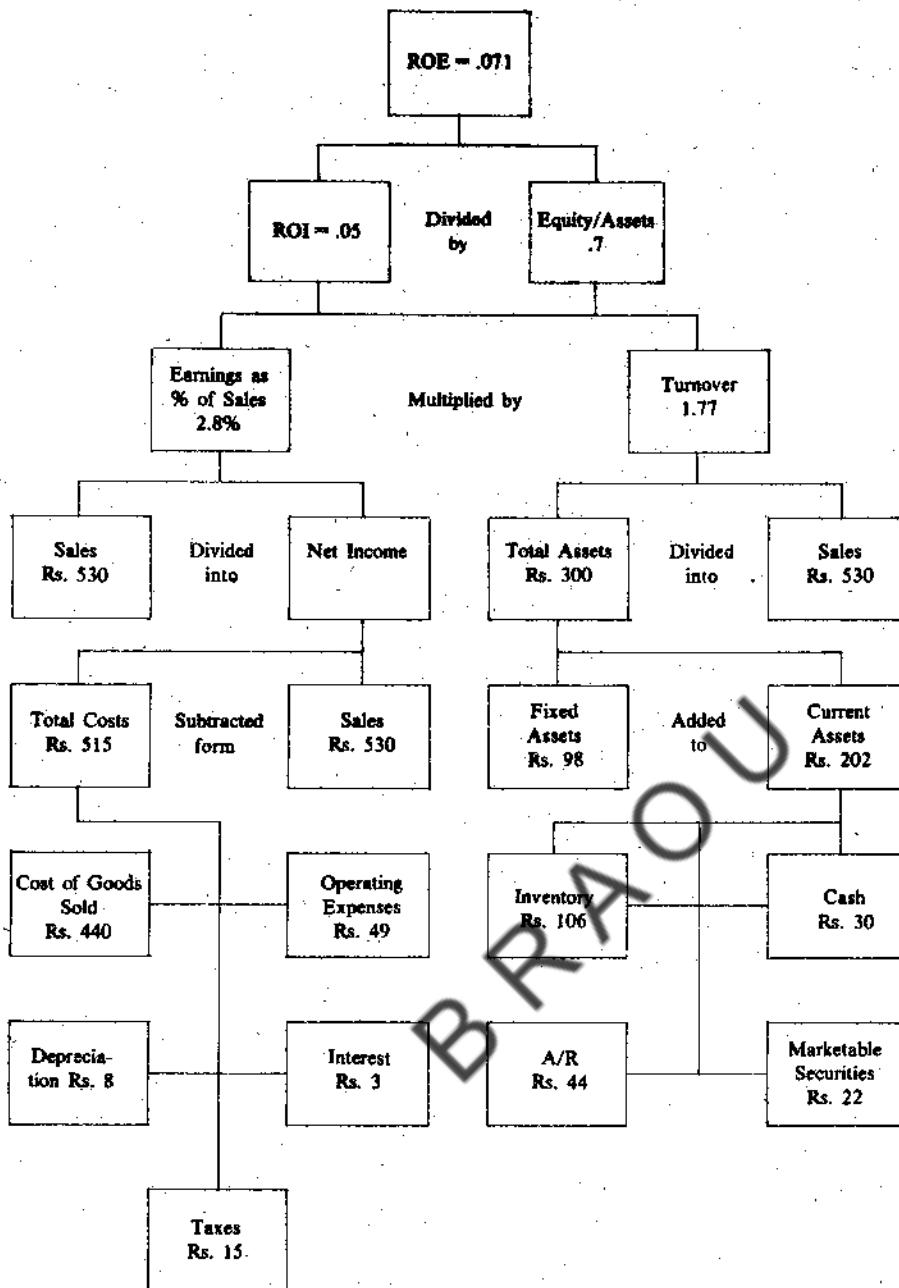
Attempt the following (ignore taxation):

- Calculate the rate of return on total assets (profit as a percentage of total assets) for each company.
- Analyse the rates of return in part (a) into the net profit percentage and the ratio of turnover to total assets.
- Comment on the relative performance of the two companies in so far as the information permits. Indicate what additional information you would require to decide which company is the better proposition from the viewpoint of:
 - potential shareholders; and
 - potential loan creditors.

21. Abrasives Ltd., has the following turnover ratios presented along with the corresponding industry averages:

Ratio description	Abrasive's ratio	Industry average
Sales/Inventory	530/101 = 5 times	10 times
Sales/Receivables	530/44 = 12 times	15 times
Sales/Fixed assets	530/98 = 5.4 times	6 times
Sales/Total assets	530/300 = 1.77 times	3 times

Financial analysis of the company is presented on the next page in the form of a Du Pont Chart. Study the chart, along with the four turnover ratios and industry averages, and comment on the major weaknesses of the company where managerial attention must be focused for future control!

**Answers or Approaches to Activities****Activity 1****Ratio Nos.****Broad Class**

- | | |
|----------|--|
| 1 to 3 | Secondary, Owners |
| 4 & 5 | Secondary, Lenders, Liquidity |
| 6 to 9 | Secondary, Management, Activity |
| 10 to 12 | Primary, Management, Profitability, Owners |
| 13 to 15 | Secondary, Management, Profitability (Appropriation) |
| 16 to 21 | Secondary, Lenders, Leverage |

Activity 2

- a) Bombay Dyeing's data relating to average number of days of inventory will have to be converted into inventory turnover ratio as follows:

$$100 \div \frac{\text{No. of days in an accounting period}}{\text{Average No. of days of inventory}}$$

Assuming the numerator to be 365 days, the inventory turnover ratios for the five years will be :

Year	Inventory turnover ratios
1981	$100 \div 365/90 = 24.63$
1982	$100 \div 365/118 = 32.36$
1983	$100 \div 365/115 = 31.55$
1984	$100 \times 365/107 = 29.33$
1985	$100 \times 365/89 = 24.39$

- b) Bombay Dyeing is a composite mill. It may, therefore, be appropriate to compare the inventory ratios for five years with the annual averages of composite mills for five years. It is manifest that Bombay Dyeing's inventory turnover ratio is higher than the industry average for the years 1982-84.
- c) The trend for the last four years since 1982 is for the ratio to decline.

Activity 3

- a) True
b) False
c) True
d) True
e) False
f) False
g) True
h) True because inventory which is the denominator of the ratio is also carried generally at cost in a world of rising prices.
i) False because it reflects only the average credit period and does not state anything about discounts and credit standards
j) True

Activity 4

Ratio	Information inputs	Computed ratio for the year		
		1983	1984	1985
1 Cost of goods sold	(7) ÷ (6)	85.06	81.97	84.13
2 Gross margin	(6) - (7) ÷ (6)	14.94	18.03	15.87
3 Net margin	(14) ÷ (6)	4.74	2.54	3.26
4 Operating Margin	(10) + (9) ÷ (6)	5.24	4.34	5.18
5 Post-tax Margin	(14) + (9) × (13) ÷ (12) ÷ (6)	9.80	6.53	6.30
6 Operating Ratio	(6) - (10) ÷ (6)	99.82	99.66	98.33
7 Total Contribution	(6) - (8) ÷ (6)	35.02	35.56	34.70
8 Gross Assets Turnover	(6) ÷ (4)	1.05	1.25	1.45
9 Net Assets Turnover	(6) ÷ (4) - (5)	1.97	2.36	2.52
10 Inventory Turnover	(7) ÷ (2)	4.09	5.16	6.38
11 Receivables Turnover	(6) ÷ (2A)	11.13	11.03	14.50
12 Average Collection Period (Days)	(2A) ÷ (6)/365	32.78	33.10	25.17

Activity 5

	1984	1985	1986
a) Gross Return on Investment	12.61	9.86	11.14
Net Return on Investment	4.51	3.57	5.81
Return on Capital employed	11.63	9.90	12.61

- b) You may first proceed to find out the Equity multiplier viz., Total Net Assets/Equity for each of the three years, and then multiply the ROI by this multiplier. Equity multipliers for the three years are as follows:

Years	Equity multiplier
1984	$95.30/33.97 = 2.81$
1985	$140.79/39.41 = 3.57$
1986	$158.82/53.16 = 2.99$

Return on Equity

12.67 12.75 17.37

- 7 (b)
 8 (d)
 9 (a)
 10 (d)
 11 (True)
 12 (True)
 13 (c)
 14 annual sales; 360; receivables; cost;
 15 trend; industry average;
 16 (d)
 17 (c)
 18 (c)
 19 Accounts payable = Rs. 25,500; Total Capital and Liabilities as well as Total Assets = Rs. 76,500; Cash = Rs. 22,100; Accounts Receivable = Rs. 13,600; Inventories = Rs. 24,480; Cost of goods sold = Rs. 91,800; Plant & Equipment = Rs. 16,320; and Sales = Rs. 1,22,400.
 20
- | | | |
|---|--------------------|---------------------|
| | Weldone Co. | Goodluck Co. |
| a) Rate of return on total assets | 13.3% | 20% |
| b) Net profit percentage | 10% | 8.3% |
| Asset turnover | 1.33 times | 2.4 times |
| c) The three ratios provide an estimate of a company's overall performance. They are inter-related: | | |

$$\frac{\text{Profit}}{\text{Assets}} = \frac{\text{Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}$$

From the viewpoint of potential investors—shareholders and loan creditors—the overall performance is important. In what way the profit between the two types of finance (loan and equity) is apportioned is also of equal importance. They will therefore need information about capital leverage, i.e. the relationship between equity and loan capital and the relationship between profits and interest payments.

The potential loan creditor will also require information about security that the company can provide.

The potential shareholders are also interested in future dividends as well as current yield. They will need information about the share prices and earnings per share so that they could make relevant comparison against similar other investment in terms of P/E ratio and yield.

- 21 a) Profit margin not too bad; assess turnover quite low. Action required.
 b) Inventory per unit of sales higher than other firms. Action required.
 Implications and impact of suggested action (like funds released in the wake of inventory reduction utilised in liquidating debt and reducing interest burden with improved profit prospects) should be highlighted.
 c) Excess capacity situation may exist, though not with definitiveness.

4.9 FURTHER READINGS

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AUDIO PROGRAMME

BRAOU

UNIT 5 LEVERAGE ANALYSIS

Objectives

This unit will enable you to:

- acquire an understanding of leverage ratios
- examine the consequences of financial leverage for a business firm
- trace relationship between financial and operating leverages, and
- assess the risk implications of financial leverage.

Structure

- 5.1 Introduction
- 5.2 Concept of Financial Leverage
- 5.3 Measures of Financial Leverage
- 5.4 Effects of Financial Leverage
- 5.5 Operating Leverage
- 5.6 Combined Leverage
- 5.7 Financial Leverage and Risk
- 5.8 Summary
- 5.9 Key Words
- 5.10 Self-assessment Questions/Exercises
- 5.11 Further Readings

5.1 INTRODUCTION

You have familiarised yourself with the various kinds of financial ratios—both separately and in their broad groupings. Unit 11 on Financial Ratios introduced the four fundamental bases for ratios viz., **liquidity, leverage, activity, and profitability**. The ratios discussed in that unit were picked up on the basis of their relevance in controlling business activities. Accordingly, the liquidity and leverage ratios were not covered.

Even though a firm's management would always be interested in maintaining a satisfactory level of liquidity and solvency, it is the lender or the banker who would insist upon certain norms and would monitor movements in these ratios.

Leverage ratios, which reflect the solvency status of a firm, are covered here in detail. You will get an idea about the basic concept of leverage and will be exposed to the role and effects of financial leverage.

We had covered another leverage concept in the unit titled 'Cost-Volume-Profit Analysis'. You will recall the 'break-even analysis' that was explained and illustrated in that unit. We derive from that discussion the term operating leverage and examine its importance. Our discussion will also help you to link-up the two concepts of leverage viz., financial leverage and operating leverage.

5.2 CONCEPT OF FINANCIAL LEVERAGE

Consider for a moment the common use of the terms 'lever' and 'leverage'. Webster's dictionary defines them as follows:

'Lever' is an inducing or compelling force.

'Leverage' is the action of a lever or the mechanical advantage gained by it; it also means 'effectiveness' or 'power'.

The common interpretation of leverage is derived from the use or manipulation of a

tool or device termed as lever which provides a substantive clue to the meaning and nature of financial leverage. Could you guess it?

Your reply, we guess, may well be in the negative.

Now, suppose we suggest that our lever is the use of debt or borrowed funds in financing the acquisition of assets. Would you get somewhere near the concept of the term financial leverage?

Probably, you need a little explanation. We will do that. You have to look at the following simple (and hypothetical) facts about the GTB (Gain Through Borrowing) Limited.

The GTB Limited wanted to purchase fixed assets worth Rs. 80 lakh for the execution of a project which was to be financed by raising share capital of Rs. 30 lakh and term loans of Rs. 50 lakh. The company was required to earn a minimum return of 20% on its share capital. Other companies of this type were earning this much and unless GTB Limited provided at least this return, no investor would be attracted to buy its shares. The GTB Limited pays tax at 40% and is not required to pay any tax on the interest charges on term-loans.

You may do your own calculations for the two situations. We now pose a question to you: What happens to the company's net return (after interest and taxes) on equity if (a) the whole of Rs. 80 lakh is financed by selling share capital, and (b) the scheme of financing as envisaged in the problem is implemented? You may assume GTB's earning power to be 40% (before taxes and interest) on total assets of Rs. 80 lakh.

We present for your verification a solution below:

Table I
Effect of Financial Leverage

	Rs. 80 lakh as share capital	Rs. 30 lakh of share capital plus 50 lakh of debt @ 18%
	(Rs. Lakh)	(Rs. Lakh)
Earnings on assets of Rs. 80 lakh @ 40%	32.0	32.00
Less interest: 18% on Rs. 50 lakh	—	9.00
Earnings after interest	32.0	23.00
Taxes @ 40%	12.8	9.20
Earnings after taxes	19.2	13.80
Earnings after interest and taxes as a % of share capital	24%	46%

If your solution tallies with ours, you may be wondering at the results. The net return on equity is 24% when no debt is used but it is 46% when debt is used. There is a considerable increase in the net return. It is conceivable that a similar outcome may be nowhere near in some other situations even if debt is employed. At this juncture, we would premise that the use of debt funds in a profit-making and tax-paying business improves the net equity returns. **The effect which the use of debt funds produces on returns is called financial leverage.**

You would have noted in the above example that the increase of net equity returns from 24% to 46% has occurred at a certain level of debt viz., when the debt is Rs. 50 lakh against an equity of Rs. 30 lakh (i.e., when the debt-equity ratio is 5:3 or 167%) or when the debt is of Rs. 50 lakh against total assets of Rs. 80 lakh (i.e., when the debt-assets ratio is 5:8 or 62.5%). The sub-section below examines these and other measures of financial leverage. But before we proceed, let us sum up the concept of financial leverage as follows:

Financial leverage refers to a firm's use of fixed-charge securities like debentures and preference shares (though the latter is not always included in debt) in its plan of financing the assets.

Activity 1

Tick the correct answer for the following statements:

- a) Financial leverage is the use of fixed-return securities only ☐ Yes ☐ No
- b) Fixed-return securities include equity shares ☐ Yes ☐ No
- c) Preference shares always form part of debt ☐ Yes ☐ No
- d) Financial leverage improves net equity returns ☐ Yes ☐ No
- e) Net equity returns are measured on the basis of net earnings after interest and taxes ☐ Yes ☐ No
- f) Financial leverage always improves the total return on capital employed. ☐ Yes ☐ No

5.3 MEASURES OF FINANCIAL LEVERAGE

The amount of debt which a firm employs or proposes to employ can be expressed in relation to total assets or total equity. Equity will include paid-up capital and reserves and total assets will be taken at net value. Even though, both equity shares and assets can be measured at market values, the present discussion will use only book values. Market values are difficult to obtain, fluctuate widely and are not available for new undertakings which also make use of the concept of financial leverage in planning their sources of finance.

We will illustrate two ratios viz., Debt-equity and Debt-assets ratios both of which are computed from Balance Sheet data and are inter-related. You may note that this section measures the use of financial leverage and not its effects. The latter is measured through Degree of Financial Leverage, which is discussed in a later section.

We shall explain the concept of financial leverage with the help of an example. Bharat Engines Limited, plans to acquire total assets amounting to Rs. 1 crore. The company has only two sources of finance viz, debt and equity. The Finance Director wants to know the changes that will take place in the Debt-equity and Debt-assets ratios for various debt levels i.e., (a) Zero (b) Rs. 10 lakh (c) Rs. 20 lakh (d) Rs. 30 lakh (e) Rs. 50 lakh (f) Rs. 80 lakh and (g) Rs. 1 crore. The table below provides the required calculations:

Table 2
Debt-assets and Debt-equity Ratios
(Total investment in assets = Rs. 100 lakh)

Debt Rs. Lakh	Equity Rs. Lakh	Debt-assets Ratio	Debt-equity Ratio
zero	100	zero	zero
10	90	10%	11.1%
20	80	20%	25%
30	70	30%	43%
50	50	50%	100%
80	20	80%	400%
100	zero	100%	∞

Please study the last two columns of the above table. The following analysis reflects the basic properties of the two ratios and indicate their inter-relationship:

- a) The Debt-assets ratio rises at a constant rate and reaches a maximum of 100%. The Debt-equity ratio grows exponentially and reaches infinity (∞)
- b) The two ratios are mathematically related and can be derived from each other. The following relationships may be used for such derivations:

$$\text{Debt-assets Ratio (D/A)} = \frac{\text{D/E Ratio}}{1 + \text{D/E Ratio}} \quad \dots (1)$$

$$\text{Debt-equity Ratio (D/E)} = \frac{\text{D/A Ratio}}{1 - \text{D/A Ratio}} \quad \dots (2)$$

The use of these formulas for deriving one ratio from the other can be demonstrated at any debt level. For example, at a debt level of Rs. 80 lakh, the Debt-assets ratio is 80%. The D/E ratio can be derived by using formula-(2) above:

$$\text{D/E Ratio} = \frac{80}{1 - 80} = \frac{80}{20} = 4.00 \text{ or } 400\%$$

Similarly, with a given D/E ratio of 400% or 4.00, the D/A ratio can be derived by using formula-(1) above:

$$\text{D/A Ratio} = \frac{4.00}{1 + 4.00} = \frac{4.00}{5.00} = 80 \text{ or } 80\%$$

Both D/A and D/E ratios are used to measure the amount of financial leverage. You may note that the D/E ratio overstates the amount of financial leverage for all levels of debt and becomes indeterminate when debt employed is one hundred per cent. It may, therefore, be technically more feasible to employ the Debt-asset ratio as indicator of the use of financial leverage.

You may come across some more ratios in contemporary literature which attempt to measure the use of financial leverage. They are:

- a) $\frac{\text{Debt}}{\text{Total Value of the firm (at Market Price)}}$
- b) $\frac{\text{Return on Equity}}{\text{Return on Total Capital}}$

Activity 2

Answer the following:

- a) Amount of leverage and degree of leverage are the same ☐ Yes/ ☐ No
- b) Debt-equity ratio overstates the use of leverage ☐ Yes/ ☐ No
- c) A firm (to be established) can use market values for its leverage ratios ☐ Yes/ ☐ No
- d) The D/E ratio is infinite at 100% debt ☐ Yes/ ☐ No
- e) D/A and D/E ratios can be derived from each other ☐ Yes/ ☐ No
- f) When the D/E ratio is 200%, D/A ratio would be
(i) 80% (ii) 100% (iii) 67% (iv) 45% (v) None of these

5.4 EFFECTS OF FINANCIAL LEVERAGE

The example in Table 1 introduced you to a possible effect of financial leverage on return on equity. You must have noted that one important consideration in the use of borrowed funds is the improvement in net equity returns which such a move brings about.

In fact, the effect of financial leverage is also measured through another variable viz., earnings per share (EPS). This is done in the case of joint stock companies which have raised their proprietary capital by selling units of such capital known as equity shares. Earnings per share are obtained by dividing earnings (after interest and taxes) by total equity. You may note that if a company has preference shares also on its capital structure, net equity earnings will be arrived at after deducting interest, taxes and preference dividends. **Capital structure** refers to the permanent long-term financing of a company represented by a mix of long-term debt, preference shares, and net-worth (which includes paid-up capital, reserves and surpluses). When the sum total of capital structure components is added to short-term debt, it is known as **Financial structure**. Financial Leverage and its effects are a crucial consideration in planning and designing capital structures.

We may reiterate that the effects of financial leverage are not always clear and identical in various states of profitability and debt proportions. It may be necessary to

explore these effects before a particular long-term finance-mix is recommended for implementation. We shall illustrate the effects of financial leverage by extending the example taken in the previous section. Bharat Engines is considering four alternative debt ratios (i.e. D/A ratios): 0%, 20%, 50% and 80%. The corresponding D/E ratios are: 0%, 25%, 100% and 400%.

The equity capital of the company is divided into shares of Rs. 10 each which can be sold in the market at their face value only.

The firm estimates a net profit (before tax) of 25% on total assets of Rs. 1 crore if business conditions are favourable, a net profit (before tax) of 50% on total assets if conditions are highly favourable, and net (before tax) loss of 25% if conditions are unfavourable. Bharat Engines is assessed to income-tax at 40%. In the event of loss, the company could assume a tax credit at this rate.

The average interest rate on borrowings by the company is estimated at 15%.

Table 3 provides an analysis of the effects of all the four alternative debt levels on the return on equity as well as on the earnings per share.

Table 3
Financial Leverage, Equity Returns & EPS
Total Investment Rs. 1 Crore.

Alternative Estimates of Earnings Before Interest
& Taxes (EBIT) (in Rs. Lakhs) as % of Total Assets.

Capital Structure	(-25%)	+25%	+50%
I: Debt = Zero, Equity = Rs. 1 Crore			
EBT	(-25.00)	25.00	50.00
Less interest (at 15%)	zero	zero	zero
Earnings (before tax)	(-25.00)	25.00	50.00
Less tax at 40%	10.00	10.00	20.00
Net Income (after tax)	(-15.00)	15.00	30.00
Return on Equity	(-15%)	15%	30%
Earnings per share (in Rs. 10,00,000 shares of Rs. 10 each)	(-1.50)	1.50	3.00
II: Debt = Rs. 20 lakh, Equity = Rs. 80 lakh			
EBIT	(-25.00)	25.00	50.00
Less interest (at 15%)	3.00	3.00	3.00
Earnings before tax	(-28.00)	22.00	47.00
Less tax at 40%	11.20	8.80	18.80
Net income	(-16.80)	13.20	28.20
Return on equity of Rs. 80 lakh	(-21%)	16.5%	35.25%
Earnings per share (in Rs. 8,00,000 shares of Rs. 10 each)	(2.1)	1.65	35.25
III: Debt = Rs. 50 lakh, Equity = Rs. 50 lakh			
EBIT	(-25.00)	25.00	50.00
Less interest (at 15%)	7.50	7.50	7.50
Earnings before tax	(-32.50)	17.50	42.50
Less tax at 40%	3.00	7.00	17.00
Net income	(19.50)	10.50	25.50
Return on equity of Rs. 50 lakh	(-39%)	21%	51%
Earnings per share (in Rs. 5,00,000 shares of Rs. 10 each)	(-3.9)	2.1	5.1
IV: Debt = Rs. 80 lakh, Equity = Rs. 20 lakh			
EBIT	(-25.00)	25.00	50.00
Less interest (15%)	12.00	12.00	12.00
Earnings before tax	(-37.00)	13.00	38.00
Less tax at 40%	14.80	5.20	15.20
Net income	(-22.20)	7.80	22.80
Return on Equity of Rs. 20 lakh	(-111%)	39%	114%
Earnings per share (in Rs. 2,00,000 shares of Rs 10 each)	(-11.1)	3.9	11.40

You may now have a closer look at the effects of leverage. Please note that the analysis presented in Table 3 above assumes:

- an average tax rate of 40% or a tax credit at the same rate in a year of loss
- four different levels of debt
- three different states of economy viz., bad, good, and very good
- the fact that equity shares of the company can be sold only at par i.e., at Rs. 10 per share.

We offer the following comments on Table 3 for further study and analysis by you:

- At zero debt level (viz., capital structure I), the after-tax return on total assets is 60% of the before-tax return because the tax rate is 40%. Also, the after-tax return on total assets is equal to the after-tax return on equity.
- Financial leverage in general is favourable when the return on assets exceeds the cost of debt. This is true of all the four capital structures when the return levels are 25% and 50%.
- When the return on assets is high, both the net return on equity and earnings per share increase with a rise in the debt ratio. You may notice that when the return on assets is the highest at 50% (last column of Table 3), the return on equity increases from 30% at zero debt to 114% at 80% debt level. The corresponding increase in EPS is from Rs. 3.00 to Rs. 11.40.
- The amount of interest affects the relationship of after-tax return on assets and return on equity at different levels of leverage. The numerators of both the ratios bear the following relationship:

$$\text{EBIT} (1-t) = \text{Net Income} + (1-t) \text{ Interest charges} \quad \text{---3}$$

Where t = tax rate

You may note that the term to the left of the equation is the numerator of return on assets and the term to the right is the numerator of return on equity. You may verify this relationship at any debt level. For example, take capital structure-II in Table 3 at an EBIT level of Rs. 25 lakh and substitute relevant values in equation (3). You will get:

$$25,00,000 (1-.40) = 13,20,000 + (1-.40) 3,00,000$$

$$\text{Rs. } 15,00,000 = \text{Rs. } 15,00,000$$

- It is significant that while higher amounts of leverage improve equity returns and earnings per share, they produce a higher degree of volatility also in such returns. Table 4 below summarises the minimum, maximum and the range of equity returns at different debt levels on the basis of the data furnished in Table 3.

Table 4
Financial Leverage and Equity Returns

Amount of Financial Leverage (Debt-assets Ratio)	Return on Equity (ROE)		
	Minimum	Maximum	Range
0%	-15%	30%	45%
20%	-21%	35.25%	56.25%
50%	-39%	51%	90%
80%	111%	114%	225%

You may observe that the Return on Equity (ROE) varies within a range of 45% when the debt ratio is zero, but the range increases to 225% when the debt ratio rises to 80%. This increased volatility will also be found to be true if you measure the equity return by net income or earnings per share. From this analysis we may conclude: **Financial leverage magnifies the volatility of returns whether measured by net income or return on equity or earnings per share.**

It would, thus, be seen that financial leverage is a double-edged sword. It magnifies returns and also increases their volatility. Increased volatility implies greater risk in the wake of a rising interest burden which, if not met, may lead to bankruptcy. In the perception of equity shareholders as well as lenders, the riskiness of the firm may increase. This aspect of financial leverage is covered in the last section of this unit.

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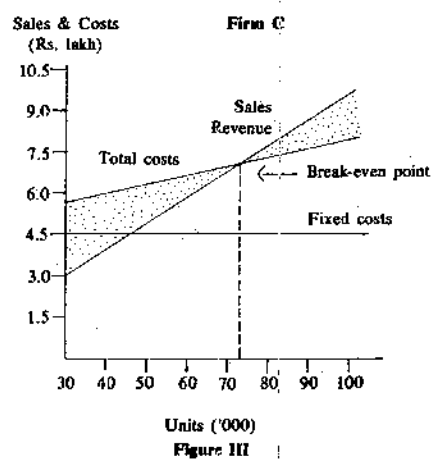
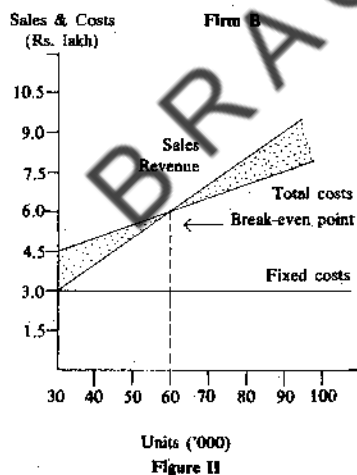
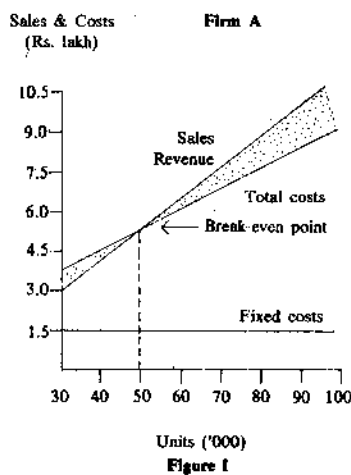
Table 5
Operating Leverage

Rs. in lakh

Units sold	Sales @ Rs. 10/ per unit	Firm A		Firm B		Firm C	
		Cost	Profit	Cost	Profit	Cost	Profit
30,000	3.00	3.60	-.60	4.50	-1.50	5.70	-2.70
40,000	4.00	4.30	-.30	5.00	-1.00	6.10	-2.10
50,000	5.00	5.00	0.00	5.50	-.50	6.50	-1.50
60,000	6.00	5.70	.30	6.00	0.00	6.90	-.90
70,000	7.00	6.40	.60	6.50	.50	7.30	-.30
80,000	8.00	7.10	.90	7.00	1.00	7.70	.30
90,000	9.00	7.80	1.20	7.50	1.50	8.10	.90
1,00,000	10.00	8.50	1.50	8.00	2.00	8.50	1.50
Fixed Costs:		Rs. 1.5 lakh		Rs. 3.0 lakh		Rs. 4.5 lakh	
Variable cost per unit:		Rs. 7.00		Rs. 5.00		Rs. 4.00	

You may have noticed the characteristics of the three firms from Table 5. They are:

- Sales volume in units, selling price per unit, and sales value realisation are identical for all the three firms.
- Fixed costs are the lowest for firm A, medium for B, and highest for C. Firm A has the least automated plant, lowest depreciation charges, low fixed costs, and a higher per unit variable cost. Firm B has a moderately automated plant. Firm C has the most highly automated plant which needs very little labour per unit of output. Its variable costs rise slowly and its overhead burden is relatively higher. Firm C has the lowest variable cost per unit at Rs. 4.00.

**Activity 4**

Look at Figures I, II and III. Comment upon the main features of each firm's volume-cost relationships.

Degree of operating leverage: Degree of operating leverage measures the effect of change in volume on net operating income or earnings before interest and taxes. This may be obtained by using the following formula:

Degree of operating leverage

$$(DOL) = \frac{\% \text{ change in net operating income}}{\% \text{ change in units sold or sales}}$$

Degree of operating leverage will be calculated for a firm when it moves over from one level of sales (volume or value) to another. For example, the degree of leverage for firm B in Table 5, when it shifts from a volume of 80,000 units to 90,000 units, would be as below:—

$$DOL = \frac{\Delta NOI / NOI}{\Delta Q / Q}$$

Where ΔNOI is the change in Net Operating Income
 NOI is net operating income or earnings before interest and taxes
 ΔQ is the change in quantity or volume, and
 Q is quantity or volume

Thus, DOL for firm B for a change in output from 80,000 units to 90,000 units would be:

$$\begin{aligned} &= \frac{(1,50,000 - 1,00,000) / 1,00,000}{(90,000 - 80,000) / 80,000} = \frac{50,000 / 1,00,000}{10,000 / 80,000} \\ &= \frac{50\%}{12.5\%} \\ &= 4 \end{aligned}$$

To be able to understand the implications of DOL, you may compare Firm A (least operating leverage) with Firm C (highest operating leverage) at any two given levels of output, say for a change in output from 80,000 units to 90,000 units i.e. an increase of 12.5%.

$$DOL_A \text{ at 80,000 units} = \frac{.30 / .90}{10,000 / 80,000} = 2.67$$

$$DOL_C \text{ at 80,000 units} = \frac{.60 / .30}{10,000 / 80,000} = 16.00$$

You may now notice the manner in which profits change in response to change in volume. Thus, for a 12.5% increase in output, profits will increase by 26.7% for Firm A (which is low-leveraged firm) and by 160% for Firm C (which is high-leveraged firm). You will find fluctuations in profits to be more steep for firms which are highly leveraged. Thus, the higher the degree of operating leverage the greater will be the fluctuations in profits in response to changes in volume. And this relationship works both ways i.e. when volume increases as well as and when it declines.

The degree of leverage has implications for a number of business and financial policy areas. The following examples based on the DOL of Firm C illustrate some of these areas:

- a) The high degree of operating leverage for Firm C suggests that volume may be increased to gain a steep rise in profits. If Firm C could increase its volume from 1,00,000 units to 2,00,000 units by reducing the selling price to Rs. 9.00 per unit, the net operating income with this price revision would be:

$$\begin{aligned} NOI &= PQ - vQ - F \quad \left\{ \begin{array}{l} \text{Where P is price per unit, v is variable cost per} \\ \text{unit, Q is volume in units and F is total fixed cost.} \end{array} \right. \\ &= \text{Rs. } 9 \times 2,00,000 - \text{Rs. } 4 \times 2,00,000 - \text{Rs. } 4.5 \text{ lakhs} \\ &= \text{Rs. } 18 \text{ lakhs} - \text{Rs. } 8 \text{ lakhs} - \text{Rs. } 4.5 \text{ lakhs} \\ &= \text{Rs. } 5.5 \text{ lakhs} \end{aligned}$$

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You may note that Firm C is able to increase its profits from Rs. 1.50 lakhs at a volume of 1,00,000 units to Rs. 5.50 lakhs at a volume of 2,00,000 units. Thus, a doubling of output (by a 10% reduction in sale price from Rs. 10 to Rs. 9) results in profits becoming about 3.6 times. Firm C with a high degree of operating leverage may, therefore, adopt an aggressive price policy.

- b) A high degree of operating leverage also suggests that profits will swing widely as volume fluctuates. If, Firm C belongs to an industry where sales are greatly affected by changes in the overall level of the economy resulting in wild fluctuation of profits, **the degree of financial leverage appropriate to Firm C will be lower** than the one for a firm which belongs to an industry not so sensitive to changes in the economy.

5.6 COMBINED LEVERAGE

The degree of operating leverage may be combined with the degree of financial leverage. In fact, degree of operating leverage (DOL) is viewed as the first-stage leverage and degree of financial leverage (DFL) as the second-stage leverage. Since financial leverage measures the effect of changes in EBIT on earnings available to equity shareholders, it may be calculated by using the following formula:

$$\text{Degree of financial leverage} = \frac{\% \text{ change in Net Income}}{\% \text{ change in EBIT}}$$

The use of this formula may be illustrated before demonstrating the implications of combining DOL and DFL. The data of Table 3 for the leverage factors of 20% debt and 80% debt may be utilised to show the effect of an increase of EBIT from Rs. 25 lakhs to Rs. 50 lakhs. The following calculations may be noticed:

DFL (80%)—the degree of financial leverage at 80% debt.

DFL (20%)—the degree of financial leverage at 20% debt.

$$\begin{aligned} \text{DFL (80\%)} &= \frac{(22.80 - 7.80)/7.80}{(50.00 - 25.00)/25.00} \\ &= \frac{15.00/7.80}{25.00/25.00} = \frac{2.92}{1.00} = 2.92 \end{aligned}$$

$$\begin{aligned} \text{DFL (20\%)} &= \frac{(28.20 - 13.20)/13.20}{(50.00 - 25.00)/25.00} \\ &= \frac{15.00/13.20}{25.00/25.00} = 1.14 \end{aligned}$$

The Figures 2.92 and 1.14 can be easily understood. The former implies that when the debt ratio (or the leverage factor) is 80%, a 10% increase in EBIT produces a 29.2% (10×2.92) increase in net income available to equity shareholders. At a leverage factor of 20%, a 10% increase in EBIT brings about only an 11.4% (10×1.14) increase in net income or earnings available to equity shareholders. You may conclude that a high degree of leverage brings about a higher magnification of equity earnings.

In the absence of debt, the degree of financial leverage (DFL) will be 1.00 (i.e. unity). The use of debt will lead to DFL above 1.00 or 100%. The DFL may be viewed as a multiplication factor, and when this multiplication factor is 1.00, there is no magnification in net income or return on equity, or in earnings per share.

A combination of operating and financial leverages measures the degree of magnification in Net Income (NI), Return on Equity (ROE), and Earnings per Share (EPS) for a given increase in sales. **When the use of operating and financial leverage is considerable, small changes in sales will produce wide fluctuations in NI, ROE and EPS.**

The Degree of Combined Leverage (DCL) may be measured by using the following formula:

$$\text{DCL} = \text{DOL} \times \text{DFL}$$

$$\begin{aligned} \text{DCL} &= \frac{(\% \text{ change in EBIT})}{(\% \text{ change in sales})} \times \frac{(\% \text{ change in net income})}{(\% \text{ change in EBIT})} \\ &= \frac{\% \text{ change in net income}}{\% \text{ change in sales}} \end{aligned}$$

You may note that a number of combinations of DOL and DFL may produce the same DCL. And if management has a target for DCL, changes in DOL or DFL may be made to attain the targeted DCL. For instance, if the firm has a high degree of operating leverage due to the nature of its operations, the degree of financial leverage may be suitably lowered so as not to lower the targeted combined leverage and vice versa.

5.7 FINANCIAL LEVERAGE AND RISK

We posed the question of risk at the beginning of this unit. You would have noted from our discussion so far that the concepts of operating, financial, and combined leverages have been examined to assess the quantum of risk (business, financial and combined) which the firm faces as a result of decisions to change the various degrees of leverages. In fact, the extent to which the various measures of net income fluctuate, for given variations in sales or EBIT, has a direct bearing on many business and financial policies.

There are several statistical measures which help us to quantify risk. We propose to calculate one such measure known as coefficient of variation by using data in Table 3 and the additional data given in Table 6 below:

Table 6
Cost Structure of Bharat Engines Ltd.

Sales (units)	1875	8125	11250
			Rs. in lakhs
Sales @ Rs. 1,000 per unit	18.75	81.25	112.50
Fixed operating cost	40.00	40.00	40.00
Variable operating costs (20% of sales in Rs.)	3.75	16.25	22.50
Earnings before interest and taxes (EBIT)	25.00	25.00	50.00
Pre-tax return on total assets (%)	- 25.00	25.00	50.00

The total cost can be estimated as follows:

$$\begin{aligned}\text{Total Cost} &= \text{Fixed operating costs} + \text{variable operating costs per unit (sales)} \\ &= 40 \text{ lakhs} + .20 (\text{sales})\end{aligned}$$

In order to obtain a measure of coefficient of variation, the first step is the assignment of probabilities to the possible levels of sales that the management has forecast. Probability in brief is the chance of some event occurring. If it is absolutely definite, it is 1, otherwise probability is always a fraction of unity (1).

The state of the economy is beyond the control of management, but corporate policies are within its control and can be reasonably forecast.

The state of the economy may range from 'very poor' to 'very good' and may accordingly be incorporated in the management's attitudes of pessimism or optimism.

Assume that the management of Bharat Engines Ltd., has assigned the following probabilities based on the aforesaid consideration:

Table 7
Estimated Probabilities

Stage of economy	Expected sales (Rs. lakh)	Probability of expected sales
A	18.75	.2
B	81.25	.5
C	112.50	.3

Note: All probabilities must add up to 1.00

Now we use information from Tables 3, 6 and 7 and present computations of coefficient of variations in Table 8 below:

Table 8
Calculation of Coefficient of Variation (Cv)

Capital Structure	State of the economy S	Probability P	Return on equity (ROE)	$P_s \times ROE$	$(ROE - \overline{ROE})$	$P_s \times (ROE - \overline{ROE})^2$
Zero Debt	A	.2	-.15	-.03	-.285	.0162
	B	.5	.15	.075	.015	.0001
	C	.3	.30	.090	.165	.0082
	$\overline{ROE} = .135$ $\sigma = .157; CV = \frac{\sigma}{\overline{ROE}} = \frac{.157}{.135} = 1.163$					$.0245 = \sigma^2$
20% Debt	A	.2	-.21	-.0420	-.3563	.0254
	B	.5	.165	.825	.0187	.0002
	C	.3	.3525	.1058	.2062	.0128
	$\overline{ROE} = .1463$ $\sigma = .1959; CV = \frac{\sigma}{\overline{ROE}} = \frac{.1959}{.1463} = 1.339$					$.0384 = \sigma^2$
50% Debt	A	.2	-.39	-.078	-.530	.05618
	B	.5	.13	.065	.010	.00005
	C	.3	.51	.153	.370	.04107
	$\overline{ROE} = .140$ $\sigma = .3119; CV = \frac{\sigma}{\overline{ROE}} = \frac{.3119}{.140} = 2.228$					$.09730 = \sigma^2$
80% Debt	A	.2	-1.11	-.222	-1.275	.3251
	B	.5	.39	.195	.225	.0253
	C	.3	.64	.192	.475	.04107
	$\overline{ROE} = .165$ $\sigma = .6466; CV = \frac{\sigma}{\overline{ROE}} = \frac{.6466}{.165} = 3.919$					$.4181 = \sigma^2$

Legend :

- S = State of the economy i.e. bad, good, very good
- P_s = Probability of occurrence of the state of the economy.
- ROE = Return on Equity
- $P_s \times ROE$ = Probability $\times$ Return on Equity.
- $\overline{ROE}$ = Expected value of Return on Equity (Mean)
- σ^2 = Variance
- σ = Standard Deviation
- CV = Coefficient of Variation

You may study Table 8 and its results carefully. The four sections of the table depict the four capital structures viz., zero debt, 20% debt, 50% debt and 80% debt. You may notice that as the leverage factor (viz., Debt ratio) rises, the coefficient of variation also goes up. Thus, for zero debt, the CV is 1.163 and for 80% debt it shoots up to 3.919. On the basis of the data furnished and probability information generated, it may be concluded that the business risk (which is the sum of operating risk and financial risk) rises with financial risk in the case of Bharat Engines Ltd.

Calculations similar to those given in Table 7 can be performed for determining the risk character of the firm in response to amounts of financial leverage stipulated. This analysis helps to plan capital structure.

5.8 SUMMARY

Concepts of financial and operating leverages are important for evaluating business and financial risk of a firm. Operating leverage refers to the use of fixed costs in operations and it is related to the firm's production processes. The greater the operating leverage the higher is the risk in operations. At the same time, a high degree of operating leverage causes profits to rise rapidly after the break-even point is reached.

Financial leverage refers to the use of debt in financing non-current assets. If the return on assets exceeds the cost of debt, the leverage is successful i.e., it improves returns on equity. While this being so, a high financial leverage magnifies financial risk. At some degree of financial leverage the cost of debt rises because of increased risk with the higher fixed charges. When this happens, riskiness of the firm also increases in the eyes of equity investors who start expecting a higher return to compensate for the increased risk burden.

Financial leverage and operating leverage are related with each other. Both have similar effects on profits. A greater use of either i.e., operating or financial leverage leads to following results:

- a) The break-even point is raised
- b) The impact of change in the level of sales on profits is magnified.

Operating and financial leverages have reinforcing effects. Operating, or first-stage leverage affects earnings **before** interest and taxes (i.e., net operating income) while financial, or second-stage leverage affects earnings **after** interest and taxes (i.e., net income available to equity shareholders).

Operating and financial leverages are measured in relative terms to assess their impact on profitability of a firm. These measures are given by the degrees of operating and financial leverages. A combined degree of financial and operating leverage can also be calculated to evaluate effects of changes in sales on net-income or earnings per share.

Financial leverage and risk are related variables and the statistical measure known as coefficient of variation can be computed to estimate the risk of the firm at different levels of leverage or debt ratio.

5.9 KEY WORDS

Financial Leverage refers to the use of debt in the financing of a firm. It denotes the presence of fixed-return securities in the capital structure of the firm.

Operating Leverage is the use of fixed costs in operations. A high operating leverage factor indicates the presence of automated production processes.

Leverage Factor refers to the ratio of long-term debt to total assets.

Capital Structure is the long-term financing plan of a firm. It covers debentures, preference shares, other fixed-return securities, long-term loans, equity shares, and reserves and surplus.

Financial Structure is the total financing plan of a firm which, besides all components of capital structure, also includes short-term debt.

Degree of Operating Leverage is the percentage change in net operating income in response to a percentage change in sales (volume or value).

Degree of Financial Leverage is the percentage change in net income available to equity investors in relation to changes in earnings **before** interest and taxes.

Degree of Combined Leverage is the percentage change in net income **after** interest and taxes in response to percentage variations in sales (volume or value).

Risk includes both operating risk (as given by the degree of operating leverage) and financial risk (as reflected by the degree of financial leverage) and is evaluated by a statistical measure known as coefficient of variation.

5.10 SELF-ASSESSMENT QUESTIONS/ EXERCISES

- 1 Is the use of financial leverage justifiable from a socio-economic standpoint? Explain by listing some advantages and disadvantages.
- 2 How does the use of financial leverage affect the break-even point? Illustrate.
- 3 In what way is financial leverage related to operating leverage? Discuss with an example.

- 4 'Risk increases proportionately with financial leverage'. Refute this statement with reasons.
- 5 'Other things remaining the same, firms with relatively stable sales are able to incur relatively high debt ratios.' Do you agree with the statement?
- 6 Why is EBIT (Earnings before Interest and Taxes or Net Operating Income) generally considered to be independent of financial leverage? Why should EBIT actually be influenced by financial leverage at high debt levels?
- 7 State whether the following are True or False:
 - a) Financial leverage affects both net income and EBIT, while operating leverage affects only EBIT. ☐ True ☐ False
 - b) Two firms with identical financial and operating leverages may have different degrees of business risk as measured by the coefficient of variation of their respective ROE. ☐ True ☐ False
 - c) Business risk refers primarily to uncertainty about future EBIT, while financial risk refers to the added uncertainty about future net income that is caused by the use of debt. ☐ True ☐ False
- 8 Other things being constant, if Firm A has more operating leverage than Firm B, then a given percentage decline in sales will cause a larger percentage decline for Firm A than for Firm B in
 - a) EBIT
 - b) Net Income
 - c) Both (a) and (b)
 - d) Neither (a) nor (b)
 - e) None of these
- 9 One of the components of a firm's financial structure that is not a component of its capital structure is:
 - a) debentures
 - b) reserves
 - c) convertible preference shares
 - d) short-term debt
 - e) equity shares
- 10 Financial leverage is different from operating leverage in that it is concerned with
 - a) capital structure
 - b) uncertainty of markets
 - c) inefficient financial managers
 - d) uncertain estimates of EBIT
 - e) None of these
- 11 In general, financial leverage is favourable whenever the return on assets exceeds the
 - a) cost of equity share capital
 - b) total cost of capital
 - c) net return after taxes
 - d) cost of debt
 - e) none of these.
- 12 Highly leveraged companies are most likely to be found in industries where sales are
 - a) increasing around a trend line
 - b) relatively unstable
 - c) relatively stable
 - d) expected to decline
 - e) relatively uncertain with high margins.
- 13 Fill in the blanks:
 - a) Firms that have a high ratio of fixed costs to variable costs are said to operate with a high degree of _____.

- b) Other things being constant firms with a degree of operating leverage are better able to employ more in their capital structures.
- c) Debt has a over equity in that is a deductible expense while is not.
- 14 A firm has a debt ratio of 75%, and it has total assets of Rs. 20 crores. Before the creditors are **unprotected** these assets may drop to a value of
- Rs. 10 crores
 - Rs. 5 crores
 - Rs. 20 crores
 - Rs. 15 crores
 - none of these.
- 15 The debt ratio of Firms A and B are 60% and 30%, respectively. Both firms have assets totalling Rs. 50 crores and both have a cost of debt of 8 per cent. Firm A earns 12 per cent before interest and taxes on its total assets. Assume a 50 per cent tax rate and answer the following questions:
- What does A earn on equity after interest and taxes?
 - If B is to earn the same rate on equity after taxes as A, what must it earn before interest and taxes on its assets?

	(A)	(B)
i)	15%	7%
ii)	9%	15%
iii)	7%	12%
iv)	9%	12%
v)	7%	15%

- 16 Triveni Dyes Ltd. desires to increase its assets by 50% to execute large government contracts it has received. The expansion could be financed by issuing additional equity shares at a net price of Rs. 45 per share (the price-earnings ratio being 20). Alternatively, debt at a cost of 10% could be increased with a price-earnings ratio of 15. The balance sheet is given below:

Current Balance Sheet of Triveni Dyes Ltd.

	Rs.		Rs.
Debt (8%)	20,000	Total assets	90,000
Equity shares of Rs. 10 each.	60,000		
Reserves	10,000		
Total claims	Rs. 90,000	Total assets	Rs. 90,000

Assume that the gross profit margin is 12% of estimated sales of Rs. 4,00,000 and that the tax rate is 35%. What are the expected market prices, after expansion, under the two alternatives?

	Debt	Equity Shares
a)	Rs. 13.15	Rs. 20.20
b)	Rs. 29.30	Rs. 41.70
c)	Rs. 52.35	Rs. 66.20
d)	Rs. 68.10	Rs. 86.20
e)	Rs. 86.50	Rs. 99.20

- 17 Chakradhar Seshan has developed a revolutionary new computerised method of preparing tax returns for individuals. He has a choice of computers on which to instal his new process. Under Plan L he would lease a computer for Rs. 5 lakhs per year and process returns with a variable cost of Rs. 2 per return. Under plan S he would lease a smaller, less efficient computer for Rs. one lakh per year, but processing costs under plan B will be Rs. 12 per return. Under either process, Seshan would charge Rs. 22 per return processed.

A. Answer the following questions:

- Which plan has a higher degree of operating leverage?
- Construct break-even charts of the two plans.
- At what volume of tax returns would Seshan have the same operating profit under either plan?
- Based on this information only, which plan is more risky?

- B. Assume that Seshan decides to use the large computer described under plan L. Seshan now needs Rs. 20 lakhs to build facilities, obtain working capital, and start operations. He has some money of his own with which he would buy stock and the balance of the required funds can be obtained in the form of debt or equity. If Seshan borrows part of the money, his interest charges will depend upon the amount borrowed according to the following schedule:

Amount borrowed	Percentage of debt at upper end of class-interval in capital structure	Interest rate on total amount borrowed
Up to Rs. 2 lakhs	10%	9.00%
More than Rs. 2 lakhs and up to Rs. 4 lakhs	20%	9.50%
More than Rs. 4 lakhs and up to Rs. 6 lakhs	30%	10.00%
More than Rs. 6 lakhs and up to Rs. 8 lakhs	40%	15.00%
More than Rs. 8 lakhs and up to 10 lakhs	50%	19.00%
More than Rs. 10 lakhs and up to Rs. 12 lakhs	60%	26.00%

Assume further that the equity shares can be sold at Rs. 20 per share regardless of the amount of debt the company uses. This will be the case at the time of initial offering of shares. Then, after the company begins operations, the price of its shares will be determined as a multiple of earnings per share. This multiple, viz., price-earnings (P/E) ratio will depend upon the capital structure as follows:

Debt-Assets Ratio	P/E Ratio
0 to 9.99%	12.5
10.00 to 19.99%	12.0
20.00 to 29.99%	11.5
30.00 to 39.99%	10.0
40.00 to 49.99%	8.0
50.00 to 59.99%	6.0
60.00 to 69.99%	5.0

If the company processes 50,000 returns annually and that its effective tax is 40%, calculate the company's EPS at different debt-assets ratios.

Answers to Activities

- (a) No (b) No (c) No (d) Yes (e) Yes (f) No
- (a) No (b) Yes (c) No (d) Yes (e) Yes (f) (iii)

$$D/A \text{ ratio} = \frac{D/E \text{ ratio}}{1 + D/E \text{ ratio}} = \frac{2.00}{1 + 2.00} = \frac{2.00}{3.00} = 67\%$$

3. Return on Equity

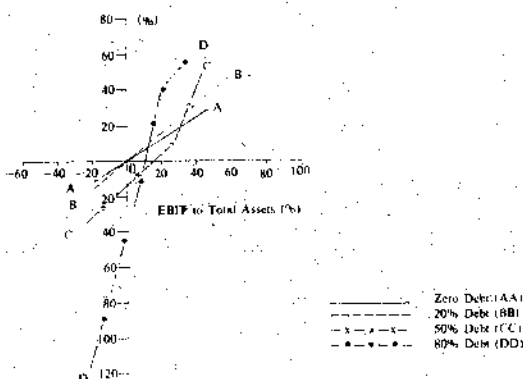


Figure: Financial Leverage and Variation in Equity Returns

Conclusions

- With zero debt, the ratio of ROE to Return on Total Assets (ROTA) as depicted by AA is a relatively flat line.
- With 80% debt, the ratio of ROE to ROTA as shown by DD becomes very steep.

This implies that as the debt-assets ratio rises, the ratio of ROE to ROTA becomes steeper.

Thus, greater financial leverage produces greater volatility in the return on equity.

Conclusions are consistent with the analysis of Table 3.

- Firm A has the lowest level of fixed costs and Firm C the highest.

Firm A has a steep total cost curve because the variable cost per unit is high and the low fixed costs do not permit a net reduction in total costs.

Total cost curve of Firm C is relatively flat. The high fixed cost component enables the firm to try variable costs, particularly the labour costs.

The location of Break-even Points (BEP) is interesting. The BEP for Firm A is at the lowest level of sales of the three firms. For Firm C, it is at the highest level of sales.

Firm C which has a BEP at a higher volume is able to record a higher rate of increase in profits once it reaches the BEP, compared to the other two firms. At a high volume of operations, Firm C begins to command a substantial cost superiority compared to the other two firms and more particularly Firm A. This result is now obvious at a level of 1 lakh units. But if volume of sales rises to 2 lakh units, the per unit costs for the three firms would be as under:

Firm	Fixed cost	Variable cost for 2 lakh units	Total cost	Units of sales	Per unit cost
	(Rs. lakh)	(Rs. lakh)	(Rs. lakh)		(Rs.)
A	1.50	14.00	15.50	2,00,000	7.75
B	3.00	10.00	13.00	2,00,000	6.50
C	4.50	8.00	12.50	2,00,000	6.25

Firm C can use the cost advantage at higher levels of sales in competitive markets. This will be particularly relevant for export sales.

Answers or approaches to Self-assessment Questions/Exercises**Hints for some selected questions:****Advantages**

- It provides a method for some investors to hold securities with fixed and prior claims.
- It may encourage real investment
- Financial leverage tends to stabilise economic functions by promoting counter-cyclical investment. Debt is costly during booms and firms avoid it after a stage. Investment is reduced and a boom is not fed further. Similarly, debt is cheaper during depressions and it may result in higher investment which pushes the economy out of unstable to more stable conditions.

Disadvantages

A major disadvantage is that heavy fixed charges may cause forced liquidation of firms during business downswings and may aggravate the severity of business depressions.

If risk is defined as coefficient of variation, it is not possible to generalise the relationship with absolute certainty. With increased financial leverage, risk could rise proportionately, more than proportionately or less than proportionately.

The example in the test of the unit demonstrates a case where risk or the CV rises less than proportionately with the debt ratio. With some other set of data, a linear relationship could be established, or a relationship where risk increases at a decreasing rate with the debt ratio could be found. Note that in all these cases risk does increase to some extent.

5 If sales tend to fluctuate widely, then cash flows and the ability to service fixed charges will also vary. Consequently, the possibility that the firm is unable to meet its fixed obligations increases. For this reason, firms in unstable industries tend to minimise their use of debt.

6 Financial leverage has no effect on EBIT; it only affects equity earnings or net income, given EBIT. The EBIT is influenced by operating leverage.

7 (a) False (b) True (c) True 8 (c) 9 (d) 10 (a) 11 (d) 12 (c)
13 (a) Operating leverage (b) low; debt (c) tax; interest; dividends.

14 (b)

Total assets = Rs. 20 crores.

Less: Debt

(.75 of Rs. 20 crores) = Rs. 15 crores

Equity = Rs. 5 crores.

Rs. 5 crores representing owners' equity is the amount that assets could drop to before creditors would begin to lose protection.

15 (ii)

	Firm A	Firm B
	Debt 60% Rs. 30 crores	30% Rs. 15 crores
	Equity 40% Rs. 20 crores	70% Rs. 35 crores
Total Assets	100% Rs. 50 crores	100% Rs. 50 crores
Firm A earns .12 × Rs. 50 crores		= Rs. 6.00 crores
Less: Interest .08 × Rs. 30 crores		= Rs. 2.40 crores
Taxable income		= Rs. 3.60 crores
Less: taxes		= Rs. 1.80 crores
Net income		= Rs. 1.80 crores
Rate of return to equity = Rs. 1.8 crores/Rs. 20 crores = 9%		
Firm B's net income .09 × Rs. 35 crores		= Rs. 3.15 crores
Add: B's taxes		= Rs. 3.15 crores
Taxable income		= Rs. 6.30 crores
Add: debt interest .08 × Rs. 15 crores		= Rs. 1.20 crores
EBIT		<u>Rs. 7.50 crores</u>
Rate of return on assets = Rs. 7.5 crores/Rs. 50 crores		= 15%

16 (d)

EBIT = Gross profit margin × Sales.
= .12 × Rs. 4,00,000 = Rs. 48,000

EBIT

Interest expenses:

(Rs. 1600 + .10 × Rs. 45,000)

Taxable Income

Tax % 35%

Earning per share

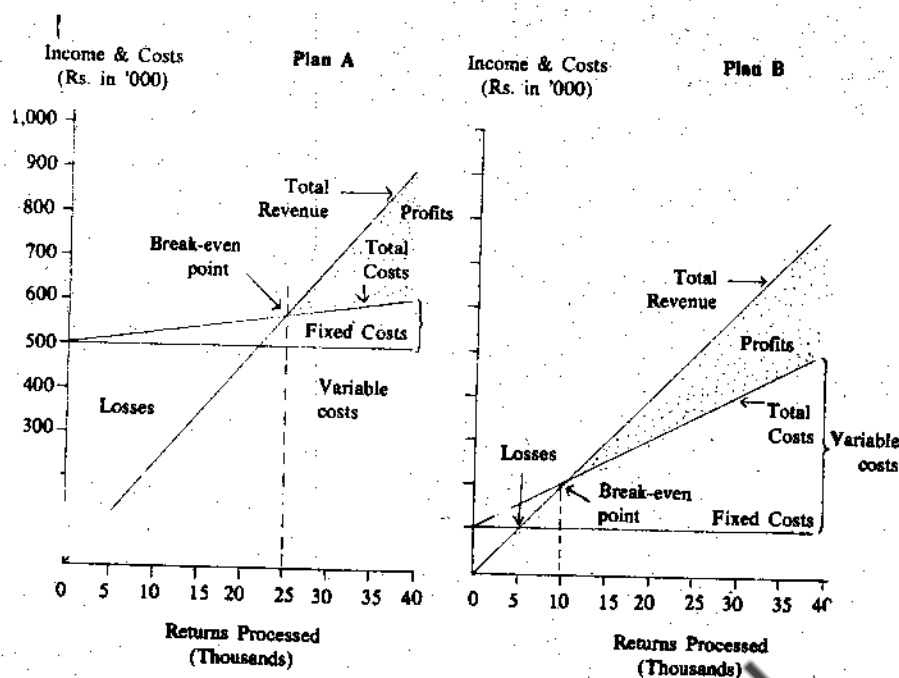
Price-Earning (P/E) ratios

Expected Market price (EPS × PE ratio) =

Debt	Equity
Rs. 48,000	Rs. 48,000
-6,100	-1,600
Rs. 41,900	Rs. 46,400
Rs. 14,665	16,240
<u>Rs. 27,235</u>	<u>Rs. 30,160</u>
27,235 ÷ 6,000	30,160 ÷ 7,000
= Rs. 4.54	= Rs. 4.31
15	20
Rs. 68.10	Rs. 86.20

17. A. i) Plan A has greater operating leverage owing to higher fixed costs.

ii) Break-even charts for Plan A and Plan B.



iii) Profit under Plan A = (Price - VC) Units - FC
 = (Rs. 22 - Rs. 2) (x) - 5,00,000

where x is the indifference number of units

Profit under Plan B = (Rs. 22 - Rs. 12) (x) - Rs. 1,00,000

Set the equation for profits under the two plans equal to one another and solve for x:

$$(Rs. 22 - Rs. 2) (x) - Rs. 5,00,000 = (Rs. 22 - Rs. 12) (x) - Rs. 1,00,000$$

$$Rs. 20x - Rs. 5,00,000 = Rs. 10x - Rs. 1,00,000$$

$$10x = Rs. 4,00,000$$

$$x = Rs. 40,000 \text{ returns processes.}$$

Thus, if fewer than 30,000 returns are processed, Plan B is better but if more than 40,000 returns are handled, Plan A is more profitable.

iv) Plan A is more risky because if sales fall below 25,000 units, losses will be incurred. The break-even of Plan B is only 10,000 forms.

B. The following steps are suggested for the solution:

i) Calculation of EBIT

Sales in Rs. = (50,000) (Rs. 22)	=	Rs. 11,00,000
Less: Fixed costs		5,00,000
Variable costs = (50,000) (Rs. 2)	=	1,00,000
EBIT	=	Rs. 5,00,000

ii) Calculation of EPS at each Debt-assets ratio using the formula: $EPS = (EBIT - I) (1 - t) / \text{No. of equity shares outstanding}$

Where

I = Interest charges = (Rupees of debt) (interest rate at each D/A ratio)

No. of shares outstanding = (Assets - Debt) / Initial price per share.

$$= (Rs. 20,00,000 - \text{debt}) / Rs. 20.00$$

The calculations made are:

$$\begin{aligned} \text{D/A} = \text{zero} : \text{EPS} &= (5,00,000) (1 - .4) / (Rs. 20,00,000 / Rs. 20.00) \\ &= (Rs. 5,00,000) (.6) / 1,00,000 = Rs. 3.00 \end{aligned}$$

$$\begin{aligned} \text{D/A} = 10\% : \text{EPS} &= (Rs. 5,00,000) - (.09) (Rs. 2,00,000) (.6) / (Rs. 18,00,000 / Rs. 20) \\ &= (Rs. 4,82,000) (.6) / 90,000 \\ &= (Rs. 2,89,200 / 90,000) = Rs. 3.21 \end{aligned}$$

$$\begin{aligned} \text{D/A} = 20\% : \text{EPS} &= (Rs. 5,00,000) - (.095) (Rs. 4,00,000) (.6) / (Rs. 16,00,000 / Rs. 20) \\ &= (Rs. 4,62,000) (.6) / 80,000 = Rs. 2,77,200 / 80,000 = Rs. 3.47 \end{aligned}$$

$$\begin{aligned}
 D/A = 30\% : EPS &= (Rs. 50,000) - (.10) (Rs. 6,00,000) (.6)/(Rs. 14,00,000/Rs. 20) \\
 &= (Rs. 4,40,000) (.6)/70,000 = Rs. 2,64,000/70,000 = Rs. 3.77 \\
 D/A = 40\% : EPS &= (Rs. 5,00,000) - (.15) (Rs. 8,00,000) (.6)/(Rs. 1,20,000/Rs. 20) \\
 &= (Rs. 3,80,000) (.6)/60,000 = Rs. 2,28,000/60,000 = Rs. 3.80 \\
 D/A = 50\% : EPS &= ((Rs. 5,00,000) - (.19) (Rs. 10,00,000)) (.6)/(Rs. 10,00,000/Rs. 20) \\
 &= (Rs. 3,10,000) (.6)/50,000 = Rs. 1,86,000/50,000 = Rs. 3.72 \\
 D/A = 60\% : EPS &= ((Rs. 5,00,000) - (.26) (Rs. 12,00,000)) (.6)/(Rs. 8,00,000/Rs. 20) \\
 &= (Rs. 1,88,000) (.6)/40,000 = Rs. 1,22,800/40,000 = Rs. 2.82
 \end{aligned}$$

iii) Calculation of Sheshan Ltd.'s expected equity share price at different debt-assets ratios.

D/A Ratio	(PE)	(EPS) Rs.	Expected Price Rs.
0%	(12.5)	(3.00)	= 37.50
10%	(12.0)	(3.21)	= 38.52
20%	(11.5)	(3.47)	= 39.91
30%	(10.0)	(3.77)	= 37.70
40%	(8.0)	(3.80)	= 30.40
50%	(6.0)	(3.72)	= 22.32
60%	(5.0)	(2.82)	= 14.10

iv) Amount of debt which Seshan should use:

The debt ratio at which share price is maximised will give the desired debt level. This is 20% or Rs. 4,00,000 of debt. Note that the EPS is also not the maximum at this debt level. For this to happen, the debt ratio must be 40% and the corresponding debt level must be Rs. 8,00,000.

5.11 FURTHER READINGS

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UNIT 6 BUDGETING AND BUDGETARY CONTROL

Objectives

The objective of this unit are to familiarise you with:

- the basic aspects of financial planning and the role of budgeting
- various types of budgets
- some new ideas and developments in the area of budgeting.

Structure

- 6.1 Introduction
- 6.2 Financial Planning
- 6.3 What is a Budget?
- 6.4 Budgetary Control
- 6.5 Classification of Budgets
- 6.6 Control Ratios
- 6.7 Performance Budgeting
- 6.8 Zero base Budgeting
- 6.9 Summary
- 6.10 Key Words
- 6.11 Self-assessment Questions/Exercises
- 6.12 Further Readings

6.1 INTRODUCTION

At the beginning of the course, we have emphasised the need for managers to be forward-looking. For you, therefore, reviewing the past information alone is not enough since your job involves not only predicting but also shaping the future of your enterprise. This requires proper planning about all activities of the business. Finance being the life blood of a business, financial planning is of utmost significance to a businessman. A budget is an important tool for financial planning and control.

However, before we come to the intricacies of budgeting, it will be useful for you to understand the meaning and implications of financial planning.

6.2 FINANCIAL PLANNING

Financial planning is concerned with raising of funds and their effective utilisation with a view to maximise the wealth of the company. It includes the determination of:

- the amount of funds needed for implementing various business plans
- the pattern of financing, i.e. the form and proportion of various corporate securities, such as shares, debentures, bonds, bank loans to be issued or raised
- the timing of floatation of various corporate securities

In spite of a good financial plan, the desired results may not be achieved if there is no effective control to ensure its implementation. The budget represents a set of yardsticks or guidelines for use in controlling internal operations of an organisation. The management, through budget, can evaluate the performance of every level of the organisation. The discrepancy between plan performance and actual performance is highlighted through budgets. The organisation may have to change the course of its operations in a particular area or revise its plans keeping in view the changing conditions.

It will, therefore, be useful for you to understand the complete budgeting process. In this unit, we shall explain what a budget is and what budgetary control means. Besides, the importance of budgeting as a management tool and the techniques of preparing various types of budgets will be discussed.

6.3 WHAT IS A BUDGET?

A budget is a plan expressed in quantitative, usually monetary terms, covering a specific period of time, usually one year. In other words, a budget is a systematic plan for the utilisation of manpower and material resources. In a business organisation a budget represents an estimate of future costs and revenues. Budgets may be divided into two basic classes: Capital Budgets and Operating Budgets. Capital budgets are directed towards proposed expenditures for new projects and often require special financing (this topic is discussed in the next unit). The operating budgets are directed towards achieving short term operational goals of the organisation, for instance, production or profit goals in a business firm. Operating budgets may be sub-divided into various departmental or functional budgets. The main characteristics of a budget are:

- a) It is prepared in advance and is derived from the long term strategy of the organisation.
- b) It relates to future period for which objectives or goals have already been laid down
- c) It is expressed in quantitative form, physical or monetary units, or both.

Different types of budgets are prepared for different purposes e.g. Sales Budget, Production Budget, Administrative Expense Budget, Raw-material Budget, etc. All these sectional budgets are afterwards integrated into a master budget which represents an overall plan of the organisation. A budget helps us in the following ways:

- a) It brings about efficiency and improvement in the working of the organisation.
- b) It is a way of communicating the plans to various units of the organisation. By establishing the divisional, departmental, sectional budgets, exact responsibilities are assigned. It thus minimises the possibilities of buck-passing if the budget figures are not met.
- c) It is a way of motivating managers to achieve the goals set for the units.
- d) It serves as a benchmark for controlling on-going operations.
- e) It helps in developing a team spirit where participation in budgeting is encouraged.
- f) It helps in reducing wastages and losses by revealing them in time for corrective action.
- g) It serves as a basis for evaluating the performance of managers.
- h) It serves as a means of educating the managers.

6.4 BUDGETARY CONTROL

No system of planning can be successful without having an effective and efficient system of control. Budgeting is closely connected with control. The exercise of control in the organisation with the help of budgets is known as budgetary control. The process of budgetary control includes (i) preparation of various budgets (ii) continuous comparison of actual performance with budgetary performance and (iii) revision of budgets in the light of changed circumstances.

A system of budgetary control should not become rigid. There should be enough scope for flexibility to provide for individual initiative and drive. Budgetary control is an important device for making the organisation more efficient on all fronts. It is an important tool for controlling costs and achieving the overall objectives.

Installing A Budgetary Control System

Having understood the meaning and significance of budgetary control in an organisation, it will be useful for you to know how a budgetary control system can be installed in the organisation. This requires, first of all, finding answers to the following questions in the context of an organisation:

- What is likely to happen?
- What can be made to happen?
- What are the objectives to be achieved?
- What are the constraints and to what extent their effects can be minimised?

Having found answers to the above questions, the following steps may be taken for installing an effective system of budgetary control in an organisation.

Organisation for Budgeting

The setting up of a definite plan of organisation is the first step towards installing budgetary control system in an organisation. A Budget Manual should be prepared giving details of the powers, duties, responsibilities and areas of operation of each executive in the organisation.

Responsibility for Budgeting

The responsibility for preparation and implementation of the budgets may be fixed as under:

Budget Controller

Although the Chief Executive is finally responsible for the budget programme, it is better if a large part of the supervisory responsibility is delegated to an official designated as Budget Controller or Budget Director. Such a person should have knowledge of the technical details of the business and should report directly to the President or the Chief Executive of the organisation.

Budget Committee

The Budget Controller is assisted in his work by the Budget Committee. The Committee may consist of Heads of various departments, viz., Production, Sales, Finance, Personnel, Purchase, etc. with the Budget Controller as its Chairman. It is generally the responsibility of the Budget Committee to submit, discuss and finally approve the budget figures. Each head of the department should have his own Sub-committee with executives working under him as its members.

Fixation of the Budget Period

'Budget period' means the period for which a budget is prepared and employed. The budget period depends upon the nature of the business and the control techniques. For example, a seasonal industry will budget for each season, while an industry requiring long periods to complete work will budget for four, five or even larger number of years. However, it is necessary for control purposes to prepare budgets both for long as well as short periods.

Budget Procedures

Having established the budget organisation and fixed the budget period, the actual work or budgetary control can be taken upon the following pattern:

Key Factor

It is also termed as limiting factor. The extent of influence of this factor must first be assessed in order to ensure that the budget targets are met. It would be desirable to prepare first the budget relating to this particular factor, and then prepare the other budgets. We are giving below an illustrative list of key factors in certain industries.

Industry	Key factor
Motor Car	Sales demand
Aluminium	Power
Petroleum Refinery	Supply of crude oil
Electro-optics	Skilled technicians
Hydel power generation	Monsoon

The key factors should be correctly identified and examined. The key factors need not be of a permanent nature. In the long run, the management may overcome the key factors by introducing new products, by changing material mix or by working overtime or extra shifts etc.

Making a Forecast

A forecast is an estimate of the future financial conditions or operating results. Any estimation is based on consideration of probabilities. An estimate differs from a budget in that the latter embodies an operating plan of an organisation.

A budget envisages a commitment to certain objectives or targets which the management seeks to attain on the basis of the forecasts prepared. A forecast on the other hand is an estimate based on probabilities of an event. A forecast may be prepared in financial or physical terms for sales, production cost, or other resources required for business. Instead of just one forecast a number of alternative forecasts may be considered with a view to obtaining the most realistic overall plan.

Preparing Budgets

After the forecasts have been finalised the preparation of budgets follows. The budget activity starts with the preparation of the sales budget. Then, production budget is prepared on the basis of sales budget and the production capacity available. Financial budget (i.e. cash or working capital budget) will be prepared on the basis of sales forecast and production budget. All these budgets are combined and coordinated into a master budget. The budgets may be revised in the course of the financial period if it becomes necessary to do so in view of the unexpected developments which have already taken place or are likely to take place.

Choice Between Fixed and Flexible Budgets

A budget may be fixed or flexible. A fixed budget is based on a fixed volume of activity. It may lose its effectiveness in planning and controlling if the actual capacity utilisation is different from what was planned for any particular unit of time e.g. a month or a quarter. The flexible budget is more useful for changing levels of activity as it considers fixed and variable costs separately. Fixed costs, as you are aware, remain unchanged over a certain range of output. Such costs change when there is a change in capacity level. The variable costs change in direct proportion to output. If flexible budgeting approach is adopted, the budget controller can analyse the variance between actual costs and budgeted costs depending upon the actual level of activity attained during a period of time. This will be explained in detail a little later.

Activity 1

Arrange a meeting with one of the officials concerned with budgetary control and administration in your organisation and discuss the following points:

- The nature and the exact nomenclature of the budgetary control system
- The time for which the system has been in operation.
- The objectives and scope (i.e., activities) of the system.

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6.5 CLASSIFICATION OF BUDGETS

Budgets can be classified into different categories on the basis of Time, Function, or Flexibility. The different budgets covered under each category are shown in the following chart:

Chart: Classification of Budgets

Time	Function	Flexibility
• Long-term	• Sales	• Fixed
• Short-term	• Production	• Flexible
• Current	• Cost of Production	
• Rolling	• Purchase	
	• Personnel	
	• Research	
	• Capital Expenditure	
	• Cash	
	• Master	

Let us discuss some of the budgets covered in the above classification.

Rolling Budget

Some organisations follow the practice of preparing a rolling or progressive budget. In such organisations, a budget for a year in advance will always be there. Immediately after a month, or a quarter, passes, as the case may be, a new budget is prepared for a twelve months. The figures for the month/quarter which has rolled down are dropped and the figures for the next month/quarter are added. For example, if a budget has been prepared for the year 19×7, after the expiry of the first quarter ending 31st March 19×7, a new budget for the full year ending 31st March, 19×8 will be prepared by dropping the figures for the quarter which has rolled past (i.e. quarter ending 31st March 19×7) and adding the figures for the new quarter ending 31st March 19×8. The figures for the remaining three quarters ending 31st December 19×7 may also be revised, if necessary. This process will continue whenever a quarter ends and a new quarter begins.

Sales Budget

Sales Budget generally forms the fundamental basis on which all other budgets are built. The budget is based on projected sales to be achieved in a budget period. The Sales Manager is directly responsible for the preparation and execution of this budget. He usually takes into consideration the following organisational and environmental factors while preparing the sales budget:

Organisational Factors	Environmental Factors
Past sales figures and trends	General trade prospects
Salesmen's estimates	Seasonal fluctuations
Plant capacity	Potential market
Orders on hand	Degree of competition
Proposed expansion or discontinuation of products	Government controls, rules and regulations relating to the industry
Availability of material or supplies	Political situation and its impact on market
Financial aspect	
Cost of distribution of goods	

It is desirable to break up the entire sales budget on the basis of different products, time periods and sales areas or territories.

Illustration 1

Andhra Vinyl Ltd. has three sales divisions at Madras, Bangalore and Hyderabad. It sells two products—I and II. The budgeted sales for the year ending 31st December, 19×6 at each place are given below:

Madras	...	Product I	50,000 units @ Rs. 16 each
		Product II	35,000 units @ Rs. 10 each
Bangalore	...	Product II	55,000 units @ Rs. 10 each
Hyderabad	...	Product I	75,000 units @ Rs. 16 each

The actual sales during the same period were:

Madras	...	Product I	62,500 units @ Rs. 16 each
		Product II	37,500 units @ Rs. 10 each
Bangalore	...	Product II	62,500 units @ Rs. 10 each
Hyderabad	...	Product I	77,500 units @ Rs. 16 each

From the reports of the sales department it was estimated that the sales budget for the year ending 31st December 19×7 would be higher than 19×6 budget in the following respects:

Madras	...	Product I	4,000 units
		Product II	2,500 units
Bangalore	...	Product II	6,500 units
Hyderabad	...	Product I	5,000 units

Intensive sales campaign in Bangalore and Hyderabad is likely to result in additional sales of 12,500 units of product I in Bangalore and 9,000 units of Product II in Hyderabad. Let us prepare a sales budget for the period ending 31st December, 19×7.

**Andhra Vinyl Limited
Sales Budget**

Division	Product	Budget for 19×7			Budget for 19×6			Actual Sales for 19×6		
		Qty. (Units)	Price (Rs.)	Value (Rs.)	Qty.	Price	Value	Qty.	Price	Value
Madras	I	54,000	16	8,64,000	50,000	16	8,00,000	62,500	16	10,00,000
	II	37,500	16	3,75,000	35,000	10	3,50,000	37,500	10	3,75,000
	Total	91,500		12,39,000	85,000		11,50,000			13,75,000
Bangalore	I	12,500	16	2,00,000	—	—	—	—	—	—
	II	61,500	10	6,15,000	55,000	10	5,50,000	62,500	10	6,25,000
	Total	74,000		8,15,000	55,000		5,50,000	62,500		6,25,000
Hyderabad	I	80,000	16	12,80,000	75,000	16	12,00,000	77,500	16	12,40,000
	II	9,000	10	90,000	—	—	—	—	—	—
	Total	89,000		13,70,000	75,000		12,00,000	—	—	12,40,000
Product	I	1,46,500	16	23,44,000	1,25,000	16	20,00,000	1,40,000	16	22,40,000
Product	II	1,08,000	10	10,80,000	90,000	10	9,00,000	1,00,000	10	10,00,000
	Total	2,54,500		34,24,000	2,15,000		29,00,000	2,40,000		32,40,000

Production Budget

This budget provides an estimate of the total volume of production distributed product-wise with the scheduling of operations by days, weeks and months, and a forecast of the inventory of finished products. Generally, the production budget is based on the sales budget. The responsibility for the overall production budget lies with Works Manager and that of departmental production budgets with departmental works managers.

Production budget may be expressed in physical or financial terms or both in relation to production. The production budgets attempt to answer questions like: (i) What is to be produced? (ii) When it is to be produced? (iii) How it is to be produced? (iv) Where it is to be produced? The production budget envisages the production programme for achieving the sales target. It serves as a basis for preparation of related cost budgets, e.g., materials cost budget, labour cost budget, etc. It also facilitates the preparation of a cash budget. The production budget is prepared after taking into consideration several factors like: (i) Inventory policies, (ii) Sales requirements, (iii) Production stability, (iv) Plant capacity, (v) Availability of materials and labour, (vi) Time taken in production process, etc.

Activity 2

From the following details of Mysore Cement Works Limited, complete the production budget for the three-month period ending March 31, 19×6 (Production budget for product P has already been worked out).

Type of product	Estimated stock on Jan. 1, 19×6	Estimated sales during Jan-March, 1986	Desired closing stock on March 31, 19×6
	(Units)	(Units)	(Units)
P	1,000	5,000	1,500
Q	1,500	7,500	2,500
R	2,000	6,500	1,500
S	1,500	6,000	1,000

Mysore Cement Works Limited
Production Budget for three months to March 31, 19 × 6

Budgeting and Budgetary Control

		Units	
Product P	Estimated Sales	5,000	
	Add: Desired closing stock	1,500	
		6,500	
	Less: Estimated opening stock	1,000	5,500
Product Q	Estimated Sales	—	
	Add: Desired closing stock	—	
	Less: Estimated opening stock	—	
Product R	Estimated Sales	—	
	Add: Desired closing stock	—	
	Less: Estimated opening stock	—	
Product S	Estimated sales	—	
	Add: Desired closing stock	—	
	Less: Estimated opening stock	—	
	Total units to be produced		25,500

Production Costs Budgets

Basically, there are three elements of costs, namely direct material, direct labour and overheads. Separate budgets for each of these elements have to be prepared.

The direct materials budget has two components, (i) materials requirement budget, and (ii) materials procurement or purchase budget. The former deals with the total quantity of materials required during the budget period, while the latter deals with the materials to be acquired from the market during the budget period. Materials to be acquired are estimated after taking into account the closing and the opening inventories and the materials for which orders have already been placed.

Illustration 2

The Sales Director of Andhra Paraffin Company expects to sell 25,000 units of a particular product next year. The Production Director consulted the storekeeper who gave the necessary details as follows:

Two kinds of raw material, P and Q are required for manufacturing the product. Each unit of the product requires 2 units of P and 3 units of Q. The estimated opening balances at the commencement of the next year are:

Finished product	: 5,000 units
Raw material P	: 6,000 units
Raw material Q	: 7,500 units

The desirable closing balance at the end of the next year are:

Finished products	: 7,000 units
Raw Material P	: 6,500 units
Raw Material Q	: 8,000 units

Let us prepare a statement showing material purchase budget for the next year.

$$\begin{aligned} \text{units to be produced} &= \text{Sales} + \text{Desired closing Stock} - \text{Opening Stock} \\ &= 25,000 + 7,000 - 5,000 = 27,000 \text{ units.} \end{aligned}$$

Materials Purchase or Procurement Budget

	Finished product units	Materials in units	
		P	Q
Production budget	27,000	54,000	81,000
Estimated Opening Balance	+5,000	-6,000	-7,500
	32,000	48,000	73,500
Estimated Closing Balance	-7,000	+6,500	+8,000
Estimated Sales of Product	25,500		
Estimated Purchase of Materials		54,500	81,500

Direct Labour Budget: Direct labour budget, like direct materials budget, may be divided into two categories, (i) direct labour requirement budget and (ii) direct labour procurement budget. The former deals with the total direct labour requirement in terms of quantity or/and value, while the latter states the additional direct workers to be recruited.

Activity 3

The production budget of a factory shows that 1,000 units of a product are to be manufactured during the next month consisting of 25 working days. Each unit is expected to take two hours and each worker is required to work for 8 hours a day. Calculate (a) the number of workers required to complete the job, (b) the number of additional workers to be recruited in case the factory has already 8 workers, and likes to keep two workers in reserve for possible absenteeism, and (c) the Labour Budget if the wages of existing and the new workers are Rs. 500 and Rs. 600 p.m. respectively. Part (a) has already been worked out.

a) Total labour hours required $= 1,000 \times 2 = 2,000$ hours
 Number of workers required if the job is to be done in a day $= \frac{2,000}{8} = 250$
 Since the job is to be completed in 25 working days, the number of workers required are $= \frac{250}{25} = 10$

b) Number of workers required [as per (a) above]

Add: Workers to be kept in reserve

No. of additional workers to be recruited $= 10 - 8 = 2$

c) Direct Labour Budget for Next Month

Current Month			Next Month		
No.	Rate	Amount	No.	Rate	Amount
8			Existing		
			Additional		
			Total		

Overhead Budget: The overheads may relate to factory, general administration, selling and distribution function. Separate budgets may, therefore, be prepared for factory overheads, administrative overheads and selling and distribution overheads.

Factory Overheads Budget: Factory or manufacturing overheads include the cost of indirect material, indirect labour and indirect expenses. Manufacturing overheads may be classified into (i) Fixed Overheads i.e. which tend to remain constant irrespective of change in the volume of output, (ii) Variable Overheads i.e. which tend to vary with the output, and (iii) Semi-variable Overheads, i.e. which are partly variable and partly fixed. The manufacturing overheads budget will provide an estimate of these overheads to be incurred during the budget period.

Fixed manufacturing overheads can be estimated on the basis of the past information and knowledge of any changes which may occur during the ensuing budget period. Variable overheads are estimated after considering the scheduled production and operating conditions in the budget period.

Illustration 3

From the following average figures of previous quarters, let us prepare manufacturing overhead budget for the quarter ending March 31, 19×6. The budgeted output during this quarter is 8,000 units.

The figures for the previous quarter are:

Fixed overheads	Rs. 40,000
Variables overheads	20,000 (@ Rs. 5 per unit)
Semi-variable	20,000 (40% fixed and 60% varying @ Rs. 5 pe. unit)

Manufacturing Overheads Budget
For the Quarter ending 31st March, 19×6

(Output 8,000 units)

Budgeting and Budgetary Control

Fixed overheads	40,000	
Variables overheads @ Rs. 5 per unit	40,000	
Semi-variable overheads		
Fixed	8,000	
Variable (@ Rs. 3 per unit)	24,000	32,000
Total Overheads		1,12,000

Administrative Overheads Budget: This budget covers the administrative expenses including the salaries of administrative and managerial staff. A careful analysis of the needs of all administrative departments of the enterprise is necessary. The minimum requirements for the efficient operation of each department can be estimated on the basis of costs for the previous years, and after a study of the plans and responsibilities of each administrative department for the budget period. The budget for the entire administrative function is obtained by integrating the separate budgets of all administrative departments.

Selling and Distribution Overheads Budget: This budget includes all expenses relating to selling, advertising, delivery of goods to customers, etc. It is better if such costs are analysed according to products, types of customers, territories and the sales departments. The responsibility for the preparation of this budget rests with the executives of the sales departments. There must be a relationship of selling expenses with the volume of sales expected and an effort should be made to control the costs of distribution. The preparation of the budget would depend on analysis of the market situation by the management, advertising policies, research programmes, and the fixed and variable elements.

Illustration 4

Let us prepare a Sales Overheads Budget for the quarter ending 31st March, 19×7 from the estimates given below:

	Rs.
Advertisement	12,500
Salaries of the sales department	25,000
Expenses of sales department	7,500
Counter salesmen salaries and allowances	30,000

Commission to counter salesmen is payable at 1% of sales executed by them.

Travelling salesman are entitled to a commission at 10% on sales effected through them and a further 5% towards expenses

Sales Territories	Sales at Counters	Sales by Travelling salesmen	Total estimated sales
A	Rs. 4,00,000	50,000	4,50,000
B	6,00,000	75,000	6,75,000
C	7,00,000	1,00,000	8,00,000

Sales Overheads Budget

	Estimated Sales in Territories		
	Rs. 4,50,000	Rs. 6,75,000	Rs. 8,00,000
Fixed Overheads			
Advertisement	12,500	12,500	12,500
Salaries of Sales Department	25,000	25,000	25,000
Expenses of Sales Department	7,500	7,500	7,500
Counter salesmen's salaries and allowances	30,000	30,000	30,000
	<u>75,000</u>	<u>75,000</u>	<u>75,000</u>

Variable Overheads

Counter salesmen commission @ 1% on sales	4,000	6,000	7,000
Travelling salesmen commission @ 10%	5,000	7,500	10,000
Expenses @ 5%	2,500	3,750	5,000
	<u>11,500</u>	<u>17,250</u>	<u>22,000</u>
Total sales overheads	86,500	92,250	97,000

Cash Budget

The cash budget is a summary of the firm's expected cash inflows and outflows over a particular period of time. In other words, cash budget involves a projection of future cash receipts and cash disbursements over various time intervals.

A cash budget helps the management in:

- determining the future cash needs of the firm
- planning for financing of those needs
- exercising control over cash and liquidity of the firm.

The overall objective of a cash budget is to enable the firm to meet all its commitments in time and at the same time prevent accumulation at any time of unnecessary large cash balances with it.

Illustration 5

Kashmir Valley Ltd. has submitted the following information:--

19×7	Sales	Purchase	Wages	Other Expenses
January	40,000	20,000	7,500	2,000
February	50,000	30,000	10,000	2,500
March	60,000	40,000	12,000	3,000
April	70,000	40,000	12,500	2,000
May	50,000	30,000	12,000	2,500
June	30,000	20,000	7,500	2,250
July	35,000	15,000	9,000	2,750
August	40,000	15,000	9,000	2,500
September	30,000	20,000	8,000	2,000
October	50,000	25,000	11,000	3,000
November	60,000	30,000	12,000	3,500
December	65,000	35,000	12,500	4,250

The company is engaged in the manufacture of furniture. It recently purchased machinery worth Rs. 50,000 on 1st April, 19×7 on deferred payment basis with interest at 12% per annum with the stipulation that the principal is repayable in four quarterly equal instalments beginning from April, 19×7 and thereafter interest to be paid as at the end of each quarter, i.e. in July, October and January. The company has been carrying deposits of Rs. 50,000 at 16% interest, payable on the last day of June every year.

About 40% sales are made on cash basis. A credit period of two months is allowed for sales on credit. Closing cash balance as on 31st March, 19×7 is projected at Rs. 5,250.

Cash discount of 5% is available if creditors are paid within one month, but not later. The company has been advised by its consultant to maintain minimum cash balance of Rs. 2,500 for day-to-day cash requirements.

As the Financial Controller of Kashmir Valley Ltd., please prepare a cash budget for the quarter April to June, 19×7.

Kashmir Valley Limited
Cash Budget for the Quarter ending 30th June, 19×7

Budgeting and Budgetary Control

	April	May	June
Opening Balance	5,250	2,500	2,500
Receipts			
Cash sales (i)	28,000	20,000	12,000
Collection from Debtors (ii)	30,000	36,000	42,000
Total Receipts (1)	63,250	58,500	56,500
Payments			
Payment for Machinery	12,500		
Interest on deposits			8,000
Creditors for Purchases (iii)	38,000	38,000	28,500
Wages	12,500	12,000	7,500
Other Expenses	2,000	2,500	2,250
Total Payments (2)	65,000	52,500	46,250
Cash Surplus/(Deficit) (1-2)	1,750	6,000	10,250
Borrowings from Bank	4,250		
Deposits in Bank		3,500	7,750
Closing Balance	2,250	2,500	2,500

	Rs.
(i) Cash Sales (40%)	
April	28,000
May	20,000
June	12,000
(ii) Collection from Debtors	
In April for Feb. Sales: $50,000 \times 60/100 = 30,000$	
In May for March Sales: $60,000 \times 60/100 = 36,000$	
In June for April Sales: $70,000 \times 60/100 = 42,000$	
(iii) Payment to Creditors	
In April for March purchases	40,000
Less: 5% Cash discount	2,000
	38,000

Master Budget

The Master or final budget is a summary budget which incorporates all functional budgets in a capsule form. It sets out the plan of operations for all departments in considerable detail for the budget period. The budget may take the form of a Profit and Loss Account and a Balance Sheet as at the end of the budget period.

The Master budget requires the approval of the Budget Committee before it is put into operation. It may happen, sometimes, that a number of master budgets have to be prepared before the final one is agreed upon. The budget generally contains details regarding sales (net), production costs, cash position, and key account balances (e.g. debtors, fixed assets, bills payable, etc.). It also shows the gross and net profits, and the important accounting ratios.

Fixed and Flexible Budgets

Fixed Budget: A fixed budget is designed to remain unchanged irrespective of the level of activity. This budget is prepared on the basis of a standard of fixed level of activity. Since the budget does not change with the change of level of activity, it becomes an unrealistic yardstick in case the level of activity (volume of production or sales) actually attained does not conform to the one assumed for budgeting purposes. The management will not be in a position to assess the performance of different heads on the basis of budgets prepared by them, because they can serve as yardsticks only when the actual level of activity corresponds to the budgeted level of activity. On account of the limitations of fixed budgeting and its inability to provide for automatic adjustments when the volume changes. Firms whose sales and production cannot be accurately estimated have given up the practice of fixed budgeting.

The Master Budget may have the following format:

Exhibit I: Budget Format

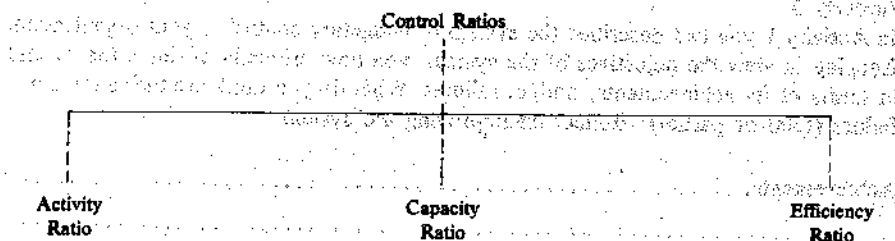
Period	Normal production capacity _____ units	Budgeted capacity _____ units	
Particulars	Product 1	Product 2	Total
	(Rs.)	(Rs.)	(Rs.)
Sales			
Cost of Sales:			
Direct materials, Direct labour,			
Variable Factory Overheads,			
Fixed Factory Overheads			
Add: Opening Stock			
Less: Closing Stock			
Gross Profit			
Administration Cost			
Selling and Distribution Cost			
Net Profit			
Assets:			
Fixed			
Current			
Total capital employed			
Ratios:			
Profit/Capital employed			
Sales/Capital employed			
Profit/Turnover			
Current Ratio			
Liquidity Ratio			
Appropriations			
Net Profit			
Dividends			
Reserves			
Taxes			
Balance of profit or Loss			

Flexible Budget: The Flexible Budget is designed to change in accordance with the level of activity attained. Thus, when a budget is prepared in such a manner that the budgeted cost for any level of activity is available, it is termed as flexible budget. Such a budget is prepared after considering the fixed and variable elements of cost and the changes that may be expected for each item at various levels of operations. Flexible budgeting is desirable in the following cases:

- Where, because of the nature of business, sales are unpredictable, e.g. in luxury or semi-luxury trades.
- Where the venture is a new and, therefore, it is difficult to foresee the demand e.g., novelties and fashion products.
- Where business is subject to the vagaries of nature, such as soft drinks.
- Where progress depends on adequate supply of labour and the business is in an area which is suffering from shortage of labour

6.6 CONTROL RATIOS

Budget is a part of the planning process. After the various budgets, including the master budget, have been prepared, you may like to compare actual performance with the budgeted performance. This can be done by using three important ratios as shown on the next page.



The above ratios are expressed in terms of percentages. If the ratio works out to 100 per cent or more, the trend is taken as favourable. If the ratio is less than 100 per cent, the indication is taken as unfavourable. We shall discuss these ratios in some detail.

Activity Ratio: Activity Ratio is a measure of the level of activity attained over a period of time. It is obtained by expressing the number of standard hours equivalent to the work produced as a percentage of the budgeted hours.

$$\text{Activity Ratio} = \frac{\text{Standard hours for actual production}}{\text{Budgeted hours}} \times 100$$

Capacity Ratio: This ratio indicates whether and to what extent budgeted hours of activity are actually utilised. It shows the relationship between the actual number of working hours and the maximum possible number of working hours in a budget period.

$$\text{Capacity Ratio} = \frac{\text{Actual hours worked}}{\text{Budgeted hours}} \times 100$$

Efficiency Ratio: This ratio indicates the degree of efficiency attained in production. It is obtained by expressing the standard hours equivalent to the work produced as a percentage of the actual hours spent in producing that work.

$$\text{Efficiency Ratio} = \frac{\text{Standard hours for actual production}}{\text{Actual hours worked}} \times 100$$

Activity 4

Calculate: Efficiency, Activity and Capacity ratios and comment on the results obtained for a factory which produces two units of a commodity in one standard hour. Actual production during a particular year is 34,000 units and the budgeted production for the year is 40,000 units. Actual hours operated are 16,000. (Some clues have been provided).

Two units are produced in one standard hour. Hence, for actual production of 34,000 units, standard hours required will be 17,000 (i.e. 34,000/2).

For budgeted production of 40,000 units, budgeted hours will be 20,000 (i.e. 40,000/2).

Efficiency Ratio :

Activity Ratio :

Capacity Ratio :

Activity 5

In Activity 1 you had described the system of budgetary control in your organisation. Keeping in view the objectives of the system, you now critically evaluate the system in terms of its achievements, and/or failures. What do you think are the causes for failure (total or partial)? Reflect on improving the system.

Achievements

.....

Failures

.....

Causes for failure

.....

Ideas for improvement

.....

6.7 PERFORMANCE BUDGETING

As explained in the preceding pages, budgeting is nothing but the technique of expressing, largely in financial terms, the management's plans for operating and financing the enterprise during specific periods of time. Any system of budgeting, in order to be successful, must provide for performance appraisal, as well as follow up measures.

The traditional (also known as line-item or object-account) budget in government enumerates estimated expenditures by type (and quantity) for a specified period of time, usually one year. The expenditure is classified by object; the personnel are listed by type of position; the budget is divided into sections according to organisational units, departments, sections; and the types of expenditure are listed by category. The primary purpose of traditional budget particularly in government administration is to ensure financial control and meet the requirements of legal accountability, that is, to ensure that appropriation, sanction or allotment limits for different items are not exceeded. It thus emphasises only the financial aspects. The expenditures are not related to the intended or planned outputs (or achievements). The necessity for linking the expenditures (or inputs in financial terms) to outputs (in physical terms), facilitating the evaluation of outcomes (or results of activities) cannot be overemphasised.

Performance budgeting (or programme budgeting) has been designed to correct the shortcomings of traditional budgeting by emphasising management considerations/approaches. Both the financial and physical aspects are incorporated into the budget. A performance budget presents the operations of an organisation in terms of functions, programmes, activities, and projects.

In performance budgeting (PB), precise detailment of job to be performed or services to be rendered is done. Secondly, the budget is prepared in terms of functional categories and their sub-division into programmes, activities, and projects. Thirdly, the budget becomes a comprehensive document. Since the financial and physical results are interwoven, it facilitates management control.

The main objectives of PB are: (i) to coordinate the physical and financial aspects; (ii) to improve the budget formulation, review and decision-making at all levels of management; (iii) to facilitate better appreciation and review by controlling

authorities (legislature, Board of Trustees or Governors, etc.) as the presentation is more purposeful and intelligible; (iv) to make more effective performance audit possible; and (v) to measure progress towards long-term objectives which are envisaged in a development plan.

Performance budgeting involves evaluation of the performance of the organisation in the context of both specific, as well as, overall objectives of the organisation. It presupposes a crystal clear perception of organisational objectives in general, and short-term business objectives as stipulated in the budget, in particular by each employee of the organisation, irrespective of his level. It, thus, provides a definite direction to each employee and also a control mechanism to higher management.

Performance budgeting requires preparation of periodic performance reports. Such reports compare budget and actual data, and show variances. Their preparation is greatly facilitated if the authority and responsibility for the incurrence of each cost element is clearly defined within the firm's organisational structure. In addition, the accounting system should be sufficiently detailed and coordinated to provide necessary data for reports designed for the particular use of the individuals or cost centres having primary responsibility for specific cost.

The responsibility for preparing the performance budget of each department lies on the respective Department Head. Each Department Head will be supplied with a copy of the section of the master budget appropriate to his sphere. For example, the chief buyer will be supplied with the copy of the materials purchase budget so that he may arrange for purchase of necessary materials. Periodic reports from various sections of a department will be received by the departmental head who will submit a summary report about his department to the budget committee. The report may be daily, weekly or monthly, depending upon the size of business and the budget period. These reports will be in the form of comparison of budgeted and actual figures, both periodic and cumulative. The purpose of preparing these reports is to promptly inform about the deviations in actual and budgeted activity to the person who has the necessary authority and responsibility to take necessary action to correct the deviations from the budget.

6.8 ZERO BASE BUDGETING

Earlier we have explained the formulation of different types of budgets. If the approach adopted in the formulation and preparation of budgets is based on current level of operations or activities, including current level of expenditure and revenue, such budgeting is known as traditional budgeting. This type of budgeting process generally assumes that the allocation of financial resources in the past were correct and will continue to hold goods for the future as well. In most cases, an addition is made to the current figures of costs to allow for expected (or even unexpected) increases. Consequently, the budget generally takes an upward direction year after year, in spite of generally declining efficiency. Such a system of budgeting cannot be expected to promote operational efficiency. It may, on the other hand, create several problems for top management. Some of these problems are:

- Programmes and activities involving wasteful expenditure are not identified, resulting in avoidable financial and other costs.
- Inefficiencies of a prior year are carried forward in determining subsequent years' levels of performance.
- Managers are not encouraged to identify and evaluate alternative means of accomplishing the same objective.
- Decision-making is irrational in the absence of rigorous analysis of all proposed costs and benefits.
- Key problems and decision areas are not highlighted. Thus, no priorities are established throughout the organisation.
- Managers tend to inflate their budget requests resulting in more demand for funds than their availability. This results in recycling the entire budgeting process.

Thus, the traditional budgeting technique may be quite meaningless in the present context when management must review or re-evaluate every task with a view to better

utilisation of scarce resources or to improve performance. The technique of zero base budgeting provides a solution for overcoming the limitations of traditional budgeting by enabling top management to focus on priorities, key areas and alternatives of action throughout the organisation.

The technique of zero base budgeting suggests that an organisation should not only make decisions about the proposed new programmes, but should also review the **appropriateness of the existing programmes** from time to time. Such a review should particularly be done of such responsibility centres where there is relatively high proportion of discretionary costs. Costs of this type depend on the discretion or policies of the responsibility centre or top managers. These costs have no direct relation to volume of activity. Hence, management discretion typically determines the amount budgeted. Some examples are: expenditure on research and development, personnel administration, legal advisory services.

Zero base budgeting, as the term suggests, examines or reviews a programme or function or responsibility from 'scratch'. The reviewer proceeds on the assumption that nothing is to be allowed. The manager proposing the activity has, therefore, to justify that the activity is essential and the various amounts asked for are reasonable taking into account the outputs or results or volume of activity envisaged. No activity or expense is allowed simply because it was being allowed or done in the past. Thus, according to this technique each programme, whether new or existing, must be justified in its entirety each time a new budget is formulated. It involves:

- dealing with practically *all* elements of managers' budget requests
- critical examination of **ongoing activities** alongwith the newly proposed activities
- providing each manager a *range of choices* in setting priorities in respect of different activities and in allocating resources

Process of Zero Base Budgeting

The following steps are involved in zero base budgeting:

Determining the objectives of budgeting: The objective may be to effect cost reduction in staff overheads or it may be to drop, after careful analysis, projects which do not fit into achievement of the organisations objectives etc.

Deciding on scope of application: The extent to which the zero base budgeting is to be introduced has to be decided, i.e. whether it will be introduced in all areas of the organisation's activities or only in a few selected areas on trial basis.

Developing decision units: Decision units for which cost-benefit analysis is proposed have to be developed so as to arrive at decisions whether they should be allowed to continue or be dropped. Each decision unit, as far as possible should be independent of other units so that it can be dropped if the cost analysis proves to be unfavourable for it.

Developing decision packages: A decision package for each unit should be developed. While developing a decision package, answers to the following questions would be desirable:

- Is it necessary to perform a particular activity at all? If the answer is in the negative, there is no need to proceed further.
- How much has been the actual cost of the activity and what has been the actual benefit both in tangible as well as intangible forms?
- What should be the estimated cost of the level of activity and the estimated benefit from such activity?
- Should the activity be performed in the way in which it is being performed and what should be the cost?
- If the project or activity is dropped, can the unit be replaced by an outside agency?

After completing decision packages for each unit, the units are ranked according to the findings of cost-benefit analysis. Essential projects are identified and given the highest ranks. The last stage is that of implementing the decisions taken in the light of the study made. It involves the selection and acceptance of those

projects which have a positive cost-benefit analysis or which are capable of meeting the objectives of the organisation.

The above analysis shows that zero base budgeting is in a way an extension of the method of cost-benefit analysis to the area of the corporate budgeting.

Advantages of Zero Base Budgeting

Let us summarise the advantages of zero base budgeting:

- It provides the organisation with a systematic way to evaluate different operations and programmes undertaken. It enables management to allocate resources according to priority of the programmes.
- It ensures that each and every programme undertaken by managers is really essential for the organisation, and is being performed in the best possible way.
- It enables the management to approve departmental budgets on the basis of cost-benefit analysis. No arbitrary cuts or increases in budget estimates are made.
- It links budgets with the corporate objectives. Nothing will be allowed simply because it was being done in the past. An activity may be shelved if it does not help in achieving the goals of the enterprises.
- It helps in identifying areas of wasteful expenditure and, if desired, it can also be used for suggesting alternative courses of action.
- It facilitates the introduction and implementation of the system of 'management by objectives'. Thus, it can be used not only for fulfilment of the objectives of traditional budgeting, but also for a variety of other purposes.

It is contended that zero base budgeting is time consuming. Of course, it is true, but it happens only in the initial stages when decision units have to be identified and decision packages have to be developed or completed. Once this is done, and the methodology is clear, zero base budgeting is likely to take less time than the traditional budgeting. In any case, till such time the organisation is properly acclimatised to the technique of zero base budgeting, it may be done in a way that all responsibility centres are covered at least once in three or four years.

Zero base budgeting as a concept has become quite popular these days. The technique was first used by the U.S. Department of Agriculture in 1962. Texas Instruments, a multinational company, pioneered its use in the private sector. Today, a number of major companies such as Xerox, BASF, International Harvester and Eastern Airlines in the United States are using the system.

Some departments of the Government of India have recently introduced zero base budgeting with a view to making the system of budgetary control more effective.

Activity 6

Discuss again with an official concerned with the budgetary control system in your organisation in the light of new developments that have taken place in the field of budgeting. Has your organisation adopted any of the features of the new developments or innovations, such as Performance Budgeting, Zero Base Budgeting, etc.? List some of the important steps taken in the recent past.

6.9 SUMMARY

Since finance is regarded as the life blood of business, financial planning is of utmost significance to management. A budget is a quantitative expression, usually in financial terms, of the future plans of an organisation. It includes projections regarding the levels of activity, expenses and revenues. A budget is an important tool of financial planning. It helps in uncovering inefficiencies in operations, in minimising wasteful expenditure and in bringing out weaknesses in the organisation structure.

The responsibility for preparing the budget rests on the Budget Controller, who is assisted in his work by a Budget Committee. The Budget Committee may consist of heads of various departments, viz., Sales, Production, Personnel, Purchase, Finance etc. Each head of the department is made responsible for preparing and executing the budget of his department. In a business organisation, preparation of any budget is preceded by a sales forecast. Production budget is prepared after considering the forecasts embodied in the sales budget and the available productive capacity etc. Production budget includes the preparation of various cost budgets associated with production process. Budgets pertaining to different functions or units are then combined and coordinated into one Master Budget.

The budgets may be revised from time to time if the changed conditions or new developments so warrant. A budget may be fixed or flexible. A fixed budget is based on fixed volume of activity. If actual capacity utilisation is likely to vary from period to period, flexible budgets are more desirable. A flexible budget is thus prepared for changing levels of activity. It considers fixed and variable costs separately and is therefore more useful to a business where the level of activity cannot be exactly predicted.

In a system of budgetary control, control ratios may be computed and used in order to compare the actual performance with the budgeted performance. These ratios are: activity ratio, capacity ratio and efficiency ratio. In case the ratio is hundred per cent or more, it is considered favourable. If it is less than hundred per cent, it is taken as unfavourable.

The traditional budgeting technique which takes the current level of operations as the basis for estimating the future level of operations is slowly going out of date. It is being increasingly realised that the traditional technique has serious shortcomings in view of the constantly changing conditions of today. The management is expected to review and re-evaluate the tasks in view of the increasing pressures of environment. The concept of 'zero base budgeting' is being considered as a suitable alternative to replacing the traditional method. 'Zero base Budgeting' technique suggests that an organisation should not only make decisions about the proposed new programmes, but should also, from time to time, review the appropriateness of the existing programmes. Nothing is allowed simply because it was being allowed in the past. Each programme, whether new or existing, has to be justified in its entirety each time a new budget is formulated.

The concept of 'Zero base Budgeting' has been accepted for adoption in the departments of the Central Government, and some State Governments.

6.10 KEY WORDS

Budget: A statement in financial terms, prepared for a defined period of time, showing the strategy to be pursued during that period for the purpose of attaining a given objective.

Budgeting: Art of building budgets.

Budgetary Control: The establishment of budgets relating to the responsibilities of executives to the requirements of a policy, and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy or to provide a basis for its revision.

Budget Manual: A document which sets out, inter alia, the responsibilities of the persons engaged in the routine of and the forms and records required for budgetary control.

Master Budget: Summary budget, incorporating all component functional budgets, which is finally approved, adopted and employed.

Budgeting and Budgetary Control

Fixed Budget: A budget designed to remain unchanged irrespective of the level of activity actually attained.

Flexible Budget: A budget designed to change in accordance with the level of activity actually attained.

Performance Budget: A budget which specifies the outputs or results to be achieved along with the inputs or expenditure to be incurred during the budget period.

Zero Based Budgeting: An operating, planning and budgeting process which requires each manager to justify his entire budget in detail from scratch.

Decision Unit: A significant programme, individual department or unit or level of an organisation that can be analysed from the standpoint of decisions and funding.

Decision Package: A programme with goals, activities, and resources along with a document that identifies and describes the programme in terms of its (i) goals, (ii) activities by means of which goals are to be achieved, (iii) benefits to be expected, (iv) alternatives to the programme, (v) consequences of not approving the programme and, (vi) financial and manpower resources required.

6.11 SELF-ASSESSMENT QUESTIONS/ EXERCISES

1. What do you understand by 'Budgeting'? Mention the types of budgets that the management of a big industrial concern would normally prepare.
2. What is Budget? What is sought to be achieved by Budgetary Control?
3. What is the significance of 'Budgetary Control' in modern business?
4. Outline a plan for Sales Budget and Purchase Budget. What considerations are necessary in the preparation of such budgets?
5. Distinguish between Master budget and Financial Budget. How does management make use of Master Budget?
6. What is a 'Flexible Budget' and how it is different from 'Fixed Budget'?
7. Explain the methods of forecasting cash requirements.
8. State whether each of the following statements is True or False:
 - a) There is no difference between a forecast and a budget. ☐ True ☐ False
 - b) A fixed budget is concerned with budgeting of fixed assets. ☐ True ☐ False
 - c) Sales budget is the most important budget among all budgets. ☐ True ☐ False
 - d) A 'fixed budget' is preferable to 'flexible budget'. ☐ True ☐ False
 - e) The principal budget factor constitutes the starting point for the preparation of various budgets. ☐ True ☐ False
 - f) A budget manual contains a summary of all functional budgets. ☐ True ☐ False
 - g) A fixed budget is one which is designed to remain unchanged irrespective of level of activity actually attained. ☐ True ☐ False
 - h) The first step in preparing the budget is determining the cost of goods sold. ☐ True ☐ False
 - i) A flexible budget is necessary for a business enterprise whose demand of goods is stable. ☐ True ☐ False
9. Fill in the blanks:
 - a) A system by which budgets are used as a means of planning and controlling all aspects of a business
 - b) is a budget designed to furnish budgeted costs for any level of activity actually attained.
 - c) is a summary of all functional budgets in a capsule form.
 - d) Budgetary control helps management to
 - e) Budget is an expression of a business plan in financial terms.
 - f) shows the anticipated sources and utilisation of cash.

- g) determines the priorities of functional budgets.
 h) A document which sets out the responsibilities of the persons engaged in the routine of and the forms and records required for budgetary control is called
 i) Cash budget is a budget.
 j) is a budget which states the additional workers to be engaged in the factory.
 k) A budget which consolidates the organisation's overall plan is called.....
 l) Capacity Ratio $\times$ Efficiency Rate =
 m) It is essential to determine the proper and to have well defined.

10 Choose the correct answer:

- i) Sales budget is a
 (a) functional budget, (b) master budget, (c) expenditure budget.
 ii) In the case of plant the limiting factor may be:
 (a) insufficient capacity, (b) shortage of experienced salesmen,
 (c) general shortage of power.
 iii) The difference between fixed and variable cost has a special significance in the preparation of:—
 (a) flexible budget, (b) master budget, (c) cash budget.
 iv) The budget that is prepared first of all is—
 (a) cash budget, (b) master budget, (c) budget for the key factor.
 v) In case of materials, the key factor may be—
 (a) insufficient advertising, (b) restrictions imposed by quota,
 (c) low market demand.
 vi) The budget which commonly takes the form of budgeted Profit and Loss Account and Balance Sheet is—
 (a) cash budget, (b) master budget, (c) flexible budget.

11 Prepare a materials budget of Bihar Udyog Ltd. based on the following information. The production orders of the products show the following consumption:

i) Consumption for a batch of 1,000 units of

Material No.	Rate per kg.	Product P	Product Q
1	Rs. 60	50 Kg.	80 Kg.
2	60	10	5
3	10	—	30
4	50	6	10
5	25	4	4
		Total	70
			129

ii) Production (units)

Product P	12,000 units
Product Q	11,000 units

12 Draw a Material Procurement Budget (Quantitative) from the following information:

Estimated sale of a product is 20,000 units. Each unit of the product requires 3 units of material X and 5 units of Material Y.

Estimated opening balance at the commencement of the next year:

Finished product	2,500 kgs.
Material X	6,000 units
Material Y	10,000 units

Materials on order:

Material X	3,500 units
Material Y	5,500 units

The desirable closing balances at the end of the next year:

Finished Product	3,500 units
Material X	7,500 units
Material Y	12,500 units

Material on order:

Material X	4,000 units
Material Y	5,000 units

- 13 Production cost of a factory for a year is as follows:

Direct Wages	Rs. 80,000
Direct Materials	1,20,000
Production overheads, fixed	40,000
Production overheads, variable	60,000

During the forthcoming year, it is anticipated that:

- average rate for direct labour remuneration will fall from Rs. 3 per hour to Rs. 2.50 per hour;
- production efficiency will remain unchanged; and
- direct labour hours will increase by 33½%

The purchase price per unit of direct materials and of the other materials and services which comprise overheads will remain unchanged.

Draw up a budget and compute a factory overhead rate, the overheads being absorbed on a direct wage basis.

- 14 ABC Co. wishes to arrange overdraft facilities with its bankers during the period April to June when it will be manufacturing mostly for stock. Prepare a Cash Budget including the extent of bank facilities the company will require at the end of each month for the above period from the following data.

a)	Sales Rs.	Purchases Rs.	Wages Rs.
February	1,80,000	1,24,800	12,000
March	1,92,000	1,44,000	14,000
April	1,08,000	2,43,000	11,000
May	1,74,000	2,46,000	10,000
June	1,25,000	2,68,000	15,000

- 50 per cent of credit sales is realised in the month following the sale and the remaining 50 per cent in the second month following. Creditors are paid in the month following the month of purchase.
- Cash at bank on the 1st April (estimated) is Rs. 25,000.

- 15 Jammu Manufacturing Company Ltd. is to start production on 1st January, 19X3. The prime cost of a unit is expected to be Rs. 40 out of which Rs. 16 is for materials 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 purchase. One-third of sales will be for cash and the rest on credit for settlement in the following month. Expenses are payable in the month in which they are incurred. The selling price is fixed at Rs. 80 per unit. The number of units manufactured and sold are expected to be as under:

January	900	April	2,000
February	1,200	May	2,100
March	1,800	June	2,400

Draw a cash budget showing requirements of cash from month to month.

- 16 The Sudershan Chemicals Ltd., operates a system of flexible budgetary control. A flexible budget is required to show levels of activity at 70%, 80% and 90%. The following is a summary of the relevant information:

- Sales based on normal level of activity of 70% (3,50,000) units at Rs. 200 each. If output is increased to 80% and 90%, selling prices are to be reduced by 2.5% and 5% of the original selling price respectively in order to reach a wider market.
- Variable costs are Rs. 100 per unit (70% is the cost of raw material). In case output reaches 80% level of activity or above the effective purchase of raw material will be reduced by 5%.
- Variable overheads: Salesman's commission is 2% of sale value.
- Semi-variable overheads (total) at 3,50,000 units are Rs. 1,20,00,000. They are expected to increase by 5% if output reaches a level of activity of 80% and by a further 10% if it reaches the 90% level.
- Total fixed overheads are Rs. 2,00,000 which is likely to remain unchanged up to 100% capacity.

- 17 Calculate: (a) Efficiency Ratio (b) Activity Ratio (c) Capacity Ratio from the following figures:
- | | |
|-------------------------|-----------|
| Budgeted production | 880 units |
| Standard hours per unit | 10 |
| Actual production | 750 units |
| Actual working hours | 6,000 |

Answers to Self-assessment Exercises

- 8 (a) F, (b) F, (c) T, (d) F, (e) T, (f) F, (g) T, (h) F, (i) F.
- 9 a) is called budgetary control
b) Flexible Budget
c) Master Budget
d) plan and control
e) for some specific future period
f) Cash budget
g) Principal budget factor
h) is termed Budget Manual
i) short-term
j) Labour Procurement Budget
k) Master Budget
l) Activity Ratio
m) Budget Period, Responsibility Centre.
- 10 (i) a; (ii) a; (iii) a; (iv) c; (v) b; (vi) b;
- 11
- | | | | | | |
|--------------|--------|--------|-------|-------|-------|
| Material No | 1 | 2 | 3 | 4 | 5 |
| Qty. (Kg.) | 1,480 | 175 | 330 | 182 | 92 |
| Amount (Rs.) | 88,800 | 10,500 | 3,300 | 9,100 | 2,300 |
- 12 Units to be procured X: 65,000; Y: 1,07,000
- 13 Cost of production Rs. 3,08,889, Production overhead rate 112.5%.
- 14
- | | | | |
|-----------------|--------------|----------|------------|
| Closing balance | April | May | June |
| (Overdraft) | (Rs. 56,000) | (47,000) | (1,67,000) |
- 15
- | | | | | | | |
|---------------|--------|--------|--------|-------|--------|--------|
| Cumulative | Jan. | Feb. | March | April | May | June |
| Surplus | Rs. | Rs. | Rs. | Rs. | Rs. | Rs. |
| Cash required | 34,800 | 37,600 | 32,400 | 6,400 | 30,800 | 66,400 |
- 16 Budgeted Profit: 70%: Rs. 214 lakhs. 80%: Rs. 250.4 lakhs, 90%: Rs. 269.65 lakhs.
- 17 (a) 125%; (b) 85.23%; (c) 68.18%.

6.12 FURTHER READINGS

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AUDIO/VIDEO PROGRAMME

Audio

Emerging Horizons in Accounting & Finance—Part I: Zero Base Budgeting

Video

Management Control Systems: Part I & II

UNIT 7 INVESTMENT APPRAISAL METHODS

Objectives

The objectives of this unit are to:

- develop an appreciation for the need for proper investment appraisal
- familiarise you with various methods of appraising capital projects, including their relative merits and demerits
- introduce some other concepts relevant in investment appraisal.

Structure

- 7.1 Introduction
- 7.2 Types of Investment Proposals
- 7.3 Need for Appraisal
- 7.4 Project Report
- 7.5 Methods of Appraisal
- 7.6 Depreciation, Tax and Inflows
- 7.7 Cost of Capital
- 7.8 Limitations of Investment Appraisal Techniques
- 7.9 Summary
- 7.10 Key Words
- 7.11 Self Assessment Questions/Exercises
- 7.12 Further Readings

7.1 INTRODUCTION

One of the aspects of financial management is proper decision-making in respect of investment of funds. Successful operation of any business depends upon the investment of resources in such a way as to bring in benefits or best possible returns from any investment. An investment can be simply defined as an expenditure in cash or its equivalent during one or more time periods in anticipation of enjoying a net inflow of cash or its equivalent in some future time period or periods.

An appraisal of any investment proposal is necessary to ensure that the investment of resources will bring in desired benefits in future. If the financial resources were in abundance, it would be possible to accept several investment proposals which satisfy the norms of approval or acceptability. Since resources are limited, a choice has to be made among the various investment proposals by evaluating their comparative merit. This would facilitate the identification of relatively superior proposals keeping in mind the limited available resources. It is apparent that some techniques should be followed for making appraisal of investment proposals. In this unit we shall describe the various appraisal methods and acquaint you with their relative merits so that you could identify the appropriate method for appraising investment proposals in different situations.

7.2 TYPES OF INVESTMENT PROPOSALS

According to the terminology used in financial management the terms 'investment decision', 'investment projects' and 'investment proposal' are generally associated with application of long term resources. What is a 'long term'? There is no hard and fast rule to define it, but by common practice and in accordance with the financing policies, practices and regulations of the financial institutions and banks a period of ten years and above is generally treated as long term.

Thus all proposals or projects involving investment of funds for a period of ten years or more will fall in the category of investment proposals. Long term investment of funds may be generally needed for the following purposes:

- Expansion of operations
- Diversification in operations
- Replacement/Modernisation of plant and machinery
- Research and Development

Expansion

A manufacturing unit, for example, is presently producing one lakh units per year. If it intends to double the production this will obviously increase the need for funds. The variable cost in aggregate will increase. Accordingly, the current assets will increase. Thus the financial resources required for working capital will have to be increased. In case the production carried so far was less than the capacity, no additional investment of funds is needed for long term. In case the existing infrastructure—plant, machinery and other permanent or fixed assets—is inadequate, the proposal for doubling the production will involve additional investment of funds for long term. It must, however, be noted that the financial needs for such a project will include not only expenditure on fixed assets but also an increase in working capital.

Diversification

The management of an enterprise such as the Indian Tobacco Company (ITC), as it happened, decided to diversify its production into other lines by adding to its original business a new area of hoteliering. Philips, famous for radio and electric bulbs etc., diversified into production of other electrical appliances and television sets. This process of diversification would involve use of large financial resources for long term investment.

Replacement

Machines used in production may either wear out or may be rendered obsolete on account of new technology. The productive capacity of the enterprise and its competitive ability may be adversely affected. Some funds may be needed for modernisation of a certain class of machines or for renovation of the entire plant or building etc. to make them more efficient and productive. Modernisation and renovation will be a substitute for total replacement. Funds will obviously be invested for long term. Where renovation/modernisation is not desirable or feasible, funds (obviously larger amounts) will be needed for replacement.

Research and Development

There has been a growing realisation that the efficiency of production and the total operations can be improved by application of new and more sophisticated techniques of production and management. New technology can be borrowed or developed. There is a greater realisation that investment of funds (obviously long term and large amounts) in constant research is a very useful, productive and ultimately profitable though there may be no immediate benefits or returns from such investments.

Activity 1

Try to look for the expenditure of capital nature incurred by your organisation over the last 3-5 years. What necessitated this expenditure? Identify the nature of this expenditure in terms of the purposes mentioned in the above section. You may like to talk to a knowledgeable person in your organisation regarding the basis of the decision and the factors that went into it.

7.3 NEED FOR APPRAISAL

You must have observed that the investment proposals: (i) involve large amount of funds (ii) involve greater amount of risk on account of unforeseen situations and (iii) often mean irreversibility once the investment decision is made. In view of these the task of appraising investment proposals is very important in financial management.

7.4 PROJECT REPORT

Preparation of a project report is a complicated process. It includes not only the

projections of financial data related to outflow and inflow of cash, but also a meticulous exercise to assess the following aspects:

- Potentiality for the marketing of the project
- Technical feasibility of the project
- Availability of managerial skills
- Environmental impact
- Financial viability

In this unit we are mainly concerned with only the financial aspects for the appraisal of an investment proposal.

Relevant Data

The following need to be considered before appraisal is taken up:

- The amount and timing of initial investment outlays
- The amount and timing of subsequent investment outlays
- The economic life of the project
- Salvage value at the end of the project
- The amount and timing of cash inflows

1 Initial Investment Outlays

This covers the total cash required to implement the proposal. It includes expenditure on design, survey, consultancy fees and the working capital costs, such as costs of maintaining stocks, contingency reserves to cover the cost of supporting additional debtors. Benefit of credit from suppliers will have the effect of reducing the quantum of additional working capital required.

2 Subsequent Investment Outlays

The cost of maintenance, replacement and updating exercises are to be treated as outflows during the period in which they are expected to be incurred.

3 Economic Life of a Project

The economic life of a project is to be distinguished from the life of an individual asset. A building may have a life of sixty years, plant may have a life of fifteen years and some equipments may have a life of five years only. The economic life of the project is determined by the duration of the 'earnings flow' generated by the project.

The economic life may end:

- a) When the cost of replacement or renovation becomes uneconomical in relation to the likely benefits;
- b) When the viability of the project is adversely affected due to obsolescence
- c) When rising maintenance costs exceed the estimated disposal value; and
- d) When the development of new technology necessitates new investment.

4 Salvage Value

Some equipments may have some value for the enterprise at the end of the life of the project or there may be an anticipated sale value of the equipment. Such amount is to be treated as an inflow at the end of the life of the project.

5 Operating Cash Flows

Three main areas are to be considered here:

- a) **Sales revenue:** It is a function of sales volume and unit selling price. Any miscalculation of sales revenue may have a crucial impact on appraisal of an investment proposal. In assessing any investment opportunity, the additional or incremental revenues generated by it need to be considered. Investment may also be undertaken to reduce operating costs. For instance, an existing plant and machinery or equipment may be replaced by a newer model which is more economical to operate. The new piece of equipment may either be more efficient (or more productive) or it may require relatively less consumption of electricity or maintenance costs, etc. It has to be noted that the ultimate impact of cost-saving equipment is the same as that of the new equipment for building up additional capacity, that is, the overall revenue is increased.

- b) **Production costs:** A distinction between fixed and variable costs will be very meaningful to anticipate the likely behaviour of costs. Only incremental costs have to be considered.
- c) **Other direct costs:** These costs will cover selling and promotion costs and additional rent, etc. The net inflow/outflow of cash can be worked out by allocating the aforesaid items period-wise. It may appear to you that in order to make an appraisal regarding the financial viability of an investment proposal, or to make a choice between two proposals, it will be enough to find out the net cash flow, that is the difference between total outflow (amount to be invested) and the inflow (net of Sales Revenue – Expenditure + Salvage Value).

See for example the following situation:

Illustration 1

Year	Net Cash Flows (Rs. 000)	
	A	B
0	40	- 360
1	150	200
2	200	300
3	220	400
4	230	450
5	370	600
Total	1210	1590

The preceding illustration tells us only that proposal B generates a total cash flow of Rs. 15,90,000 whereas proposal A brings in only Rs. 12,10,000. This alone does not help us in arriving at any appropriate decision, unless we know the total investment needed for each of them, the time value of money and the desired or acceptable rate of return on investment. Hence it will be useful to examine a few methods of assessing the return on investment.

7.5 METHODS OF APPRAISAL

The main methods used for evaluating investment proposals are:

- Pay Back Period
- Accounting Rate of Return
- Discounted Cash Flow*
- Net Present Value
- Internal Rate of Return
- Profitability Index

Pay Back Period

In simple terms it means the total period within which the total amount invested will be recovered throughout net cash flow (after tax). Suppose a sum of Rs. 5 lakh has to be invested in a project whose expected net cash flows are as follows:

Illustration 2

Year	Incremental Cash Flow (Rs. 000)		
	Annual	Annual	Cumulative
0	(—) 500	(—)	500
1	185	(—)	315
2	125	(—)	190
3	140	(—)	50
4	170	(—)	120
5	180		300

It is apparent that the total money invested is Rs. 5 lakh which is shown as a negative cash flow. This could be recovered during the fourth year. To be exact, the

payback period is 3.29 years (i.e., three years and three and a half months approx.), as calculated below:

$$P = E + \frac{B}{C}$$

where P stands for payback period

E stands for number of years immediately preceding the year of final recovery

B stands for the balance amount still to be recovered

C stands for cash flow during the year of final recovery

Anybody can say that shorter the period the better it is. Early and certain results are better than more uncertain long-term estimates.

The Payback method is simple to calculate.

The greatest weakness of this method is that it ignores the timing and amount of all cash inflows. It does not take any cognizance of the cash flows after the payback period. Thus, this method is not appropriate either for absolute or comparative appraisal. Let us observe the following example of two projects:

Illustration 3

(Rs. 000)

Years	Project A			Project B		
	Cash Flow	Cumulative Cash Flow		Cash Flow	Cumulative Cash Flow	
0	(-) 700	(-) 700		(-) 700	(-) 700	
1	100	(-) 600		400	(-) 300	
2	200	(-) 400		300	(-) 0	
3	300	(-) 100		200	(-) 200	
4	400	300		100	300	
5	500	800		—	—	
Payback period		3.25 years			2 years	

In both cases the investment is Rs. 7 lakhs which is shown as negative cash flow in zero year. It is apparent that the payback period is shorter for project B and as such it may be preferred. Project A, being a slow starter in cash flows, is likely to be rejected. As we noted earlier, this method ignores the total benefits or cash in flows generated by projects. In this particular illustration, Project A generates cash flows for a period longer than B. Project B brings in returns for a lesser number of years and that too at a decreasing rate. The payback method thus concentrates only on the liquidity aspect and ignores the overall profitability of the project. It would be better not to depend solely on this method because it is simple. As this method does have some utility it need not be rejected totally but may be assigned the status of a secondary or subsidiary criterion. In this context, a maximum period of payback may be laid down and a project exceeding this period may not be entertained.

Accounting Rate of Return

This method of working out the rate of return on investment is based on the financial accounting practices of the company for working out the annual profits. The net annual profits are derived after deducting depreciation and taxes. The average of annual profits thus derived is worked out on the basis of the period (number of years) of the life of the project.

Illustration 4

(Amount in Rupees)

Years	Cash Flow (after tax)	Depreciation	Interest
1	13,000	6,000	400
2	11,000	6,000	400
3	9,000	6,000	400
4	6,400	6,000	400
5	6,400	6,000	400
Total	45,800	30,000	2,000

The investment is Rs. 30,000. Accounting rate of return will be equal to the average of net cash flow (after depreciation, taxes, and interest) as a percentage of investment

$$\frac{(45,800 - 30,000 - 2,000) \times \frac{1}{5}}{30,000} = 9.2 \text{ per cent}$$

In the above illustration the calculation of the return is based on the original (initial) investment in the project which is Rs. 30,000. Since the investment in this Illustration is a depreciable asset and is estimated to have five years of useful life with no salvage value, it could be argued that the investment base for calculating ARR ought to be average investment which would be one-half of initial investment, in this case Rs. $30,000/2 = 15,000$. The ARR based on average investment would be:

$$\frac{(45,800 - 30,000 - 2,000) \times \frac{1}{5}}{15,000} = 18.4 \text{ per cent}$$

It will be seen that where there is no salvage value and the average investment is one-half the original investment, the rate of return will be double the rate calculated on the original investment.

In the calculation of ARR, working capital is usually not considered. Any additional working capital needed, however, should be taken into account in calculating the fund requirements of new investment. This method like the Payback Method ignores the time value of cash flows since it does not give any recognition to the timing (1st year, 2nd year and so on) of the generation of income. The timing of cash flow is an important variable in investment decision-making. Higher earnings in earlier years and lower earnings in later years cannot be taken at par with lower earnings in earlier years and greater earnings in later years. The ARR method thus suffers from a serious drawback by neglecting the quality or pattern of benefits and by ignoring the time value of money. Further, it does not take into account the scrap value of asset (or project) at the end of its useful life. Finally, the calculation of profit is subject to varying practices. The attempts at window dressing and manipulation of accounting data have a distorting influence on the calculation of profit and consequently on the ARR. All these factors make ARR a less reliable method.

Discounted Cash Flow (DCF)

This concept is based on the premise of the 'time value of money'. The flow of income is spread over a few years. The real value of a rupee in your hand today is much more than that of a rupee which you will earn after a year. Why is it so? It is the value of time. The future income, therefore, has to be discounted in order to be associated with the current outflow of funds in the investment. Two methods of appraisal of investment project are based on this concept. These are Net Present Value method and Internal Rate of Return method.

Net Present Value Method

Calculation of the net present value of future income can be related to the understanding of the compounded rate of interest or the general formula of compounding. Suppose a sum of Rs. 100 (P) is invested for a period of one year at a rate of interest (r) of 10 per cent per annum. The investment at the end of one year will be equal to (you can refer to Table 3 given at the end of this unit):

$$\begin{aligned} P \left(1 + \frac{r}{100} \right)^n \\ &= 100 \left(1 + \frac{10}{100} \right)^1 \\ &= \left(100 \times \frac{11}{10} \right)^1 = 110 \\ &= 110 \end{aligned}$$

It can also be stated that Rs. 110 in one year's time is worth only Rs. 100 today. Applying the compounding formula over the number of years to work out the present value (PV) of a future flow of income the formula will be reconstructed as

$$PV = \frac{P}{(1+r)^n} \times \frac{100}{100}$$

Where P is the amount to be received in future (number of years = n) and r is the annual rate of interest. Suppose we want to know the PV of cash flow of Rs. 500 to be received at the end of five years discounted at 10% rate of interest. The PV will be:

$$\frac{P=500}{\left(1 + \frac{r=10}{100}\right)^n} \times 100 = 310.5$$

Rather than spending your time on calculations, see Table 1 showing the discount factor for 10% over a period of 5 years in respect of the present value of one rupee. It is 0.621. By multiplying it with the expected future income of Rs. 500 the PV of this income will be $500 \times 0.621 = \text{Rs. } 310.5$. If a person were to receive a series of equal amounts over a period of five years, say Rs. 1,000 every year, the present value of these receipts can be calculated as given below:

Year	Amount Rs.	Present Value Factor	Present Value Rs.
1	1,000	.909	909
2	1,000	.826	826
3	1,000	.751	751
4	1,000	.683	683
5	1,000	.621	621
			3790

The process of reducing future values according to the factors shown to determine the present value is called discounting. When the annual cash flows to be received over a period of time are equal in amount, as in the above case, a simple method of determining the present value is available through Table 2. Taking the above example, you could look in the 10 per cent column at the line for 5 years in Table 2 and find a factor of 3.790. Multiplying it by Rs. 1,000, you would find the present value to be the same i.e. Rs. 3,790 as determined by the longer method using Table 1. Table 2 contains factors which represent the present value of Rupee one received annually for the given number of years (this form of cash flows is commonly known as an **annuity**).

You will realise that by discounting the expected annual returns for each year the project has been covered and not a few years' return as covered under Payback Method. By adding the PV of the annual inflow of cash for each year of the expected life of the project we come to know the PV of the aggregate of the inflows. This can easily be compared with the cash outflow needed today for investment. The investment proposal can be acceptable if the aggregate PV of cash inflow is more than the current outflow. The decision to accept or reject the proposal or to accept the superior one (with higher PV against the same investment) out of two or more proposals can be taken more rationally with the Discounted Cash Flow—Net Present Value Method. We may illustrate the method by comparing two projects.

Illustration 5

Project	Initial	Net Cash Income (before depreciation but after Tax) (Rs. in Thousand)							
		Year							
	Rs.	1	2	3	4	5	6	7	8
A	20,000	4	4	4	8	2	—	—	—
B	20,000	8	6	2	2	2	2	2	2

If the present value of the stream of net cash income exceeds the capital outlay, the

firm can be assured of a surplus. When alternative projects are being considered, that project which has positive (or highest) net present value will be selected.

(Interest rate = 7%)

Year	Project A			Project B		
	Net Cash Income Rs.	Discount Factor*	PV Rs.	Net Cash Income Rs.	Discount Factor*	PV Rs.
1	4,000	0.935	3,740	8,000	0.935	7,480
2	4,000	0.873	3,492	6,000	0.873	5,238
3	4,000	0.816	3,264	2,000	0.816	1,632
4	8,000	0.763	6,104	2,000	0.763	1,526
5	2,000	0.713	1,426	2,000	0.713	1,426
6	—	—	—	2,000	0.666	1,332
7	—	—	—	2,000	0.623	1,246
8	—	—	—	2,000	0.582	1,164
Total present value			18,026	21,044		
Initial Cost			20,000	20,000		
Net Present Value			(1,974)	1,044		

*Refer to Table 1

One important point should not escape your notice. In working out the NPV we used a discounting rate (in our Illustrations the rates were 10 per cent and 7 per cent) which is also known as the 'cutoff' rate or 'hurdle' rate or 'required rate of return'. The discounting rate is particularly needed when more than one investment proposals is to be appraised and the funds available for investment are not sufficient to accommodate all the proposals. Is the discounting rate chosen arbitrarily or is there any basis for its selection? Should it be the rate at which the firm would borrow or lend money, or should it be the current rate of return on capital employed?

A business enterprise may set a target rate of return for appraising investment which ordinarily would not be less than the cost (or interest rate) of funds needed for investment. It may however be stated that monetary interest rates do not reflect the additional risks which may be borne by the business. Logically speaking, therefore, the firm should select that rate of interest which most adequately represents the risk of the project, i.e. a rate which is presumably close to, if not exactly equal to, the overall rate of return on capital employed. We shall further deal with this subject under 'Cost of Capital' a little later. Apart from recognising the time value of money, the NPV method considers total benefits of a proposed project over its life. This method is particularly useful for the selection of mutually exclusive projects. The method is in line with the objective of financial management i.e. maximisation of the wealth of shareholders. The acceptance of the proposals with positive net present values are expected to have a positive impact on the market prices of shares.

Compared to pay back or ARR methods, NPV method is difficult to calculate and understand. What discounting rate is to be used in calculating present values may be difficult to decide. The selection of a particular discounting rate has a crucial effect on the desirability of a project. With a change in rate, a desirable project may turn into an undesirable one and vice-versa. As will be observed in a subsequent section, cost of capital is generally adopted as the basis for the discount rate. Further, NPV is an absolute measure. For projects involving different outlays the NPV method may not give dependable results. It may also not give satisfactory results where the projects under competition have different lives. Other things being equal, a project with shorter pay back would be preferable.

Activity 2

- How much money would you have to deposit in a savings account today in order to have Rs. 4,000 in that account at the end of five years if the bank pays a 5 per cent return calculated half-yearly? How much would you have to deposit if you wanted to have Rs. 10,000 after five years?
- How much money would you have in a Fixed Deposit Account after seven years if you deposit Rs. 1,000 today and the bank pays, an 11 per cent rate annually? How much would you have after seven years if you deposit Rs. 4,500 today?

- c) Suppose you have won a prize in a state lottery, you have the opportunity to pick one of the two prizes?

Prize A: Rs. 50,000 a year for the next ten years, paid on December 31 of each year.

Prize B: Rs. 2,50,000 cash paid today, January 1

Assuming both prizes are tax-free and that you can earn an interest of 6 per cent per annum on your money (also tax-free), which prize would you pick?

Which prize would you pick if you could earn 10 per cent on your money?

At about what interest rate would you consider the two prizes to be of equal value to you?

Internal Rate of Return

You have already observed the superiority of the Discounted Cash Flow technique over the Payback Period and the Accounting Rate of Return methods. The main point of difference is the recognition of the time value of future inflows in the former.

The Internal Rate of Return is another method under the Discounted Cash Flow technique which is used for appraising the investment proposals. Under this method, we derive the discounting rate at which the aggregate of the PVs of all future cash inflows equals the present cash outflows for the proposal. The following illustration will make it clear for you.

Illustration 6

Year	Net Cash Flow	Present Value of Net Cash Flows			
		At Discount Rate 20%		At Discount Rate 10%	
		Discount Factor*	Rs.	Discount Factor*	Rs.
0	— 100	1.000	— 100.00	1.000	(—) 100.00
1	40	0.833	33.30	0.909	36.40
2	35	0.694	24.30	0.826	28.90
3	30	0.579	17.40	0.751	22.50
4	25	0.482	12.10	0.683	17.10
5	20	0.402	8.00	0.621	12.40
			(—) 4.90		17.30

* See Table 1

From the above illustration you will realise that at the discount rate of 20%, the aggregate of the PVs (Rs. 95.10) of future cash inflows is Rs. 4.90 less than the current outflow of each investment of Rs. 100. At discount rate of 10%, the aggregate of PVs of future cash inflows is Rs. 17.30 more than the initial cash outflow. In order to equate the inflows and outflows, the rate of discount will be located by interpolation between the two aforesaid rates of 20% and 10%. This can be done as shown below. Thus the two inflows will be equal if a discount rate of 17.8% is applied. Obviously if this discount rate is higher than the target rate or the interest rate used to work out the cost of funds, the investment project should be acceptable.

$$IRR = LRD + \frac{(NPVL)}{(PV)} \times R$$

Where IRR is the Internal Rate of Return

LRD is the Lower rate of discount

NPVL is the Net Present Value at lower rate of discount (i.e. differences between present values of cash inflows and present value of cash outlay or outflows).

PV is the difference in present values at lower and higher discount rates

R is the difference between two rates of discount

Substituting the values, we get:

$$IRR = 10 + \frac{(17.30)}{(22.20)} \times 10 = 17.8$$

IRR through Payback Reciprocal

The calculation of IRR involves a trial and error procedure which is tedious and time consuming. This problem can be overcome by using reciprocal of payback which is a good approximation of the IRR. The method can be used in both the cases where a fixed cash flow is received over the life of the asset and where varying cash flows are received.

Where cash inflows are constant (or the same) every year (called annuity):

The procedure to calculate IRR is as under:

- i) Determine the pay back period of the proposed project
- ii) Look for the factor closest to the pay back period in the year row of Table 2 (the present value of annuity). The relevant year for the purpose would be equivalent to the life period of the project. For instance, if the life of the project is 6 years and its pay back period is 4 years, then we have to look for the factor closest to 4.000 for the year 6 in Table 2. According to Table 2 the factors closest to 4.0 for 6 years are 3.998 (13% rate of interest) and 4.111 (12% discount rate). The value closest to 4.0 is 3.998. Therefore, the actual value lies between 12 and 13 per cent, tilting on the side of 12 per cent. This value can be calculated by interpolation as shown in Illustration 6.

Where the stream of cash flows is of varying nature: The calculation of IRR under such circumstances is a little more difficult. The way to simplify the process is to use a 'fake annuity' as a starting point.

The following procedures may be followed:

- i) Calculate the average annual cash flows to get a fake annuity.
- ii) Determine 'fake payback period' by dividing the initial outlay with the average annual cash flows after taxes (CFAT) as calculated in step (i).
- iii) Look for the factor in Table 2 closest to the fake payback period in the same manner as in the case of annuity.
- iv) Adjust the IRR obtained in step (iii) by comparing the pattern of average annual cash flows as per step (i) to the actual varying stream of cash flows. If the actual cash flow stream happens to be higher in the initial years of the project's life than the average stream, adjust the IRR a few percentage points upward. Conversely, if in the early years the actual cash flow is below the average, adjust the IRR a few percentage points downward.
- v) Find out the present value of the uneven cash flows, taking the IRR as the discount rate as estimated in step (iv) by using Table 1.
- vi) If by chance, the PV of CFAT equals the initial outlays, you have arrived at the right IRR. Otherwise repeat step (v), that is, if you have not struck the right rate of IRR. The net present value will either be positive or negative. If it is positive, work for another rate (i.e. higher rate) which will turn it into a negative figure. If the NPV is negative, work for another rate (i.e. lower rate) which will turn it into a positive figure. When two consecutive discount rates have been found out one of which causes the NPV to be positive and the other causes it to be negative, the actual IRR can be ascertained through the process of interpolation as explained in Illustration 6.

In short, therefore, whether the cash inflows of a project are the same each year or are different, you should select two discounting rates in such a manner that the NPV result of the lower rate of discount is a positive amount and the NPV result of the higher discounting rate is a negative amount. You can then apply the interpolation formula and arrive at the correct IRR. If you are strong enough in your intuition and can, with a little effort, guess the two consecutive discounting rates, you need not even bother about what is mentioned in part (b) of the above discussion (viz., when the stream of cash flows is of varying nature).

IRR, like the NPV, takes into consideration time value of money and also the total cash inflows and outflows over the entire life of the project (asset). For managers it is easier to understand as the calculation is always a percentage and not an absolute amount as under Net Present Value method. An added advantage is that it does not require a discounting rate. The method itself provides a rate of return. If projects are

chosen with IRR greater than the required rate of return, the method would lead to the realisation of the objective of maximisation of wealth of the shareholders.

However, IRR requires tedious calculations (based on trial and error procedure or interpolation), as you must have already noted. Under the IRR method it is assumed that cash flows are reinvested at the same rate as IRR. This also implies that if IRR of two projects is say 16% and 20%, the cash flows arising from these two projects will also be reinvested at their respective rates i.e. 16% and 20%. The reinvestment of cash flows at two different rates within the same company may sound rather unrealistic. Whether cash flows from projects would be reinvested in the company or used for other purposes may depend on several factors. In some cases the cash generated may not be used internally.

Activity 3

An administrator of a hospital is considering a proposal to purchase a new machine that will aid productivity in the X-ray department. The machine will cost Rs. 13,791 now and is expected to have a five-year useful life and a zero disposal value, and will result in operational savings of Rs. 4,000 annually. The hospital is not subject to income taxes.

The administrator has two alternatives, alternative A is to continue to operate the X-ray department without change (i.e. do nothing). Alternative B is to buy the new machine, which will reduce hand processing. Because no change in revenue is indicated, the cash savings is the difference between the cash operating costs under two alternatives.

1. Compute the project's expected net present value. Assume that the required rate of return (also referred to as the minimum desired rate of return or hurdle rate) is 6 per cent. (The relatively low interest rate is not unusual for a non-profit institution).
2. Compute the expected internal rate of return on the project.

Profitability Index

It may at times be observed that if we use Internal Rate of Return method, a proposal may be rejected because the IRR is less than that of the other one but actually the former may not be a bad proposal if NPV is worked out by the target rate of discount.

Illustration 7

Project	Cash outflow in year 0	Cash inflow per annum for 5 years Rs.	IRR %	NPV at 10% Rs.
A	50,000	15,000	15.4	6,850
B	68,000	20,000	14.4	7,800

If the organisation has to choose one of the two projects and it uses the IRR criterion, Project B will be rejected because it has lower IRR. On the other hand, if it uses a target rate of 10%, project B will be selected as it has higher NPV. However if target rate of 15% is used, Project A will be selected as it looks better. You can yourself compute the figures and verify the results.

It has been explained earlier that if the PV of aggregate future cash inflows is higher than the present cash outflow by way of investment, the investment proposal is good. If we have to choose between two proposals then the better proposal will be the one where the excess of discounted cash inflows over the cash outflow is larger.

Illustration 8

Proposal	PV of total inflows Rs.	Outflow Rs.	Surplus Rs.
A	4,50,000	4,00,000	50,000
B	1,20,000	1,00,000	20,000

Apparently, proposal A appeals because the net surplus over cash outflows is larger than in case of B. Please note that we are ignoring a very significant point and it is the 'rate of return on investment'. The quantum of inflow is irrelevant unless it is viewed against the total amount of investment. Now by applying simple method of calculating rate of return we find that in case of A the return on investment is

$$\frac{(50,000 \times 100)}{4,00,000} = 12.5 \text{ per cent, whereas in case of B it is}$$

$$\frac{(20,000 \times 100)}{1,00,000} = 20 \text{ per cent. Now it can be rationally stated that proposal B}$$

is superior to A.

The profitability Index (PI) is the relationship between the present values of net cash inflows and the present value of cash outflows. It can be worked out either in unitary or in percentage terms. The formula is:

$$\text{Profitability Index} = \frac{\text{Present Value of Cash inflows}}{\text{Present Value of Cash outflows}}$$

If we apply this formula to the Illustration we find that profitability index for each of the two proposals is:

$$\text{A} \quad 4,50,000 \div 4,00,000 = 1.125 \text{ or } 112.5\%$$

$$\text{B} \quad 1,20,000 \div 1,00,000 = 1.20 \text{ or } 120\%$$

You will find that the result is identical as per the rate of return on investment calculated earlier. Proposal B, therefore, is superior.

Now, a question may be asked. If the result under both the aforesaid methods is identical, then why have two methods? Please note that in case there is a 'cut off rate' prescribed by the management for approving investment proposals, a proposal will not be approved if the rate of return is less than the 'cut off rate' or the minimum expected rate of return. The profitability index in the absence of a cut off rate may appear to have no relevance. However, if two or more investment proposals qualify this test, a choice may have to be made among these proposals because of resource constraints. Hence for choice making, a proposal with a high profitability index may be approved. In case there is no basic cut off rate the profitability index can again be regarded as a good guide for choice making.

7.6 DEPRECIATION, TAX AND INFLOWS

It must be made clear that depreciation is excluded from Discounted Cash Flow (DCF) computations. A common error is to discount cash flows obtained after deducting the amount of depreciation. This type of error, in fact, shows lack of understanding of the basic idea involved in DCF. The DCF approach is fundamentally based on inflows and outflows of cash and not on the accrual concept of revenues and expenses. Depreciation does not involve any cash flow. It is merely a book entry to allocate the cost of the asset over its useful life. It has of course the effect of reducing the disposable income.

In the DCF approach, the initial cost of an asset is usually regarded as a lump sum outflow of cash at time zero. The cash inflows in our illustrations are assumed to be after income taxes. Depreciation, as you have noted, is not a factor in discounted cash-flow techniques. Nevertheless, depreciation has some bearing on the annual cash flows because of its connection with income tax. Probably, you are aware that depreciation is deductible as a regular business expense in the determination of the income tax payable.

Because depreciation does not require the repeated outlay of cash over the useful life of the asset, it does not reduce the cash earnings from a particular investment. But the incremental earnings from such an investment are taxed at the prevailing rate, and the incremental tax payments (paid in cash) reduce cash earnings. Since depreciation on the asset is a tax deduction, it reduces the tax payment. It thus acts to 'shield' part of the cash inflow from the tax burden.

Illustration 9

Newlook company has the opportunity to purchase a piece of automatic equipment whose original cost is Rs. 12,000. Assuming the annual cash savings from using the automatic equipment to be Rs. 5,600 before taxes, depreciation (straight line) Rs. 2,400 (based on the initial cost of Rs. 12,000), no salvage value, five-year life and the tax rate of 50 per cent, calculate cash inflow after taxes.

	Tax Purpose	Cash inflow
Gross annual cash cost savings	Rs. 5,600	Rs. 5,600
Less : Depreciation	2,400	
Net incremental income subject to tax	Rs. 3,200	
Income tax at 50% (payment in cash)	1,600	1,600
Net cash inflow after taxes		Rs. 4,000

Had depreciation not been deductible, the income tax on Rs. 5,600 would have been Rs. 2,800 and the net incremental cash inflow Rs. 2,800. As it is, Rs. 1,200 of cash flow is retained; the tax rate (50 per cent) applied to the depreciation deduction (Rs. 2,400) is thus regarded as a 'tax shield'.

7.7 COST OF CAPITAL

The net present value techniques for investment appraisal require the use of a desired minimum rate of return which as you have already noted, is also called the **hurdle rate, discount rate, required rate of return**, or the **cost of capital**. The rate of return a project is expected to give should be at least equal to the opportunity cost rate, which is determined by what can be earned if the funds were invested elsewhere with similar risk.

In general, the riskier the project the higher the expected rate of return. Thus, each investment opportunity could have its own rate of return or cost of capital depending on its risk. In this context it will not be illogical to push up the Required Rate of Return (RRR) as the risk increases. The RRR in fact can be taken as the sum of the risk-free rate of interest plus a risk premium. In financial management, we often separate the investment and the financing decisions. We expect each investment project (with risk equal to the average for the firm) to earn a rate of return equal to at least the average cost of capital for the firm. Basically, there are two ways in which the desired minimum rate can be established:

- 1 The rate could be based on the operating performance of the company itself or the industry with which it is associated.
- 2 The rate could be based on the company's cost of funds.

Obviously, the former method is more subjective. Management may regard its own operating experience as a satisfactory standard to be used for undertaking new capital projects. If industry experience is better, management may decide to adopt this higher level for goal-setting purposes. In some cases, it may be the wish of management to set a 'desired' rate for cut-off purposes which is independent of either and reflective of a level of future profits (i.e. the target rate) intended to improve on both.

Cost of funds (or capital), on the other hand, places the minimum level at a point determined by what it costs the company for money in the market. Various methods are available for determining the cost of capital. The cost in the form of interest rate for borrowed funds (debt, loans or bonds) is fairly obvious and determinable. The cost of preference shares is the fixed dividend payable on them. The cost of equity funds is often less clear. The stated rate of dividends on preference shares may not be a proper guide to the cost of this type of capital, because preference stock bears many of the same characteristics as borrowed funds.

A difficult problem therefore lies in the treatment of common shareholders equity, particularly retained earnings. You could probably say that capital from this source has no cost, being internally generated. This thinking, however, may not be valid. The more persuasive argument is that earnings retained in business have an

opportunity cost. If this part of capital cannot earn a satisfactory return by being ploughed back into the operations of the business, it ought to be paid to the shareholders in the form of dividends. One measure of this opportunity cost is the average return which shareholders would have earned on their dividends (after personal income taxes) if the company had not retained profits but had distributed them in dividends (or additional dividends) and the shareholders had invested them. The shareholders have to forego these returns if funds are retained in the business instead.

When a company's shares are listed on a stock exchange, the market price will usually reflect the earnings per share (after taxes) currently being earned by the company. The company's practice with respect to dividend payment and retention of earnings will also have an influence on the market price. Thus, one method of determining the cost of common equity capital for the firm with listed shares is to relate its earnings per share to the market value of the stock.

The company's cost of capital is a dynamic thing, affected by its current capital structure, its financing plans for the future and any changes in its rate of earnings. To determine an average cost of capital for a firm it is necessary to include some provision for capital structure, the expected cost of borrowed funds, and the market-established cost of equity capital.

Illustration 10

Assume that a company has 40 per cent of its capital structure composed of debentures (with 14 per cent interest) and 60 per cent of equity shares which show a market value of Rs. 25 per equity share, reflecting current earnings per share (after taxes) of Rs. 7. Cost of capital determined by weighted average would be:

Type of capital	Weight	After-tax rate	Weighted average
Debentures	40%	7	2.8%
Common stock	60%	28	16.8%
	100%		19.6%

In this calculation, the rate of 7 per cent for debentures is the effective cost of interest after taxes, since interest is a deductible expense for tax purposes (i.e. 14 per cent rate before taxes $\times$ 50 per cent assumed tax rate). The effective rate of 28 per cent for common stock (Rs. 7 earnings per share/Rs. 25 market price) is also taken after taxes, so the weighted average of 19.6 per cent is an after-tax rate. In this case, management presumably would reject capital expenditure proposals promising less than 19.6 (or say 20) per cent return after taxes. Acceptance of those indicating higher returns would, of course, be subject to whatever other constraints management might impose, such as total budget limitations. The RRR or cost of capital thus plays a crucial role in determining the acceptability of an investment proposal.

7.8 LIMITATIONS OF INVESTMENT APPRAISAL TECHNIQUES

The investment appraisal techniques appear to be exact. However, it has to be appreciated that the true value of an investment proposal can only be approximated. The results arrived at are dependent upon estimated factors and this has to be constantly borne in mind. The dependability of the results would, to a large extent, depend upon the extent of objectivity and reliability of the input data. Incessant inflation also complicates the picture. In estimating cash flows, it is important to take account of anticipated inflation.

There are essentially three factors in the quantitative techniques for investment appraisal: (1) capital investment, (2) return or cash flows, and (3) project or asset life.

While capital investment can be determined in some cases with a high degree of accuracy (e.g., the purchase price and installation cost of a piece of equipment), in

other cases (e.g., development of a new product, opening a new sales territory), the amount can only be approximated.

The return factor (cash savings, incremental inflows or earnings) nearly always depends on estimates. And these estimates depend upon the subjective probabilities (in analysing risk) which are assigned to possible outcomes. With uncertainties pervading the future, projected cash flows may become, at best, half-truths. The source of most major errors is the estimate of sales volume and price. Determining the amount of cash savings, for example, from the use of labour-saving equipment requires that an experienced engineer or production executive estimates the number of labour manhours to be saved, the increase or decrease in maintenance cost, the effects on power consumption, and a host of other factors. Estimates of the contribution margin in increased sales volume resulting from the introduction of a new product, the opening of a new market, or an augmentation of the advertising programme, are always highly speculative.

Finally, the estimate of the useful or economic life of a project or asset is probably the most tenuous of all, for it depends upon several environmental factors technological and marketing. An engineer's guess as to the useful life of a productive asset can be fairly reliable only if the rate of technological change and obsolescence can be properly estimated. The profitable career of a new product depends upon customer acceptance and competitors' reactions—both highly speculative phenomena. Certain statistical techniques based on probability are helpful in minimising the errors of estimating under conditions of uncertainty, but they cannot eliminate uncertainty, and therefore error, entirely.

The soundness of the decision, therefore, would not only depend on the right choice (or combination) of appraisal technique (or techniques), but would also depend on sound common sense and judgement of the decision-makers.

7.9 SUMMARY

Effective deployment of capital over the long-term is one of the key means by which management attempts to achieve the objective of wealth maximisation. Decisions affecting investment in long-term capital projects or assets have a major impact on the future well-being of the organisation. Apart from being uncertain, such decisions, typically, involve large commitments of funds. This unit focused on how investment decision can be made more effective in contributing to the health and growth of the firm. The use of the methods of analysis will enable the management to rank and choose intelligently among proposals competing for essentially scarce long term funds.

The methods presently in common use are (i) the **pay back period**, (ii) the **accounting rate of return**, and (iii) **discounted cash flow** techniques.

The pay back is a 'rough-and-ready' means of estimating how long it will take to recoup the original investment from the flow of cash earnings produced by the project. It suffers from a serious drawback i.e. it provides no measure of profitability. It concerns itself only with the liquidity of the investment.

The accounting rate of return is readily understood and easily determinable, but is subject to serious limitations. It averages cash flows, and fails to distinguish between projects with long lives and those with shorter lives and between those with uneven cash flows. Moreover, it overlooks the all important time value of money. This model is adequate where the return of a project plainly far exceeds the required rate or in case of projects which are not subject to close competition for funds from other projects.

The discounted cash-flow techniques are of two basic types: (1) the net present value and (2) the internal rate of return. The former employs some desired (or required) rate of return as a discount factor in determining the present worth of the cash inflows. The investment should show an excess of present value at the desired rate over the initial cost or investment. The latter is the rate of return which discounts the stream of future cash inflows to the original cost, of the investment which produces them. Under many circumstances, both these DCF technique give identical answers.

Profitability index is the percentage relationship between present value of the cash inflows discounted at the desired rate and the cost of the investment. This device offers ready comparability between projects of unlike size and duration. In general, discounted cash flow techniques provide the most reliable appraisals of alternative investment proposals. The use of present value tables makes these techniques reasonably simple to employ.

Certain limitations underlie all capital budgeting appraisals. However, the three basic factors of the quantitative analytical techniques—investment, return, and time—are all, to varying degrees, the results of estimates. The estimate of future benefits is the key measurement in investment appraisal. Certain techniques like sensitivity analysis have been developed which help to narrow the margin of error of such estimates.

7.10 KEY WORDS

Accounting Rate of Return (ARR): A measure of rate of return for evaluating capital investment proposals, derived from accrual accounting methods for income determination.

Cost of Capital: The cost of raising capital in the market, which may include interest on borrowed money or the relation of a company's earnings to the market value of its equity shares.

Discounted Cash Flow: A measure of rate of return for evaluating capital investment proposals based on the concept of the time value of money.

Discounting: A reduction of some future amount of money to a present value at some appropriate rate in accordance with the concept of the time value of money.

Internal Rate of Return (IRR): That rate which equates the present value of the future cash inflows with the cost of the investment which produces them.

Net Present Value (NPV): A technique of discounted cash flow for capital expenditure evaluation which seeks to determine whether the present value of estimated future cash inflows at management's desired rate of return is greater or less than the cost of the proposal.

Payback Period: The length of time required to equate cash return with the initial cost of capital investment, which is determined by dividing the original investment by the annual cash inflows (cash savings after taxes).

Present Value: The amount of money which, if invested immediately at a stated rate, would yield one or more future payments reflecting the increased value of the investment in accordance with the time value of money. Conversely, it may be considered the value of a future stream of payments discounted at a given rate to the present time.

Profitability Index: The present value of future cash inflows divided by the present value of the initial outlay, also known as benefit-cost ratio.

Salvage value: The residual value of a depreciable asset at the end of its useful life.

7.11 SELF-ASSESSMENT QUESTIONS/ EXERCISES

1. Examine different classes of capital projects and explain why they are often approached differently?
2. What data you would seek before you appraise any capital or asset acquisition project?
3. Explain the concept of payback period. Why does this method enjoy a good deal of popularity among businessmen? What are its limitations?
4. Explain Accounting Rate of Return and discuss its limitation?
5. What is the meaning of Internal Rate of Return? Are Internal Rate and Payback related? Explain.

- 6 What is meant by Net Present Value? Why is profitability Index considered useful?

"Discounted cash flow techniques may be fine for some projects, but they have one flaw—they ignore depreciation. Depreciation is an important factor in some types of capital investment. Therefore, discounted cash flow methods are useless when considering investment in depreciable assets." Discuss the logic of this position.

- 8 How does depreciation act as a tax shield?
- 9 What are the essential limiting factors in the reliability of capital budgeting measurement techniques including discounted cash flow?
- 10 Explain the concept of 'cost of capital' as a device for establishing a cut off point for capital investment proposals.
- 11 State whether the following statements are true or false :
- Capital investment is not necessarily an investment in tangible property. ☐ True ☐ False
 - All investments are expected to yield inflows. ☐ True ☐ False
 - A comparison of the investment and the returns (or benefits) cannot be made unless all monetary amounts are stated on the same time basis. ☐ True ☐ False
 - The net amount invested in the new machine is the cost of the new machine minus the net amount received from the sale of old machine. ☐ True ☐ False
 - Net working capital that must be held to support the investment is a part of the total investment in an asset or project. ☐ True ☐ False
 - Depreciation on the asset is included as a cost in computing DCF returns. ☐ True ☐ False
 - The net working capital released on the termination of a project is not a return (or inflow) of the final year. ☐ True ☐ False
 - The costs incurred in the past have no bearing on the decisions to be made in future. ☐ True ☐ False
- 12 The Western India Company is considering the replacement of one of its machines with a newer model which supposedly will reduce operating costs considerably. The company has prepared the following analysis of costs:

	Old Machine	New Machine
	Rs.	Rs.
Depreciation	10,000	18,000
Labour	12,000	6,000
Other Costs	10,000	4,000
Total Annual Costs	32,000	28,000

The old machine originally cost Rs. 80,000 and has been operated for three years out of an estimated eight-year life. The new machine, which has an estimated life of five years, can be acquired for Rs. 90,000 less a trade-in allowance of Rs. 20,000 for the old machine. The other costs listed above consist of repairs, power to operate the machine, lubrication and similar costs.

Which of the following statements is false?

- Depreciation on the old machine is a sunk cost.
 - Depreciation on the old machine may be disregarded in deciding whether to replace the old machine.
 - Labour and other costs are out-of-pocket costs.
 - The payback period of the new machine is seven and one-half years.
- 13 The Greatways Company is considering replacing an old machine with a newer model having lower maintenance costs. The old machine has a current book

value of Rs. 9,000 and a (straight-line) depreciation charge of Rs. 3,000 per year for the remaining life of 3 years including the current year. It will have no salvage value. However, at present the machine can be sold in the market for Rs. 6,000. The existing machine requires an annual maintenance costs of Rs. 3,000. The new machine will cost Rs. 12,000 and require an annual maintenance costs of Rs. 600. It's expected useful life is 3 years with no salvage value.

Assuming straight-line depreciation also for new machine and a tax rate of 50%, determine the incremental cash flows (both outflows and inflows) of the replacement decision.

- 14 Farewell Company has an investment opportunity costing Rs. 30,000 with the following expected net cash flow (i.e. after taxes and before depreciation):

Year	Net cash flow
1	Rs. 4,000
2	4,000
3	4,000
4	4,000
5	4,000
6	7,000
7	9,000
8	12,000
9	9,000
10	2,000

Using 10% as the cost of capital (rate of discount), determine the following:

- Payback period
 - Net present value at 10% discounting factor.
 - Profitability index at 10% discounting factor.
 - Internal rate of return with the help of 10% discounting factor and 15% discounting factor.
- 15 The Deccan Corporation, which has a 50% tax rate and a 20% after-tax cost of capital, is evaluating a project which will cost Rs. 1,25,000 and will require an increase in the level of inventories and receivables of Rs. 25,000 over its life. The project will generate additional sale of Rs. 1,00,000 and will require cash expenses of Rs. 25,000 in each year of its 5-year life. It will be depreciated on a straight-line basis. What are the net present value and internal rate of return for the project?
- 16 The management of Maratha Udyog has two alternative projects under consideration. Project 'A' requires a capital outlay of Rs. 3,00,000 but project 'B' needs Rs. 4,20,000. Both are estimated to provide a cash flow for six years: A Rs. 80,000 per year and B Rs. 1,10,000 per year. The cost of capital is 12%. Show which of the two projects is preferable from the viewpoint of (i) Net Present Value and (ii) Internal Rate of Return.
- 17 Speedex Dry Cleaning Company is considering the purchase of new wash and dry equipment in order to expand its operations. Two types of options are available: a Low Speed System (LSS) with a Rs. 40,000 initial cost and a High Speed System (HSS) with a Rs. 60,000 initial cost. Each system has a sixteen years life and no salvage value. The net cash flows after taxes (CFAT) associated with each investment proposals are:

	Low Speed System (LSS)	High Speed System (HSS)
CFAT for year 1 through 16	Rs. 8,000	Rs. 12,000

Which speed system should be chosen by speedex, assuming 15% cost of capital/rate of discount?

- 18 Space Age Printers, a large and profitable printing press, is faced with the prospect of replacing a large printing system. Two systems currently being marketed will do the job satisfactorily. The Superior system costs Rs. 1,50,000 and will require cash running expenses of Rs. 60,000 per year. The Matchless

system costs Rs. 2,25,000 but running expenses are expected to be only Rs. 45,000 per year. Both machines have a ten-year useful life with no salvage value and would be depreciated on a straight-line method.

- If the company pays a 40% tax and has a 11% after-tax required rate of return, which machine should it purchase?
- Would your answer be different if the required rate of return is 9%?

- 19 Vishwa Bharti Company is examining two mutually exclusive proposals for new capital investment. The data on the proposals are as follows:

	Proposal A	Proposal B
Net cash outlay	Rs. 50,000	Rs. 60,000
Salvage value	2,000	NIL
Estimated life	5 years	6 years
Depreciation	Straight-line Method	Straight-line Method
Corporate income-tax	50%	50%
Cut-off rate used for appraisal	10%	10%
Earnings before depreciation and taxes:		
Ist year	Rs. 13,000	Rs. 12,000
IInd year	15,000	16,000
IIId year	18,000	18,000
IVth year	22,000	24,000
Vth year	12,000	24,000
VIth year		20,000

Using both (a) present value method and (b) D C F rate of return (internal rate of return) calculations, you are asked to advise which proposal would be financially preferable. (you may calculate depreciation on the original cost without taking salvage value into account. You may also ignore income tax on salvage value received).

- 20 Arunachal Limited has been having a job performed by a neighbouring company on a part used in its project at a cost of Rs. 5 per part. The annual average production of this part is expected to be 6,000 pieces.

The Arunachal Limited itself can perform this operation by bringing into operation two machines: spare lathe which has a net book value of Rs. 2,000 and a new machine which can be purchased at a price of Rs. 70,000

The new machine is expected to last 7 years. The old machine has a remaining physical life of at least 10 years and could be sold now for approximately Rs. 15,000. The final salvage value of both machine is considered negligible. In performing the operation itself, the Arunachal Limited will incur out-of-pocket costs for direct labour, power supply etc. of Rs. 2 per part.

Prepare an analysis (including explanatory comments) which would help to determine whether it is profitable for the company to perform these operations itself. The company normally expects to earn a rate of return before taxes of about 15% on its invested capital. Ignore income tax effect.

- 21 The Mahanagar Company, by purchasing and installing a small computer, expects to realise certain cash savings in its data processing operations.

The direct cash expenses per month under the present manual-book-keeping machine system are:

	Rs.
Salaries—book-keeping and clerical	9,250
Forms and supplies	1,500
Overtime, payroll, taxes, fringes	2,250
Total	13,000

The existing furniture and equipment are fully depreciated on the books of the company.

The computer costs Rs. 1,60,000 including alterations, installation and accessory equipment.

The department will be staffed as follows:

	Per year
Data processing supervisor	Rs. 20,000
Machine Operator	8,000
Programmer	8,500
Key-punch operators (2 @ Rs. 5,500)	11,000
Other pay roll costs	4,500

It is expected that forms and supplies costs will remain unchanged.

The computer is expected to be obsolete in five years, having a salvage value of Rs. 10,000 at that time.

Assuming a 50 per cent tax rate:

- Determine the annual cash flow reflecting the tax shield and
- Decide whether or not to purchase the computer using discounted cash flow assuming a desired rate of return of 16 per cent after taxes.

- 22 The Frontline Manufacturing Company is considering the purchase of two different types of machines to manufacture auto speed guages, one of the many products it produces for industrial markets. The two machines are alike in the following ways: each requires an initial investment of Rs. 15,00,000, will last for five years after which the salvage value will be zero and has sufficient capacity to meet the projected steady demand. The main difference between the two machines is the timing and amount of operating cash flows. Machine A's operating cash costs would start out high and then decrease in subsequent years. For machine B, constant operating cash costs are predicted. The incremental net cash flows (revenues minus operating cash costs) for the two machines are expected to be as follows:

	After tax Cash Flow per year					
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Machine A	15,00,000	2,00,000	4,00,000	4,00,000	6,00,000	11,00,000
Machine B	15,00,000	5,00,000	5,00,000	5,00,000	5,00,000	5,00,000

The company needs to determine which of the two machines it should buy to manufacture speed guages. Unsure of which method of evaluation to use, the Deputy Managing Director asks that calculations be made for the following methods:

- Payback period (assume, for this calculation only, that cash flows are spread evenly throughout the year)
- Accounting rate of return
- Internal rate of return
- Net present value (cost of capital = 10 per cent)
- Net present value (cost of capital = 12 per cent)
 - Perform the above calculations for each machine. For each method state which machine looks like a better investment
 - Why does the net present value method yield different decisions at the two different discount rates? Does the internal rate of return method exhibit the same phenomenon?
 - Comment on the usefulness of each of the above methods for choosing between the two machines.

Answers to Questions/Exercises (11 through 22)

- (a) T, (b) F, (c) T, (d) T, (e) T, (f) F, (g) F, (h) T.
- d) The payback period is approximately five and five-sixth years. The required outlay is Rs. 70,000 (90,000 - 20,000). The annual savings in out-of-pocket costs are 22,000 (12,000 + 10,000) less Rs. 10,000 (6,000 + 4,000), or 12,000. The payback period is then Rs. 70,000 ÷ 12,000.
- | | |
|--|-----------|
| Cash inflow due to sale of machine | Rs. 7,500 |
| Net cash outflow | Rs. 4,500 |
| Total cash inflow each year with new machine | Rs. 1,700 |

- 14 a) Payback period = Six years and four months
 b) Net present value = Rs. 3,917
 c) Profitability Index = Rs. 1.131 (or 113.1%)
 d) Internal rate of Return = 12.75 (approx.)

15 NPV = Rs. 9,600
 IRR = 22.78 (try interpolation between 20% and 24%)

	NPV	IRR
Project A	28,880	15.34
Project B	32,210	14.68

Project B is preferable as its NPV is more than that of A. Project A is preferable on the basis of IRR.

	LSS	HSS
NPV	7,632	11,448

The High Speed System should be chosen by the company as its NPV is greater than that of the Low Speed System. However, the profitability index of both the systems is the same, that is, 119.08 per cent. On the basis of this criterion, the company could be indifferent between the two systems. The decision then would depend on other factors.

- 18 a) NPV = Rs. 4,332 (negative)
 Since the NPV is negative, Matchless system should not be acquired. The company should buy the Superior system.
 b) NPV = Rs. 2,016
 Since the NPV is positive at 9% rate of discount the company should purchase the Matchless system. Therefore, the answer is definitely different

	Proposal A	Proposal B
a) NPV (Rs.)	948	1,879
b) Average cash flow (Rs.)	13,600	14,500
Break payback period	3.846	4.138
IRR	9.274	11.024

Since the NPV and IRR of proposal B are higher than those of proposal A, proposal B would be financially preferable.

- 20 The present value of annual savings = Rs. 74,880.
 Investment required to produce the part = 85,000
 (Rs. 70,000 + 15,000)

As the present value of savings is less than the present value of investment required, the part should continue to be purchased.

- 21 a) Net cash flow after taxes Rs. 58,000
 Tax shield amount Rs. 15,000
 b) Net present value (positive) Rs. 33,086
 The computer should be purchased.

	Machine A	Machine B
22 1) Payback period	3.83	3.00
Machine B is preferable		
2) ARR	32%	26.7%
(Note: Calculations are based on average investment) Machine B is preferable and can be purchased if 32 per cent is an acceptable ROI.		
3) IRR	18.05	19.88%
Machine B can be purchased if 19.88 per cent is considered a sufficiently high IRR.		
4) a) NPV (at 10%)	Rs. 4,05,500	Rs. 3,95,500
Both have positive NPV. As the NPV of machine A is higher, its purchase is preferable.		
NPV (at 12%)	Rs. 2,87,500	Rs. 3,02,500
Both have positive NPV. As machine B has higher NPV, its purchase is preferable.		
(Note: NPV and IRR calculations are based on three-decimal place discount factors)		

- b) Machine A's cash inflows occur later than those of machine B. Therefore, at higher discount rates, machine A looks less attractive than machine B. But because machine A's total inflows are greater, at a low enough discount rate its NPV is greater than that of machine B. The crossover point occurs somewhere between the discount rates of 10 per cent and 12 per cent. The internal rate of return of machine B is higher than the crossover rate (beyond which this machine becomes more attractive than machine A), hence, machine B dominates machine A using IRR.
- c) The payback period and ROI methods both ignore the time value of money. As the two machines differ mainly in the timing of their cash inflows, failure to consider the time value of money results in an incomplete comparison of cash flows. The internal rate of return method considers all the cash flows and the time value of money, but still does not always lead to the same decisions as the net present value method. As discussed in part (b), the IRR for each machine is constant, whereas the relative NPV's for the two machines depends on the firm's cost of capital. The most useful method for making the purchase decision is the net present value method with careful thought about the firm's measure of its cost of capital.

7.12 FURTHER READINGS

- Van Horne, C. James, 1985. *Financial Management and Policy*, Prentice-Hall of India: New Delhi. (Chapters 4-7).
- Weston, J. Fred and E.F. Brigham, 1986. (8th ed.), *Managerial Finance*, Dryden Press: (Chapters 5 and 6).
- Hornigren, C.T., 1985. *Cost Accounting: A Managerial Emphasis*, Prentice-Hall of India: New Delhi. (Chapters 12 and 13).
- Shrivastava, R.M., 1984. *Financial Decision-making*, Sterling Publishers: New Delhi. (Chapters 8, 9 and 11).

VIDEO PROGRAMME

Project Appraisal: Institutional Viewpoint

APPENDIX: TABLES

Table 1
Present Value of Re. 1 = $1/(1+r)^n$

Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.789	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092
26	0.772	0.598	0.464	0.361	0.281	0.220	0.172	0.135	0.106	0.084
27	0.764	0.586	0.450	0.347	0.268	0.207	0.161	0.125	0.098	0.076
28	0.757	0.574	0.437	0.333	0.255	0.196	0.150	0.116	0.090	0.069
29	0.749	0.563	0.424	0.321	0.243	0.185	0.141	0.107	0.082	0.063
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057

Table 1
Present Value of Re. 1 = $1/(1+r)^n$

Year	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
21	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.022
22	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018
23	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015
24	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013
25	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
26	0.066	0.053	0.042	0.033	0.026	0.021	0.017	0.014	0.011	0.009
27	0.060	0.047	0.037	0.029	0.023	0.018	0.014	0.011	0.009	0.007
28	0.054	0.042	0.033	0.026	0.020	0.016	0.012	0.010	0.008	0.006
29	0.048	0.037	0.029	0.022	0.017	0.014	0.011	0.008	0.006	0.005
30	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004

Table 1
Present Value of Re. 1 = $1/(1+r)$

Year	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	0.826	0.820	0.813	0.806	0.800	0.794	0.787	0.781	0.775	0.769
2	0.683	0.672	0.661	0.650	0.640	0.630	0.620	0.610	0.601	0.592
3	0.564	0.551	0.537	0.524	0.512	0.500	0.488	0.477	0.466	0.455
4	0.467	0.451	0.437	0.423	0.410	0.397	0.384	0.373	0.361	0.350
5	0.386	0.370	0.355	0.341	0.328	0.315	0.303	0.291	0.280	0.269
6	0.319	0.303	0.289	0.275	0.262	0.250	0.238	0.227	0.217	0.207
7	0.263	0.249	0.235	0.222	0.210	0.198	0.188	0.178	0.168	0.159
8	0.218	0.204	0.191	0.179	0.168	0.157	0.148	0.139	0.130	0.123
9	0.180	0.167	0.155	0.144	0.134	0.125	0.116	0.108	0.101	0.094
10	0.149	0.137	0.126	0.116	0.107	0.099	0.092	0.085	0.078	0.073
11	0.123	0.112	0.103	0.094	0.086	0.079	0.072	0.066	0.061	0.056
12	0.102	0.092	0.083	0.076	0.069	0.062	0.057	0.052	0.047	0.043
13	0.084	0.075	0.068	0.061	0.055	0.049	0.045	0.040	0.037	0.033
14	0.069	0.062	0.055	0.049	0.044	0.039	0.035	0.032	0.028	0.025
15	0.057	0.051	0.045	0.040	0.035	0.031	0.028	0.025	0.022	0.020
16	0.047	0.042	0.036	0.032	0.028	0.024	0.022	0.019	0.017	0.015
17	0.039	0.034	0.030	0.026	0.023	0.020	0.017	0.015	0.013	0.012
18	0.032	0.028	0.024	0.021	0.018	0.016	0.014	0.012	0.010	0.009
19	0.027	0.023	0.020	0.017	0.014	0.012	0.011	0.009	0.008	0.007
20	0.022	0.019	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005
21	0.018	0.015	0.013	0.011	0.009	0.008	0.007	0.006	0.005	0.004
22	0.015	0.013	0.011	0.009	0.007	0.006	0.005	0.004	0.004	0.003
23	0.012	0.010	0.009	0.007	0.006	0.005	0.004	0.003	0.003	0.002
24	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.003	0.002	0.002
25	0.009	0.007	0.006	0.005	0.004	0.003	0.003	0.002	0.002	0.001
26	0.007	0.006	0.005	0.004	0.003	0.002	0.002	0.002	0.001	0.001
27	0.006	0.005	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001
28	0.005	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001
29	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000
30	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000

Table 2
Present Value of An Annuity of Re. 1 for n periods = $\frac{1 - \frac{1}{(1+r)^n}}{r}$

Periods (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.941	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.901	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.766	4.623	4.486	4.355
7	6.727	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.651	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.565	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.470	8.982	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.366	9.786	9.252	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.254	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.132	11.348	10.635	9.986	9.393	8.853	8.358	7.904	7.487	7.103
14	13.002	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.863	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	14.716	13.577	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	15.560	14.291	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	16.396	14.992	13.753	12.659	11.689	10.828	10.059	9.372	8.756	8.201
19	17.224	15.678	14.323	13.134	12.085	11.158	10.336	9.604	8.950	8.365
20	18.043	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514
21	18.855	17.011	15.415	14.029	12.821	11.764	10.835	10.017	9.292	8.649
22	19.658	17.657	15.937	14.451	13.163	12.041	11.061	10.201	9.442	8.772
23	20.453	18.292	16.443	14.857	13.488	12.303	11.272	10.371	9.580	8.883
24	21.241	18.913	16.935	15.247	13.798	12.550	11.469	10.529	9.707	8.985
25	22.021	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077
26	22.793	20.120	17.877	15.983	14.375	13.003	11.826	10.810	9.929	9.161
27	23.557	20.706	18.327	16.329	14.643	13.210	11.987	10.935	10.027	9.237
28	24.314	21.281	18.764	16.663	14.898	13.406	12.137	11.051	10.116	9.307
29	25.063	21.844	19.188	16.984	15.141	13.591	12.278	11.158	10.198	9.370
30	25.805	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427

Table 2

$$\text{Present Value of an Annuity of Re. 1 for } n \text{ periods} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Periods (n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.546	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.206	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.934	4.730
17	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.844
20	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.351	5.101	4.870
21	8.075	7.562	7.102	6.687	6.312	5.973	5.665	5.384	5.127	4.891
22	8.176	7.645	7.170	6.743	6.359	6.011	5.696	5.410	5.149	4.909
23	8.266	7.718	7.230	6.792	6.399	6.044	5.723	5.432	5.167	4.925
24	8.348	7.784	7.283	6.835	6.434	6.073	5.746	5.451	5.182	4.937
25	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948
26	8.488	7.896	7.372	6.906	6.491	6.118	5.783	5.480	5.206	4.956
27	8.548	7.943	7.409	6.935	6.514	6.136	5.798	5.492	5.215	4.964
28	8.602	7.984	7.441	6.961	6.534	6.152	5.810	5.502	5.223	4.970
29	8.650	8.022	7.470	6.983	6.551	6.166	5.820	5.510	5.229	4.975
30	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979

Table 2

$$\text{Present Value of an Annuity of Re. 1 for } n \text{ periods} = \frac{1 - \frac{1}{(1+r)^n}}{r}$$

Periods (n)	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	0.826	0.820	0.813	0.806	0.800	0.794	0.787	0.781	0.775	0.769
2	1.509	1.492	1.474	1.457	1.440	1.424	1.407	1.392	1.376	1.361
3	2.074	2.042	2.011	1.981	1.952	1.923	1.896	1.868	1.842	1.816
4	2.540	2.494	2.448	2.404	2.362	2.320	2.280	2.241	2.203	2.166
5	2.926	2.864	2.803	2.745	2.689	2.635	2.583	2.532	2.483	2.436
6	3.245	3.167	3.092	3.020	2.951	2.885	2.821	2.759	2.700	2.643
7	3.508	3.416	3.327	3.242	3.161	3.083	3.009	2.937	2.868	2.802
8	3.726	3.619	3.518	3.421	3.329	3.241	3.156	3.076	2.999	2.925
9	3.905	3.786	3.673	3.565	3.463	3.366	3.273	3.184	3.100	3.019
10	4.054	3.923	3.799	3.682	3.570	3.465	3.364	3.269	3.178	3.092
11	4.177	4.035	3.902	3.776	3.656	3.543	3.437	3.335	3.239	3.147
12	4.278	4.127	3.985	3.851	3.725	3.606	3.493	3.387	3.286	3.190
13	4.362	4.203	4.053	3.912	3.780	3.656	3.538	3.427	3.322	3.223
14	4.432	4.265	4.108	3.962	3.824	3.695	3.573	3.459	3.351	3.249
15	4.489	4.315	4.153	4.001	3.859	3.726	3.601	3.483	3.373	3.268
16	4.536	4.357	4.189	4.033	3.887	3.751	3.623	3.503	3.390	3.283
17	4.576	4.391	4.219	4.059	3.910	3.771	3.640	3.518	3.403	3.295
18	4.608	4.419	4.243	4.080	3.928	3.786	3.654	3.529	3.413	3.304
19	4.635	4.442	4.263	4.097	3.942	3.799	3.664	3.539	3.421	3.311
20	4.657	4.460	4.279	4.110	3.954	3.808	3.673	3.546	3.427	3.316
21	4.675	4.476	4.292	4.121	3.963	3.816	3.679	3.551	3.432	3.320
22	4.690	4.488	4.302	4.130	3.970	3.822	3.684	3.556	3.436	3.323
23	4.703	4.499	4.311	4.137	3.976	3.827	3.689	3.559	3.438	3.325
24	4.713	4.507	4.318	4.143	3.981	3.831	3.692	3.562	3.441	3.327
25	4.721	4.514	4.323	4.147	3.985	3.834	3.694	3.564	3.442	3.329
26	4.728	4.520	4.328	4.151	3.988	3.837	3.696	3.566	3.444	3.330
27	4.734	4.524	4.332	4.154	3.990	3.839	3.698	3.567	3.445	3.331
28	4.739	4.528	4.335	4.157	3.992	3.840	3.699	3.568	3.446	3.331
29	4.743	4.531	4.337	4.159	3.994	3.841	3.700	3.569	3.446	3.332
30	4.746	4.534	4.339	4.160	3.995	3.842	3.701	3.569	3.447	3.332

Table 3
Compound Amount of Re 1 at the end of n periods = $(1 + r)^n$

Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100
2	1.020	1.040	1.061	1.082	1.102	1.124	1.145	1.166	1.188	1.210
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.992	2.144
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560
19	1.208	1.457	1.753	2.107	2.527	3.026	3.616	4.316	5.142	6.116
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727
21	1.232	1.516	1.860	2.279	2.786	3.399	4.140	5.034	6.109	7.400
22	1.245	1.546	1.916	2.370	2.925	3.603	4.430	5.436	6.658	8.140
23	1.257	1.577	1.974	2.465	3.071	3.820	4.740	5.871	7.258	8.954
24	1.270	1.608	2.033	2.563	3.225	4.049	5.072	6.341	7.911	9.850
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.834
26	1.295	1.673	2.157	2.772	3.556	4.549	5.807	7.396	9.399	11.918
27	1.308	1.707	2.221	2.883	3.733	4.822	6.214	7.988	10.245	13.110
28	1.321	1.741	2.288	2.999	3.920	5.112	6.649	8.627	11.167	14.421
29	1.334	1.776	2.357	3.119	4.116	5.418	7.114	9.317	12.172	15.863
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.062	13.267	17.449

Table 3
Compound Amount of Re 1 at the end of n periods = $(1 + r)^n$

Year	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200
2	1.232	1.254	1.277	1.300	1.322	1.346	1.369	1.392	1.416	1.440
3	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728
4	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074
5	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488
6	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986
7	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583
8	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300
9	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160
10	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192
11	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430
12	3.498	3.896	4.334	4.818	5.350	5.936	6.580	7.288	8.064	8.916
13	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.699
14	4.310	4.887	5.535	6.261	7.076	7.987	9.007	10.147	11.420	12.839
15	4.785	5.474	6.254	7.138	8.137	9.265	10.539	11.974	13.589	15.407
16	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.171	18.488
17	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186
18	6.543	7.690	9.024	10.575	12.375	14.462	16.877	19.673	22.900	26.623
19	7.263	8.613	10.197	12.055	14.232	16.776	19.748	23.214	27.251	31.948
20	8.062	9.464	11.523	13.743	16.366	19.461	23.105	27.393	32.429	38.337
21	8.949	10.804	13.021	15.667	18.821	22.574	27.033	32.323	38.591	46.005
22	9.933	12.100	14.713	17.861	21.644	26.186	31.629	38.141	45.923	55.205
23	11.026	13.552	16.626	20.361	24.891	30.376	37.005	45.007	54.648	66.247
24	12.239	15.178	18.788	23.212	28.625	35.236	43.296	53.108	65.031	79.496
25	13.585	17.000	21.230	26.461	32.918	40.874	50.656	62.667	77.387	95.395
26	15.080	19.040	23.990	30.166	37.856	47.414	59.268	73.947	92.090	114.474
27	16.738	21.325	27.108	34.389	43.534	55.000	69.344	87.258	109.587	137.369
28	18.580	23.884	30.633	39.203	50.065	63.800	81.132	102.964	130.409	164.842
29	20.623	26.750	34.615	44.692	57.574	74.008	94.924	121.498	155.187	197.811
30	22.892	29.960	39.115	50.949	66.210	85.849	111.061	143.367	184.672	237.373

Table 3
Compound Amount of Re 1 at the end of n periods = $(1 + r)^n$

Year	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	1.210	1.220	1.230	1.240	1.250	1.260	1.270	1.280	1.290	1.300
2	1.464	1.488	1.513	1.538	1.562	1.588	1.613	1.638	1.664	1.690
3	1.772	1.816	1.861	1.907	1.953	2.000	2.048	2.097	2.147	2.197
4	2.144	2.215	2.289	2.364	2.441	2.520	2.601	2.684	2.769	2.856
5	2.594	2.703	2.815	2.932	3.052	3.176	3.304	3.436	3.572	3.713
6	3.138	3.297	3.463	3.635	3.815	4.001	4.196	4.398	4.608	4.827
7	3.797	4.023	4.259	4.508	4.768	5.042	5.329	5.692	5.945	6.275
8	4.595	4.908	5.239	5.589	5.960	6.353	6.767	7.206	7.669	8.157
9	5.560	5.987	6.444	6.931	7.451	8.004	8.595	9.223	9.892	10.604
10	6.727	7.305	7.926	8.594	9.313	10.086	10.915	11.806	12.761	13.786
11	8.140	8.912	9.749	10.657	11.641	12.708	13.862	15.112	16.462	17.921
12	9.850	10.872	11.991	13.215	14.552	16.012	17.605	19.343	21.236	23.298
13	11.918	13.264	14.749	16.386	18.190	20.175	22.359	24.759	27.394	30.287
14	14.421	16.182	18.141	20.319	22.737	25.420	28.395	31.691	35.339	39.373
15	17.449	19.742	22.314	25.195	28.421	32.030	36.062	40.565	45.587	51.185
16	21.113	24.085	27.446	31.242	35.527	40.357	45.799	51.923	58.807	66.541
17	25.547	29.384	33.758	38.740	44.408	50.850	58.165	66.461	75.861	86.503
18	30.912	35.848	41.523	48.038	55.510	64.071	73.869	85.070	97.860	112.454
19	37.404	43.735	51.073	59.567	69.388	80.730	93.813	108.890	126.240	146.190
20	45.258	53.357	62.820	73.863	86.734	101.720	119.143	139.379	162.849	190.047
21	54.762	65.095	77.268	91.591	108.418	128.167	151.312	178.405	210.075	247.061
22	66.262	79.416	95.040	113.572	135.522	161.490	192.165	228.358	270.997	321.178
23	80.178	96.887	116.899	140.829	169.403	203.477	244.050	292.298	349.585	417.531
24	97.015	118.203	143.786	174.628	211.753	256.381	309.043	374.141	450.964	542.791
25	117.388	144.207	176.857	216.539	264.691	323.040	393.628	478.901	581.743	705.627
26	142.039	175.933	217.534	268.508	330.864	407.030	499.907	612.993	750.448	917.315
27	171.867	214.638	267.566	332.950	413.579	512.857	634.881	784.630	968.077	1192.508
28	207.959	261.857	329.106	412.858	516.973	646.199	806.298	1004.326	1248.818	1550.260
29	251.630	319.466	404.801	511.944	646.216	814.210	1023.999	1285.537	1610.974	2015.337
30	304.471	389.748	497.904	634.810	807.769	1025.904	1300.477	1645.488	2078.154	2619.936

Table 4
Compound Amount of an Annuity of Re 1 at the end of n periods = $\frac{(1 + r)^n - 1}{r}$

Number of Payments	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100
3	3.030	3.060	3.091	3.122	3.152	3.184	3.215	3.246	3.278	3.310
4	4.060	4.121	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641
5	5.100	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105
6	6.151	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716
7	7.213	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487
8	8.285	8.583	8.892	9.214	9.549	9.897	10.260	10.637	11.028	11.436
9	9.367	9.754	10.159	10.583	11.026	11.491	11.978	12.487	13.021	13.579
10	10.461	10.949	11.464	12.006	12.578	13.181	13.816	14.486	15.193	15.937
11	11.565	12.168	12.807	13.486	14.206	14.971	15.783	16.645	17.560	18.531
12	12.681	13.411	14.192	15.026	15.917	16.870	17.888	18.977	20.140	21.384
13	13.807	14.680	15.617	16.627	17.712	18.882	20.140	21.495	22.953	24.552
14	14.945	15.973	17.086	18.292	19.598	21.015	22.550	24.215	26.019	27.975
15	16.095	17.293	18.598	20.023	21.578	23.275	25.129	27.152	29.360	31.772
16	17.255	18.638	20.156	21.824	23.657	25.672	27.888	30.324	33.003	35.949
17	18.428	20.011	21.761	23.697	25.840	28.212	30.840	33.750	36.973	40.544
18	19.612	21.411	23.414	25.645	28.132	30.905	33.998	37.450	41.300	45.598
19	20.808	22.839	25.116	27.671	30.538	33.759	37.378	41.446	46.017	51.158
20	22.016	24.296	26.869	29.777	33.065	36.785	40.995	45.761	51.159	57.274
21	23.236	25.782	28.675	31.968	35.718	39.992	44.864	50.422	56.763	64.001
22	24.468	27.298	30.536	34.247	38.504	43.391	49.005	55.456	62.872	71.401
23	25.712	28.843	32.452	36.617	41.429	46.994	53.435	60.892	69.530	79.541
24	26.969	30.420	34.425	39.082	44.500	50.814	58.175	66.764	76.788	88.495
25	28.239	32.029	36.458	41.645	47.725	54.863	63.248	73.105	84.699	98.345
26	29.521	33.669	38.551	44.311	51.112	59.154	68.675	79.953	93.321	109.179
27	30.816	35.342	40.708	47.083	54.667	63.704	74.482	87.349	102.720	121.097
28	32.124	37.049	42.929	49.966	58.400	68.526	80.696	95.337	112.965	134.206
29	33.445	38.790	45.217	52.965	62.320	73.637	87.344	103.964	124.131	148.627
30	34.780	40.566	47.573	56.083	66.436	79.055	94.458	113.281	136.303	164.489

Table 4
Compound Amount of an Annuity of Re 1 for n periods = $\frac{(1+r)^n + 1}{r}$

Periods (n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.110	2.120	2.130	2.140	2.150	2.160	2.170	2.180	2.190	2.200
3	3.342	3.374	3.407	3.440	3.472	3.506	3.539	3.572	3.606	3.640
4	4.710	4.779	4.850	4.921	4.993	5.066	5.140	5.215	5.291	5.368
5	6.228	6.353	6.480	6.610	6.742	6.877	7.014	7.154	7.297	7.442
6	7.913	8.115	8.323	8.535	8.754	8.977	9.207	9.442	9.683	9.930
7	9.783	10.089	10.405	10.730	11.067	11.414	11.772	12.141	12.523	12.916
8	11.859	12.300	12.757	13.233	13.727	14.240	14.773	15.327	15.902	16.499
9	14.164	14.776	15.415	16.085	16.786	17.518	18.284	19.086	19.923	20.799
10	16.722	17.549	18.419	19.337	20.304	21.321	22.393	23.521	24.709	25.959
11	19.561	20.654	21.814	23.044	24.349	25.733	27.200	28.755	30.403	32.150
12	22.713	24.133	25.650	27.270	29.001	30.850	32.823	34.931	37.180	39.580
13	26.211	28.029	29.984	32.088	34.352	36.786	39.403	42.218	45.244	48.496
14	30.095	32.392	34.882	37.580	40.504	43.672	47.102	50.817	54.840	59.195
15	34.405	37.279	40.417	43.842	47.580	51.659	56.109	60.964	66.260	72.035
16	39.189	42.753	46.671	50.979	55.717	60.925	66.648	72.938	79.849	87.441
17	44.500	48.883	53.738	59.116	65.074	71.673	78.978	87.067	96.021	105.930
18	50.395	55.749	61.724	68.393	75.835	84.140	93.404	103.739	115.265	128.115
19	56.939	63.439	70.748	78.968	88.211	98.602	110.282	123.411	138.165	154.738
20	64.202	72.052	80.945	91.023	102.442	115.379	130.030	146.625	165.416	186.686
21	72.264	81.698	92.468	104.766	118.808	134.839	153.135	174.018	197.845	225.023
22	81.213	92.502	105.488	120.433	137.629	157.414	180.168	206.341	236.435	271.027
23	91.146	104.602	120.202	138.294	159.274	183.600	211.796	244.482	282.358	326.233
24	102.172	118.154	136.828	158.655	184.165	213.975	248.801	289.489	337.006	392.479
25	114.411	133.332	155.615	181.866	212.789	249.211	292.097	342.596	402.036	471.975
26	127.996	150.332	176.845	208.327	245.707	290.085	342.753	405.263	479.423	567.370
27	143.076	169.372	200.834	238.493	283.563	337.499	402.021	479.210	571.513	681.843
28	159.814	190.697	227.943	272.881	327.097	392.498	471.364	566.467	681.101	819.211
29	178.393	214.580	258.575	312.084	377.162	456.298	552.495	669.431	811.509	984.053
30	199.017	241.330	293.189	356.776	434.736	530.305	647.419	790.928	966.695	1181.863

Table 4
Compound Amount of an Annuity of Re 1 for n periods = $\frac{(1+r)^n + 1}{r}$

Number of Paymen	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.210	2.220	2.230	2.240	2.250	2.260	2.270	2.280	2.290	2.300
3	3.674	3.708	3.743	3.778	3.812	3.848	3.883	3.918	3.954	3.990
4	5.446	5.524	5.604	5.684	5.766	5.848	5.931	6.016	6.101	6.187
5	7.589	7.740	7.893	8.048	8.207	8.368	8.533	8.700	8.870	9.043
6	10.183	10.442	10.708	10.980	11.259	11.544	11.837	12.136	12.442	12.756
7	13.321	13.739	14.171	14.615	15.073	15.546	16.032	16.534	17.050	17.583
8	17.119	17.762	18.430	19.123	19.842	20.588	21.361	22.163	22.995	23.858
9	21.714	22.670	23.669	24.712	25.802	26.940	28.129	29.369	30.664	32.015
10	27.273	28.657	30.113	31.643	33.253	34.945	36.723	38.592	40.556	42.619
11	34.001	35.962	38.038	40.238	42.566	45.030	47.638	50.398	53.317	56.405
12	42.141	44.873	47.787	50.895	54.207	57.738	61.501	65.510	69.779	74.326
13	51.991	55.745	59.778	64.109	68.759	73.750	79.106	84.852	91.015	97.624
14	63.908	69.009	74.527	80.495	86.948	93.925	101.464	109.611	118.409	127.911
15	78.329	85.191	92.669	100.814	109.685	119.345	129.860	141.302	153.748	167.284
16	95.778	104.933	114.982	126.010	138.106	151.375	165.922	181.867	199.334	218.470
17	116.891	129.018	142.428	157.252	173.633	191.732	211.721	233.789	258.141	285.010
18	142.438	158.402	176.187	195.992	218.041	242.582	269.745	300.250	334.001	371.513
19	173.350	194.250	217.709	244.030	273.551	306.653	343.753	385.320	431.861	483.966
20	210.754	237.985	268.782	303.597	342.938	387.383	437.567	494.210	558.100	630.156
21	256.011	291.342	331.602	377.461	429.672	489.102	556.709	633.588	720.949	820.202
22	310.774	356.437	408.870	469.051	538.089	617.269	708.021	811.993	931.023	1067.262
23	377.036	435.852	503.910	582.623	673.611	778.758	900.185	1040.350	1202.018	1388.439
24	457.213	532.740	620.809	723.452	843.013	982.234	1144.234	1332.648	1551.602	1805.970
25	554.227	650.942	764.595	898.080	1054.765	1238.614	1454.177	1706.788	2002.564	2348.759
26	671.614	795.148	941.451	1114.618	1319.454	1561.652	1847.803	2185.689	2584.305	3054.385
27	813.652	971.080	1158.984	1383.126	1650.317	1968.681	2347.708	2798.681	3334.751	3971.696
28	985.518	1185.716	1426.549	1716.076	2063.894	2481.537	2982.585	3583.309	4302.820	5164.199
29	1193.475	1447.572	1755.655	2128.933	2580.864	3127.733	3788.885	4587.633	5551.637	6714.457
30	1445.103	1767.036	2160.453	2640.875	3227.077	3941.940	4812.875	5873.172	7162.602	8729.789

BLOCK 3 FINANCIAL FLOWS AND FORECASTING

This block introduces you the financial techniques such as preparation of cash flow and funds flow statements, forecasting the cash requirements and cost-volume-profit analysis in managerial decision making.

The first unit deals with the steps involved in the preparation of cash flow and funds flow statements. The uses of these statements also discussed.

The second unit explains the concept of Cost-volume-profit analysis and its managerial uses in financial decision making.

The third unit presents the financial forecasting i.e., budgets for sales, capital etc., The tools of financial performance are explained in detail.

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UNIT 8 CASH AND FUNDS FLOW ANALYSIS

Objectives

After studying this unit, you should be able to:

- * appreciate the need for preparing the statement of changes in financial position.
- * distinguish between cash flow and funds flow.
- * prepare funds flow and cash flow statements.
- * analyse the sources of finance and applications of finance.

Structure

- 8.1 Introduction
- 8.2 Changes in Financial Position
- 8.3 Statement of Changes in Financial Position: Working Capital Basis.
- 8.4 Statement of Changes in Financial Position: Cash Basis.
- 8.5 Statement of Changes in the Firm's Total Financial Resources.
- 8.6 Uses of the Statement of Changes in Financial position.
- 8.7 Summary
- 8.8 Key words
- 8.9 Self Assessment Questions/Exercises
- 8.10 Further Readings

8.1 INTRODUCTION

The profit and loss account and balance sheet are the basic financial statements. Profit and loss account is the summary of the revenue and expenses of a firm during a particular period of time. It gives the overall profit/loss made during that particular year.

The balance sheet reflects the financial position of a firm as on a particular date. It presents the firm's assets and liabilities at a point of time. These statements certainly provide useful information regarding the operations of a firm. However, they fail to explain the financial data required for financing and investing decisions by management, i.e. causes for changes in assets, liabilities and owners' equity. They do not indicate the movement of finances between sources and uses from the end of one period to the end of the next period. Therefore, an additional statement known as "The Statement of Changes in Financial Position" should be prepared to show the changes in assets, liabilities and owners' equity between the dates of two balance sheets.

8.2 CHANGES IN FINANCIAL POSITION

The changes that have taken place in the financial position of a firm between two dates of balance sheets can be ascertained by preparing the funds flow statement which contains the sources and uses of financial resources. This is a valuable aid to financial manager, creditors and owners in evaluating the uses of funds by a firm and in determining how these uses are financed. This statement also helps to assess the growth of the firm and its resulting financial needs to decide the best way to finance those needs.

The term 'fund' has been defined in a number of ways. Some interpret 'funds' as 'cash' only and fund flow statements prepared on this basis is called a cash-flow statement. In this statement only inflow and outflow of cash is taken into account. While preparing this statement the net income is adjusted for the amounts of increases or decreases in debtors, creditors, inventories, accrued revenues, expenses etc. This

statement is useful in predicting future cash requirements.

On the other hand, the funds-flow statement includes all current assets or financial resources. Thus a funds flow statement is a report on financial operations, flows or movements during the period. Here the term funds denote the working capital. Working capital is the difference between current assets and current liabilities. Hence the term 'fund' and working capital both are synonymus. Various titles have been used for this statement. Accounting principle Board (APB) of USA recommended the title "Statement of Changes in Financial Poistion" rather than the Funds Flow Statement or the "Cash Flow Statement".

Statement of changes in financial position may be prepared on the basis of 1) working capital ii) Cash and iii) total financial resources.

8.3 STATEMENTTTT OF CHANGES IN FINANCIAL POSITION : WORKING CAPITAL BASIS

In order to prepare the statement of changes in financial position on the basis of working capital, you have to adopt the following procedure.

1. Prepare the Statement of Changes in Working Capital.
2. Calculate the funds from operations
3. Find out the hidden transactions or changes in non-current assets and non-current liabilities.
4. Prepare Sources and uses statement.

The Statement of Changes in Working Capital

The current assets are those which can be converted into cash within a reasonable time say one year. current liabilities are payable normally less than a year.

Current Liabilities

Sundry Creditors
Bills Payable
Bank overdraft
Provision for Taxation
Dividends payable
Outstanding Expenses

Current Assets

Cash
Bank balance
Debtors
Bills Receivable
Inventory
Short-term Investment

Working capital is the excess of current assets over current liabilities

$WC = CA - CL$ where

WC = Working Capital

CA = Current Assets

CL = Current Liabilities

The following changes in current assets and current liabilities will affect WC.

- i) An increase in CA causes an increase in WC
- ii) A decrease in CA causes a decrease in WC
- iii) An increase in CL causes a decrease in WC
- iv) A decrease in CL causes an increase in WC.

Form of Statement of Changes in Working Capital

	31st December		Changes in Working Capital	
	1993	1994	Increase	Decrease
Current Assets				
i)				
ii)				
iii)				
Current Liabilities				
i)				
ii)				
iii)				
Working Capital				
Increase/decrease in working capital				

Funds from Business Operations

Funds generated from operations is equivalent to net profit plus non cash charge i.e. expenditure incurred or debited to profit & loss account but does not involve any cash out flow for example depreciation, general reserve, capital reserve, amortisation of goodwill preliminary expenses etc. are debited to profit and loss account and the profit to that extent is reduced. Profit and loss account is the combined result of past and current decisions, some appropriate adjustments have to be made to the profit disclosed by the profit and loss account to arrive at the funds from operations. For this purpose i) all such expenses which have been deducted from revenue but which do not reduce working capital are to be added back ii) such items which have been added to revenue but have not contributed to the working capital are to be subtracted; and iii) all such revenues which are not directly caused by business operations should also be deducted and shown separately in the statement.

Funds from Operations

	Rs.
(A) Net profit current year or closing balance of P & L A/c in balance sheet	
(B) Add: Non Operating and Non fund items such as :	
depreciation:	
excess provision for bad and doubtful debts :	
Amortisation of goodwill, patents and	

other intangible assets:
 Appropriation of retained earnings like
 i) general reserve
 ii) sinking fund etc;
 loss on sale of fixed assets;
 dividend including interim;
 proposed dividend and provision for tax
 (If it is not taken as current liability)

(C) Less: Non-operating items:

Profit on sale of fixed assets:
 dividends received;
 excessive provisions retransferred to P & L A/c;
 Last year Net Profit or Opening balance of
 P & L A/c as given in Balance sheet.

A + B - C = Funds from business Operations.

Hidden Transactions:

Some times nothing may be spelled out explicitly about the transaction which took place in the balance sheets. We have to find out the hidden transaction by comparing two balance sheets as on a particular date. In such a case to find out the hidden transaction the fixed assets, fixed liabilities and other fictitious assets ledgers have to be prepared. These hidden transactions can be purchase or sale of fixed assets, depreciation on fixed assets, amount written off as discount on issue of shares, goodwill, patents etc. The amount transferred to general reserve, repayment of preference share capital, redemption of debentures etc.

Preparation of Funds Flow Statement

The fund flow statement states that where from the funds were financed and how effectively they were used.

Form of Fund Flow Statement

SOURCES	USES
Funds from business operations (+)	Working capital increase
Issue of share capital	Purchase of fixed assets
Issue of debenture capital	Payment of dividend and tax
Raising long term loans	Redemption of long term loans,
Sale of fixed assets	Redemption of preference
Non-trading receipts	share capital
Working capital decrease	Redemption of debentures
	Funds from business operations(-)

Example 1

Consider the Balance Sheets of Computers India Ltd.

BALANCE SHEETS OF COMPUTER INDIA LTD.

LIABILITIES	1992	1993 Assets	1992	1993
	Rs.in lakhs	Rs.in lakhs	Rs.in lakhs	Rs.in lakhs
Equity Share capital	3.00	4.00 Goodwill	1.00	.80
8% Redeemable Preference share Capital	1.50	Land & Buildings plant	2.00	1.70
		Investment	.80	2.00
Capital Reserve	-	.20 Sundry Debtors	.20	.30
General Reserve	.40	.50 Stock	1.40	1.70
Profit & Loss A/c	.30	.48 Bills Receivable	.77	1.09
Proposed Dividend	.42	.50 Cash in hand	.20	.30
Sundry Creditors	.25	.47 Cash at Bank	.15	.10
Bills payable	.20	.16 Preliminary expenses	.10	.08
Liability for Expenses	.30	.36	.15	.10
Provision for Tax	.40	.50		
	6.77	8.77	6.77	8.77

Notes

- A piece of land had been sold out in 1993 and the profit on sale has been credited to capital Reserve.
- A machine has been sold for Rs.10,000. The written down value of the machine was Rs.12,000. Depreciation of Rs.10,000 is charged on plant account in 1993.
- The investments are trade investments, Rs.3,000 dividend is received including Rs.1,000 from pre-acquisition profit which has been credited to investment account.
- An interim dividend of Rs. 20,000 has been paid in 1993.

Solution.

Statement of Changes in Working Capital

	1992	1993	Increase	Decrease
	Rs.in Lakhs	Rs.in Lakhs	Rs.in Lakhs	Rs.in Lakhs
Current Assets:				
Debtors	1.40	1.70	.30	-
stock	.77	1.09	.32	-
Bills Receivable	.20	.30	.10	-
Cash in hand	.15	.10	-	.05
Cash at Bank	.10	.08	-	.02
Current Liabilities:				
Creditors	.25	.47	-	.22
Bills payable	.20	.16	.04	-
Liability for expenses	.30	.36	-	.06
Provision for Taxation	.40	.50	-	.10
Provision for Dividend	.42	.50	-	.08
	1.57	1.99		
Working Capital	1.05	1.28		

Increase in working Capital	.23			.23
	<u>1.28</u>	<u>1.28</u>	<u>.76</u>	<u>.76</u>

Note: Provision for tax and dividend treated as current liabilities.

Hidden Transactions:

Land & Buildings A/c

To Balance b/d	2.00	By Sale	.50
Profit transferred to Capital reserve	.20	By Balance c/d	1.70
	<u>2.20</u>		<u>2.20</u>

Plant A/c

To Balance b/d	.80	By sale	.10
		By loss on sale	.02
To purchase	1.42	By Depreciation	.10
		By Balance c/d	2.00
	<u>2.22</u>		<u>2.22</u>

Investment A/c

To Balance b/d	.20	By pre-acquisition A/c	.01
To purchase	.11	By Balance c/d	.30
	<u>.31</u>		<u>.31</u>

General Reserve

		By Balance b/d	.40
To Balance c/d	.50	" P & L A/c	.10
	<u>.50</u>		<u>.50</u>

Preference Share Capital

To preference share holders	.50	By Balance b/d	1.50
To Balance c/d	1.00		
	<u>1.50</u>		<u>1.50</u>

Funds Generated from business operations

Closing Profit & Loss A/c .48

Add:	Transfer to General Reserve	.10
	Goodwill written off	.20
	Loss on sale of plant	.02
	Depreciation on plant	.10
	Preliminary Expenses	.05

	Interim dividend	.20	
	Capital Reserve	.20	.87
			<u>1.35</u>
Less	Opening P & L A/c	.30	
	Dividend on investments	.02	
	Profit on Sale of land	.20	
			<u>.52</u>
			.83

Funds Flow Statement

SOURCES	Amount Rs.in Lakhs	APPLICATIONS	Amount Rs.in Lakhs
Funds generated from operations	0.83	Redemption of preference share capital	.50
Issue of equity share capital	1.00	Plant purchased	1.42
Sale of land	.50	Investments purchased	.11
Sale of machine	.10	Interim dividend	.20
Dividend received	.03	increase of w.c.	.23
	<u>2.46</u>		<u>2.46</u>

Example. 2

the Chief Executive of a plastic manufacturing company has reviewed the annual financial statements for the year 1988 and is unable to determine from a reading of the balance sheet the reasons for the changes in working capital during the year. He asks you for assistance and presents the following balance sheets of the company.

	Dec.1987 Rs.	Dec.1988 Rs.
Goodwill	1,00,000	Nil
Buildings	2,80,000	4,05,000
Land	75,000	70,000
Machinery	1,00,000	1,65,000
Tools	35,000	20,000
Trade investments	7,500	9,000
Inventories	1,09,000	1,05,000
Sundry debtors	46,000	90,000
Bills receivable	13,5000	10,500
Cash in hand	4,500	1,000
Unexpired insurance	700	600
Unamortised debenture discount	1,250	1,050
	<u>7,72,450</u>	<u>8,77,150</u>
Equity share capital	2,00,000	3,59,000
10% Debentures	50,000	75,000
Sundry creditors	26,000	29,000
Bank overdraft	—	4,000
Bills payable	5,000	4,500
Bank loans (short-term)	3,400	750
Accrued taxes	1,500	2,500

Accrued interest	3,000	5,000
Allowances for doubtful accounts	1,150	2,250
Accumulated depreciation	90,500	1,35,600
Retained earnings	3,91,900	2,68,550
	<u>7,72,450</u>	<u>8,77,150</u>

Additional information

- There were no purchase or sale of tools.
- Equity shares were issued at a discount of 10%. The discount was charged to the goodwill account.
- Old machinery that cost Rs.2,250 was scrapped and written off the books. Accumulated depreciation on such equipment was Rs.1,650.
- The income statement for the year 1988 was:

	Rs.	Rs.
Sales (net)		6,25,000
Less: Expenses		
Operating Charges:		
Materials and supplies	1,25,000	
Direct labour	1,05,000	
Manufacturing overheads	90,750	
Depreciation	61,750	
Selling expenses	1,22,500	
General expenses	1,15,000	
Interest expenses (Net)	3,750	
Unusual Items:		
Writing off goodwill	1,15,000	
writing-off of land	5,000	
Loss on machinery	600	
		<u>-7,44,350</u>
Net loss		<u>1,19,350</u>

Prepare a statement of changes in financial position using a working capital approach.

Solution:

1)) Funds from business operations

	Rs.	Rs.
Net loss for current year	-1,19,350	
Add:		
Depreciation	61,750	
Interest	3,750	
Goodwill written off	1,15,000	
Land written off	5,000	
Loss on sale of machinery	600	
Debenture discount amortised	200	
		<u>1,86,300</u>
		66,950
Less last-year profit		<u>Nil</u>
		66,950

Statement of Changes in working capital:

	1987	1988	Working Capital	
	Rs.	Rs.	Increase	Decrease
			Rs.	Rs.
Current Assets:				
Inventories	1,09,000	1,05,000		4,000
Sundry debtors	46,000	90,000	44,000	
Bills receivable	13,500	10,500		3,000
Cash in hand	4,500	1,000		3,500
Unexpired insurance	700	600		100
Total current Assets	1,73,700	2,07,100		
Current Liabilities:				
Sundry creditors	26,000	29,000		3,000
Bank overdraft	—	4,000		4,000
Bills payable	5,000	4,500	500	
Bills loans (short-term)	3,400	750	2,650	
Accrued interest	3,000	5,000		2,000
Accrued taxes	1,500	2,500		1,000
Allowances for doubtful accounts	1,150	2,250		1,100
Total current Liabilities	40,050	48,000		
Net working capital:				
(Current assets - Current liabilities)	1,33,650	1,59,000		
Increase in net working capital	25,450			25,450
	1,59,100	1,59,100	47,150	47,150

Working Notes:

1) Determination of dividend amount:

Balance of retained earnings 31.12.1987	3,91,900
Net loss of 1988	- 1,19,350
	<u>2,72,550</u>

However, the balance of retained earnings as on 31-12-1988 is Rs.2,68,550 i.e., Rs.4,000 less. In the absence of any other information, this amount is assumed to have been paid as dividends to equity holders.

2) Purchase of machinery:

Machinery (31.12.1987)	Rs. 1,00,000
Less: Scrap value of machine	- 2,250
	<u>97,750</u>
Closing balance of machinery (31.12.1988)	1,65,000

Difference represents purchases	67,250
3) Goodwill:	
Balance in the beginning	1,00,000
Add: Discount on issue of equity shares	15,000
	1,15,000
Less: Writing off goodwill against P & L account	-1,15,000
	Nil

FUNDS FLOW STATEMENT

SOURCES	Rs.	USES	Rs.
Funds flow business operations	66,950	Increase in Working Capital	25,450
		Building purchased	1,25,000
Issue of equity shares	1,35,000	Machinery	67,250
Issue of debentures	25,000	Trade investments	1,500
		Interest to debenture holders	3,750
		Dividend to equity holders	4,000
	2,26,950		2,26,950

ACTIVITY-I

- 1) From the following Balance Sheets of X Ltd. prepare a statement of changes in working capital:

Balance Sheets as on the 31st of December.

Capital and Liabilities	1993 Rs.	1994 Rs.
Share capital	5,00,000	5,00,000
Debentures	3,70,000	4,50,000
Tax payable	77,000	43,000
Sundry Creditors	60,000	1,22,000
Bills payable	36,000	70,000
Interest payable	37,000	45,000
Dividends payable	50,000	35,000
	11,30,000	12,65,000
Assets		
Fixed Assets	6,00,000	7,00,000
Investments (long-term)	2,00,000	1,00,000
Work-in-progress	70,000	80,000
Stock in trade	1,50,000	2,25,000

Sundry Debtors	60,000	1,00,000
Bills receivable	10,000	40,000
Cash	30,000	10,000
prepaid expenses	10,000	10,000
	<u>11,30,000</u>	<u>12,65,000</u>

2) From The following profit & Loss A/c prepare the funds from operations.

	Rs.		Rs.
To Operating expenses:			
To Administration	5,000	By Gross profit b/d	10,000
To Selling	3,000	By Profit on sale	2,000
To Depreciation	2,000	of machinery	
To Preliminary expenses	1,000		
To Loss on sale of Land	500		
To Net profit	500		
	<u>12,000</u>		<u>12,000</u>

3) Account of balances relating to Plant & Machinery during 1993 are as follows:

	January 1, 1993	December 31, 1993
	Rs.	Rs.
Plant & Machinery	2,00,000	4,00,000
Less: Accumulated depreciation	50,000	70,000

Plant & Machinery with an original cost of Rs.40,000 having an accumulated depreciation of Rs.20,000 were sold at a gain of Rs.5,000. Find out the hidden transaction.

8.4 STATEMENT OF CHANGES IN FINANCIAL POSITION : CASH BASIS

In a Cash Flow Statement, the term 'Fund' is used to mean cash only. This statement summarises the causes of changes in cash position between dates of two balance sheets. It indicates the sources and uses of cash. This statement is also similar to the statement prepared on working capital basis, except that it focuses attention on cash instead of working capital. For this purpose we have to prepare i) Cash from operations and ii) Cash Flow Statement.

Cash from operations

The net profit showed in the statement may include items which do not increase or decrease cash. Such items should be adjusted to net profit to determine the net increase in cash from operation.

The items reducing net profit and involving no cash out flows should be added to the net profit such as depreciation, amortisation of goodwill, general reserve, loss on sale of fixed assets etc., Similarly the gain/profit on sale of fixed assets should be subtracted as you were calculating in funds from business operations.

The increase or decrease in current assets and liabilities influence the flow of cash from operations, hence the changes have to be either added for subtracted to the adjusted net profit or funds from business operations. Here you do not need to prepare a separate working capital changes statement.

Form of Cash from Operations

Adjusted net profit (funds from business operations)	
--	------

Add Decrease in Current Assets	
--------------------------------	------

Increase in Current Liabilities	
---------------------------------	------

Less Increase in Current Assets	
---------------------------------	------

Decrease in Current Liabilities	
---------------------------------	------

Cash from Operations	
----------------------	------

Cash Flow Statement

All transactions involving inflow of cash will be called as sources of funds and transactions resulting in outflow of cash will be called application of funds.

Cash Flow Statement

Sources of Cash	Applications of Cash
Cash opening balance	Purchase of fixed assets
Cash from operations	Dividend paid
issuance of share capital	Tax paid
Sales of any fixed asset	Repayment of loans,
Long term loan raised	Debentures and preference
	share capital
	cash closing balance

From the example 1 calculate the cash from operations and cash flow statement.

	Rs. in lakhs
Cash from operations	
Funds generated from operations	.83
Add increase in Tax	.10
Dividend	.08
increase in Creditors	.22
increase in outstanding expenses	.06

1.29

Less

increase in Debtors	.30	
increase in stock	.32	
increase in B/R	.10	
decrease in B/R	.04	.76

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CASH FLOW STATEMENT

	Rs. in lakhs		Rs. in lakhs
Cash in hand (open.bal.)	.10	Preference Share Redeemed	.50
Cash at Bank (Open.bal.)	.15	Interim Dividend	.20
Issue of Shares	1.00	Plant Purchased	1.42
Sale of Land	.50	Investment Purchased	.11
Sale of Machinery	.10	Cash in hand (Closi.Bal)	.08
Dividend Received	.03	Cash at bank (Closi.Bal)	.10
Cash from Operation	.53		
	2.41		2.41

Example - 3

The following are the summarised Balance Sheets of a Limited company as on 31st of December, 1990 and 1991.

	1990	1991		1990	1991
	Rs.	Rs.		Rs.	Rs.
Share Capital	2,00,000	2,50,000	Land & Buildings	2,00,000	1,90,000
General Reserve	50,000	60,000	Machinery	1,50,000	1,69,000
P & L a/c	30,500	30,600	Stock	1,00,000	74,000
Long-term Loan	70,000	-	Debtors	80,000	64,000
Creditors	1,50,000	1,35,000	Cash	500	8,600
Provision for taxation	30,000	35,000	Goodwill		5,000
	5,30,500	5,10,600		5,30,500	5,10,600

Additional information

During the year ending on 31.12.1991

- 1) Dividend of Rs.23,000 was paid;
- 2) Assets of another company (Stock:Rs. 20,000 Machinery : Rs.25,000, and goodwill: Rs.5000) were purchased for a consideration of shares Rs.50,000;
- 3) Additional Machinery was purchased for Rs.8,000;
- 4) Depreciation written off on machinery : Rs.12,000
- 5) Income tax provided during the year Rs.33,000;
- 6) Loss on sale of machinery amounting to Rs.200 was written off to General Reserve account

Prepare the Cash Flow Statement.

Solution

Machinery Account

	Rs.		Rs.
To Balance b/d	1,50,000	By Depreciation	12,000
To Share Capital	25,000	By General Reserve	200
To Cash (Purchase)	6,000	By Cash	1,800
		By Balance c/d	1,69,000
	1,83,000		1,83,000

General Reserve Account

	Rs.		Rs.
To Machinery a/c	200	By Balance b/d	50,000
To Balance c/d	60,000	By P & L a/c	10,200
	60,200		60,200

Provision for Taxation Account

	Rs.		Rs.
To Cash (tax paid)	28,000	By Balance b/d	30,000
To Balance c/d	35,000	By P & L a/c	33,000
	63,000		63,000

Decrease in stock during the year		1,00,000
Stock as on 31.12.1990	74,000	
Less: Stock as on 31.12.1991	20,000	
(-) Stock from vendor Co.		54,000
		46,000

Cash from Operations

Closing Balance of P & L a/c	Rs.	30,600
Add: Non-fund operating items:		
Dividend	23,000	

Depreciation - Building	10,000	
Machinery	12,000	
Provision for taxation	33,000	
Transfer to General Reserve	10,200	88,200
		1,18,800
(-) Ope. balance of P & L a/c		30,500
Funds from operations		88,300
Add: Decrease in stock	46,000	
Decrease in debtors	15,800	
		61,800
		1,50,100
Less: Decrease in creditors		14,800
Cash from operations		1,35,300

Cash Flow Statement

Sources	Rs.	Uses	Rs.
Cash from operations	1,35,300	Payment of dividends	23,000
Sale of machinery	1,800	Purchase of machinery	8,000
		Tax paid	28,000
		Repayment of loan	70,000
			1,29,000
		Increase in cash balance	8,100
	1,37,100		1,37,100

Alternatively, the Cash Flow Statement can be prepared in the following way:

Cash Flow Statement

Cash balance as on 1.1.1991		500
Add: Sources of cash:		
Cash from operations		1,35,300
Sale of machinery		1,800
		1,37,600
Less: Applications of cash:		
Dividends	23,000	
Purchase of machinery	8,000	
Tax paid	28,000	
Repayment of loan	70,000	
		1,29,000
Cash balance as on 31.12.1991		8,600
		1,37,600

Activity-2

1) Compute cash from operations from the following:

	1993	1994
	Rs.	Rs.
Debtors	10,000	12,000
Provision for doubtful debts	1,000	1,200
Bills Receivable	4,000	3,000
Bills Payable	5,000	6,000
Creditors	8,000	9,000
Stock	5,000	8,000
Short-term investments	10,000	12,000
Outstanding expenses	1,000	1,500
Prepaid expenses	2,000	1,000
Accrued income	3,000	4,000
Income received in advance	2,000	1,000
Profit after providing for depreciation of	2,000	10,000

8.5 STATEMENT OF CHANGES IN THE FIRM'S TOTAL FINANCIAL RESOURCES

The statement of changes in financial position should reveal all changes whether it is prepared on cash basis or working capital basis. There are many significant investment and financing activities which do not influence cash position of the firm. Such transactions must be reported in the statement. For this purpose the statement of changes in financial position can be easily adapted to reflect these changes.

8.6 USES OF STATEMENT OF CHANGES IN FINANCIAL POSITION

The statement of changes in financial position is an important planning tool. It gives a clear picture of the causes of changes in the company's working capital position or cash position. The statement reveals the financing and investing policies followed by the company. The statement also reveals the various fixed assets acquired, dividends paid, long term loan and preference capital redeemed by the company, and the manner in which they have been financed from the internal and external sources.

8.7 SUMMARY

In this unit, we have explained the need, meaning and importance of the statement of changes in financial position. The statement of changes in financial position may be prepared on the basis of i) working capital ii) cash and iii) total financial resources. We have tried to explain the procedure involved in the preparation of the statement of changes in financial position on working capital and cash basis. The uses of the statement of changes in financial position is also discussed.

8.8 KEY WORDS

- | | | |
|---|---|--|
| 1. Statement of changes in financial position | : | A statement prepared to explain the causes of changes in assets, liabilities and owner's equity of a firm between two balance sheet dates. |
| 2. Funds | : | The term Funds include not only cash but also the total current assets or financial resources. |
| 3. Funds from Operation | : | The amount of net profit/loss after the adjustment of non-operating items. |
| 4. Cash from Operation | : | Cash inflow or outflow on account of business operation. |

8.9 SELF ASSESSMENT QUESTIONS

1. Explain the need and importance of statement of changes in financial position.
2. Discuss in detail the procedure of making a Funds Flow Statement.
3. What is a cash Flow statement? How is it prepared.
4. A company has reported a net profit of Rs.30,000 for the year 1988. The following are the list of transactions having a bearing on determination of net income:

	(Rs.)
Amortisation of premium on debentures	2,000
Depreciation	10,000
Bad debts	5,000
Amortisations of goodwill (charged against general reserve)	4,000
Amortisation of patents	2,000
Amortisation of preliminary expenses	3,000
Loss on sale of plant and equipment	4,000
Extraordinary gains (transferred to capital reserve)	6,000
Amortisation of deferred investment tax credit	4,000
Interest revenue accrued	1,000
Income taxes, of which Rs.5,000 is payable at the end of 1990	15,000
Profit on revaluation of land	5,000
Share transfer fees	400
Interest on debentures	5,000
Dividends to equity holders	10,000

Determine the amount of working capital provided from business operations assuming that the effect of non-operating transactions on working capital items is separately reported.

5. The comparative balance sheets of Soma Pvt. Ltd are given below:

SOMA PVT. LTD

Comparative Balance Sheets

	31 Dec. 1991	31 Dec. 1990
Assets	Rs.	Rs.
Cash	82,000	22,000
Debtors	1,04,000	24,000
Stock	1,12,000	60,000
Prepaid expenses	22,000	14,000
Plant and Machinery	3,80,000	3,60,000
Goodwill	36,000	40,000
	<u>7,36,000</u>	<u>5,20,000</u>
Equities	Rs.	Rs.
Creditors	30,000	14,000
Provision for depreciation	1,00,000	60,000
Debentures	1,02,000	1,02,000
Premium on debentures issue	12,000	18,000
Share capital	1,90,000	90,000
Share premium	30,000	-
Reserves and surplus	2,72,000	2,36,000
	<u>7,36,000</u>	<u>5,20,000</u>

The following additional information is available from the accounting records for 1991:

1. Net Profit for the year Rs.66,000

2. Debentures premium of Rs.6,000 was amortised during the year.

Prepare a statement of changes in financial position on a) working capital basis, b) cash basis. Also prepare a schedule of working capital changes.

6. Balance Sheets and income statement of Greenwood Company Limited as on December 31, 1990 and 1991 are as follows:

Liabilities	1990	1991	Assets	1990	1991
	Rs.	Rs.		Rs.	Rs.
Account payable	15,000	25,000	Cash balance	5,000	2,000
Cash credit	13,000	10,000	Account receivable	10,000	8,000
Outstanding expenses	2,000	3,000	Loan and advances	5,000	-
Long-term loan	30,000	20,000	Inventories	20,000	25,000
Capital	30,000	30,000	Fixed assets (net)	60,000	65,000
Surplus	10,000	12,000			
	<u>1,00,000</u>	<u>1,00,000</u>		<u>1,00,000</u>	<u>1,00,000</u>

Income Statement for the Year 1991

	Rs.
Sales	2,00,000
Less Cost of goods sold (including depreciation Rs. 10,000)	1,70,000
Gross Profit	30,000
Less Other expenses	20,000
Income before tax	10,000
Less income tax provision	5,000
Retained in Business	5,000

Prepare a statement of sources and uses of funds.

PROBLEM-7

From the following data of Jalan Co., prepare (a) a statement of sources and uses of working capital (funds), (b) a schedule of changes in working capital, and (c) a statement of sources and uses of cash.

Assets	31 Dec. 1991 Rs.	31 Dec. 1990 Rs.
Cash	1,26,000	1,14,000
Marketable securities	42,400	20,000
Debtors	60,000	50,000
Stock	38,000	28,000
Long-term investments	28,000	44,000
Machinery	2,00,000	1,40,000
Buildings	2,40,000	80,000
Land	14,000	14,000
Liabilities		
Accumulated depreciation	1,10,000	60,000
Creditors	40,000	30,000
Bills Payable	20,000	10,000
Mortgage loan	2,00,000	1,00,000
Share capital	2,20,000	1,60,000
Share Premium	24,000	-
Reserve and surplus	1,34,000	1,30,000
	<u>7,48,400</u>	<u>4,90,000</u>

JALAN CO.
Income Statement for 1991

		Rs.
Sales		2,40,000
Cost of goods sold		1,34,800
Gross Profit		1,05,200
Less: Operating expenses		
Depreciation-Machinery	20,000	
Depreciation-Buildings	32,000	
Other expenses	40,000	
		92,000
Net Profit from operations		13,200
Gain on sale of long-term investment		4,800
Total		18,000
Loss on sale of machinery		2,000
Net Profit		16,000

8.10 FURTHER READINGS

M.Y. Khan & P.K. Jain	:	Management Accounting Tata McGraw-Hill Publishing Company Ltd. New Delhi.
LM. Pandey	:	Management Accounting Vikas Publishing House Pvt. Ltd. New Delhi.
J. Batty	:	Management Accounting M.C. Donal and Evans.
Anthony, R.N.	:	Management Accounting Text and Cases (Illionis, Iravin)
Prasanna Chandra	:	Financial Management.

UNIT 9 COST - VOLUME - PROFIT ANALYSIS

Objectives

The objectives of this unit are:

- * to explain the meaning and importance of Cost-Volume-Profit Analysis.
- * to discuss the factors that affect Cost-Volume-Profit analysis relationships.
- * to explain the role of break-even analysis.
- * to state the limitations of break-even analysis.

Contents

- 9.1 Introduction
- 9.2 Fixed and variable costs
- 9.3 Break-even analysis
- 9.4 Break-even chart
- 9.5 Uses of break even analysis
- 9.6 Limitations of break even analysis
- 9.7 Summary
- 9.8 Further Readings.

BRAOUI

9.1 INTRODUCTION

Many managerial decisions require a careful analysis of the behaviour of cost and profits as they affect the expected volume of sales. In the short run, most of the costs and prices of a firm's products will, in general, be determined. The principal uncertainty is not the cost or price of a product but the quantity that will be sold. Thus, the short run profitability of a product will be most sensitive to the volume of sales. The study of the relationship between cost, volume and profit is known as Cost-Volume-Profit (C.V.P.) analysis which is used as an important management tool for profit planning. In fact the entire exercise of profit planning is associated with Cost-Volume-Profit inter-relationships. A technique commonly used to study Cost-Volume-Profit relationships is 'Break-Even Analysis' (B.E.P.). Break even analysis refers to a system of determination of that level of activity where the total cost equals total revenue. In short, it determines the sales volume at which the firm makes neither loss or profit.

9.2 FIXED AND VARIABLE COSTS

C.V.P. makes use of fixed costs and variable costs. However C.V.P. analysis requires a separation between fixed and variable costs. Therefore, before proceeding with the analysis, we must know the behaviour of both the categories of costs viz., Fixed and Variable.

Fixed costs remain constant in total regardless of changes in volume upto a certain level of output. They remain the same irrespective of the level of production attained. In other words, they will have to be incurred even when output is nil. An example would be the rent paid on a building. However, it should be noted that there is an inverse relationship between volume and fixed costs per unit. Thus total fixed costs do not change with a change in volume but vary per unit of volume inversely with volume. If the total production increases, fixed cost per unit will go down and vice versa. We can observe the behaviour of the fixed costs with the help of Figures 1 and 2.

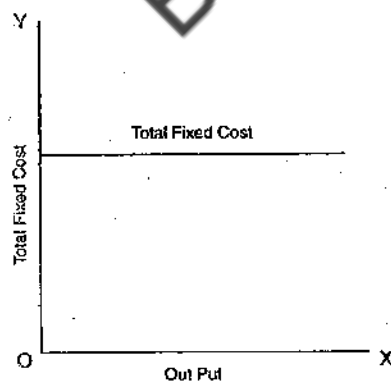


Fig. 1

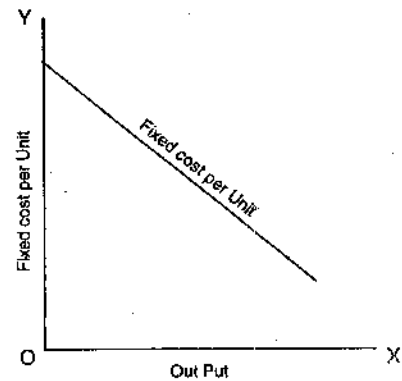


Fig. 2

Variable costs as the very name indicates vary in direct proportion to changes in volume. An increase in volume means a proportionate increase in the total variable costs and decrease in volume results in a proportionate decrease in the total variable costs. There is a linear (direct) relationship between volume and total variable costs, but variable costs are constant per unit. Figures 3 and 4 depict the behaviour of total variable costs and variable cost per unit.

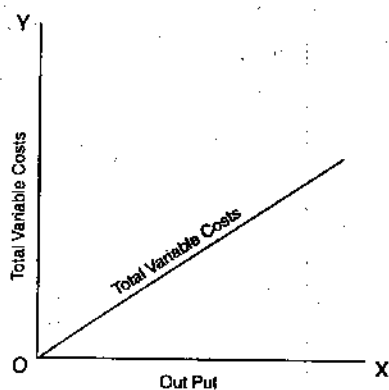


Fig. 3

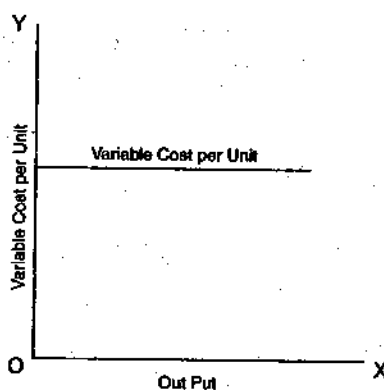


Fig. 4

Activity 1

- * Explain the behaviour of costs in relationship volume of production attained.

Relevant Time period

The categorisation of costs into fixed and variable must always be made with reference to a specific time period. In the long run all fixed costs tend to become variable. During such a long period of time, equipment becomes obsolete and needs to be replaced, buildings and land can be sold, changed. Over long periods of time, contractions in activity can be accompanied by a contraction in virtually all categories of costs. And large expansions in activity will eventually cause all cost components to increase especially when the increase in activity is accomplished by increasing the diversity and complexity in the product line and distribution channels.

In the short run virtually all costs are fixed. Materials have been acquired, utilities are turned on, and the firm is already committed to paying its employees. For this brief time period, variations in activity will not lead to much cost variation within the two extremes long and short time periods.

Finally, we assume that costs can be uniquely divided between fixed and variable costs over the relevant range of analysis, although the model can be extended to situations where revenues and costs are non-linear functions of production and sales.

A dynamic management, therefore, uses CVP analysis to predict and evaluate the implications of its short-run decisions about fixed costs, variable costs, volume and selling price for its profit plans on a continuous basis.

You may be asked by your management to prepare a report analyzing each of the following issues:

- What is the projected profit given the initial data?
- What minimum level of sales need be achieved to avoid losses?
- What should be the sales level to earn a target profits?
- What will be the effect of changes in prices, costs and volume on profits?
- How will profits be affected when sales-mix is changed?
- What will be new break-even point under (d) and (e) above?

- g) What will be the impact of plant expansion on cost-volume-profit relationships?
- h) Which product is the most profitable and which one is the least profitable?
- i) Should the sale of a product or operation of a plant be discontinued?
- j) Should or not the firm be shut down temporarily? and so on.

It is quite easy to answer these questions, once the behaviour of costs is understood. By assumption, only the revenue and the variable costs will change with changes in volume. The fixed costs remain constant over the relevant range. As a result, we can simulate the effects of different decisions on the profitability of the firm.

C.V.P. analysis works from the general profit equation:

$$\text{profit} = \text{Sales} - \text{Total Variable Cost} - \text{Total Fixed Costs}$$

We define the following notation:

- x = Units produced and sold
- p = Price per unit
- v = Variable Cost per Unit
- f = Total fixed cost

so that we can write

$$\text{Profit} = Px - Vx - f \text{ or } (P - V)x - f$$

(the basic C.V.P. equation).

The difference between the price and the variable cost per unit (P-V) is referred to as the contribution per unit. The product of the contribution per unit and the number of the units sold, (P-V)x is generally referred to as the contribution margin.

9.3 BREAK-EVEN ANALYSIS

Break-even analysis is the most widely known form of the CVP analysis. Break-even analysis is concerned with the study of revenues and costs in relation to volume of sales and particularly, the determination of the break-even volume of sales (i.e. the sales volume where revenue becomes exactly equal to the total costs giving neither any profit nor any loss). It indicates the level of sales at which costs and revenues are in equilibrium. The equilibrium point is commonly known as the break-even point. The break-even point may be defined as that point of sales volume at which total revenue is equal to total costs. It is a no-profit, no-loss point.

A quantity of special interest from the basic C.V.P. equation is the break-even point (BEP), defined as the level of output at which the contribution margin just covers the fixed costs, that is the output level at which profits are zero.

Determination of the Break-even Point

There are two approaches that can be used to compute the break-even point : 1) the mathematical approach, and 2) the graphic approach.

Break-even formulae

The break-even point can be computed in terms of units, or in terms of money value of sales volume or as a percentage of estimated capacity.

The BEP formulae, for both in terms of units and in terms of money values of sales volume, can easily be determined from our basic C.V.P. equation by setting the left hand side (profits) equal to '0' and substituting BEP for x:

$$\text{Profit} = (P-V) \times f \text{ ----- (i)}$$

$$0 = (P-V) \text{BEP} - f \text{ ----- (ii)}$$

$$(P-V)\text{BEP} = f \text{ ----- (iii)}$$

$$\text{BEP} = \frac{f}{(P-V)} \text{ ----- (iv)}$$

The (iv) equation is referred to as the break-even equation.

Example 1 : Suppose the fixed costs of a factory are Rs.20,000 per year, the variable costs are Rs.4.00 per unit and the selling price is Rs.8.00 per unit.

The break-even point would be :

$$\text{BEP} = \frac{\text{Rs.20,000}}{(8-4)} = 5,000 \text{ units}$$

In other words, the company would not make any loss or profit at a sales volume of 5,000 units as shown below:

Sales (5,000 × Rs.8)	Rs.40,000
-Variable cost @ (5,000 units × Rs.4)	Rs.20,000
Contribution	Rs.20,000
-Fixed Cost	Rs. 20,000
Net Profit	Nil

It can be observed from equation (iv) that is necessary for a positive break-even point to occur that the price be greater than the variable cost per unit (i.e. $P > V$). Mathematically, if the price is less than the variable cost per unit ($P < V$) a solution for break-even point in terms of negative sales volume does exist; but the negative sales volume in practice is an unacceptable proposition. In case price equals variable cost per unit ($P = V$), no break-even point can exist unless firm has zero fixed costs. Under zero fixed costs situation, every sales volume point will be a break-even point, because revenue would be exactly equal to total costs at any sales volume.

To express the BEP in revenue rather than units sold, we multiply both sides of (BEP) equation by price per unit, P , and obtain -

$$\text{BEP} = f/(P-V) \text{ ----- (iv)}$$

$$P(\text{BEP}) = P(f/(P-V)) \text{ ----- (v)}$$

$$\text{BEP}_r = \frac{f}{\frac{P-V}{P}} \text{ ----- (vi)}$$

Where BEP_r is the break-even point in terms of rupee sales and the quantity $(P-V)/P$ is referred to as the contribution margin ratio.

Example-2 Substituting the data of example-1 in equation (vi), we get:

$$\begin{aligned} \text{BEP}_r &= \frac{20,000}{1 - \frac{4}{8}} \\ &= \frac{20,000}{\frac{4}{8}} \\ &= \frac{20,000}{4} \times 8 = \text{Rs.40,000/-} \end{aligned}$$

The same answer could be obtained by multiplying the breakeven units by price (5,000 × 8 = Rs.40,000). The advantage of this formula is that it can be used both

with the per unit information and total information. This is so because the variable costs and sales revenues change in direct proportion to sales volume.

$$\begin{aligned}
 \text{BEP}_r &= \frac{F}{1 - \frac{V}{S}} \\
 &= \frac{\text{Fixed Costs}}{1 - \frac{\text{Total Variable Costs}}{\text{Total Sales Revenue}}} \\
 &= \frac{20,000}{1 - \frac{20,000}{40,000}} \\
 &= \frac{20,000}{\frac{20,000}{40,000}} \\
 &= \frac{20,000}{20,000} \times 40,000 \\
 &= \text{Rs. } 40,000/-
 \end{aligned}$$

BEP as a Percentage of Full Capacity

Full capacity means the maximum possible volume attainable by the firm with the existing fixed equipment, operating policies practices and organising ability. Many firms are interested in computing the break-even point as a percentage of full capacity. This can be done by dividing the capacity sales by the break-even sales. For instance, in 'example 1' if the firm is assumed to have as estimated full capacity of 10,000 units of product, its break-even point of 5,000 units is reached at 50 percent of the capacity ($\frac{5,000}{10,000}$). Similarly, in example 2 the break-even point as a percentage of capacity is 50 per unit ($\frac{\text{Rs. } 40,000}{\text{Rs. } 80,000}$). Break-even point as a percentage of full capacity will provide us the maximum rupee volume of sales that the plant can contribute to the fixed cost and profit.

The break-even point as a percentage of full capacity can be determined directly if information as to the total marginal income or contribution is available. The formula is :

$$\text{B/E Point (as Percentage of Capacity)} = \frac{\text{Fixed Costs}}{\text{Total Contribution}}$$

Example 3:

Fixed Cost = Rs. 20,000
 Price per unit = Rs. 8/-
 Variable Cost per unit Rs. 4/-
 Total Sales in Units 10,000

$$\begin{aligned}
 \text{Total Contribution} &= P - V \times \text{Total Units} \\
 &= \text{Rs. } 8 - 4 \times 10,000 \text{ Units} \\
 &= 4 \times 10,000 \text{ Units} = 40,000/-
 \end{aligned}$$

$$\text{BEP (as percentage of capacity)} = \frac{\text{Rs. } 20,000}{\text{Rs. } 40,000} = 5 \text{ or } 50\%$$

P/V Ratio or Contribution Ratio

Profit/Volume (P/V) ratio is useful in establishing a relationship between the contribution (i.e. sales - variable costs) and sales value. The ratio is also called 'Contribution/Sales' ratio. Any increase in contribution would mean increase in profit only because fixed costs are assumed to be constant at all levels of production. Further, the relationship between sales and variable cost is constant, since variable

costs as a proportion to sales remain constant at various levels of production. It is really Contribution/Sales ratio (C/S ratio), which indicates the proportion of sales revenue which contributes to fixed costs and profit. This ratio expresses the relationship between contribution and sales and when multiplied by 100, it indicates the amount of contribution being earned per 100 rupees of sales. This can be computed in various ways as shown below:

$$\text{P/V Ratio} = 1) \frac{\text{Contribution}(\text{Sales} - \text{Variable Costs})}{\text{Sales}}$$

$$2) \frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales}}$$

$$3) \frac{\text{Fixed Cost} - \text{Loss}}{\text{Sales}}$$

$$4) \frac{\text{Change in Contribution}}{\text{Change in Sales}}$$

$$5) \frac{\text{Change in Profit (or Loss)}}{\text{Change in Sales}}$$

Example 4. With the help of the following example, P/V ratio is computed by using the above formula:

(All Figures Rs./thousands)

	Sales	Profit	Total Cost	Variable Cost	Fixed Cost
Period I	20	2	18	14	4
Period II	30	5	25	21	4
Differential or incremental sales, cost and profit	10	3	7*	7*	-

1 (70% variable cost i.e. 7/10)

$$1. \frac{\text{Sales} - \text{Variable Cost}}{\text{Sales}} = \frac{20 - 14}{20} = \frac{6}{20} \times 100 = 30\%$$

$$2. \frac{\text{Fixed Cost} + \text{Profit}}{\text{Sales}} = \frac{4 + 2}{20} = \frac{6}{20} \times 100 = 30\%$$

$$3. \frac{\text{Change in Contribution}}{\text{Change in Sales}} = \frac{10 - 7}{10} = \frac{3}{10} \times 100 = 30\%$$

$$4. \frac{\text{Change in Profits}}{\text{Change in Sales}} = \frac{3}{10} = \frac{3}{10} \times 100 = 30\%$$

Improvement in P/V Ratio

P/V ratio is a function of contribution to sales. Improvement of this ratio means widening the gap between the sales and variable costs. This can be achieved through:

- 1) increasing the selling prices,
- 2) reducing the variable costs,
- 3) Changing the sales-mix so that high contribution earning products are sold more in preference to products having lower P/V ratio.

P/V ratio being a function of contribution to sales, reduction in fixed cost or increase in the volume of business does not affect the P/V ratio.

Uses of Profit/Volume Ratio

The P/V ratio may be applied in a variety of business situations:

- 1) To determine the Break-even point and profit
(Margin of Safety $\times$ P/V ratio)
- 2) To determine the variable cost for any volume of sales by back calculation method i.e. by deducting P/V ratio from sales taken at 100%.
- 3) To ascertain profit at any volume of sales
(Volume $\times$ P/V ratio = Amount of Contribution(-) Fixed Cost = Profit/Loss).
- 4) To calculate sales volume required to earn a desired amount of profit.
- 5) To make alignment of loss priced business to normal price business.
- 6) To effect price reduction in times of severe competition and short-run trading difficulties.
- 7) To measure the effect on profit due to changes in volume.

9.4 BREAK-EVEN CHART

The break-even point can also be computed graphically. A break-even chart provides a pictorial view of the relationship between costs, volume and profit. Break-even chart is a chart which shows the profitability or otherwise of an undertaking at various levels of activity and as a result indicates the point at which neither profit is made nor loss is incurred. The chart is an important aid in profit planning exercises. It highlights the impact of fixed cost on the operations of an undertaking. The relationship between fixed costs and profits at varying volumes may exert a powerful influence on selling price decisions and profit policies. Break-even chart depicts, amongst other things, the break-even point, margin of safety and angle of incidence.

Assumptions for Construction of Break-even Chart

1. Fixed cost will not change with respect to a defined period of time.
2. Variable costs viz. material, wage costs and variable expenses like power and fuel, consumables etc. will not undergo any upward or downward revision or change within the defined period of time.
3. Semi-fixed or semi-variable costs can be segregated precisely into (a) fixed and (b) variable element.
4. Selling prices of products will remain stabilised within the defined period of time.
5. Plant will operate at a pre-determined efficiency level.
6. There will not be any change in the productline or in the manufacturing process or distribution channels.
7. Whatever quantities are produced will be sold and there will not be any opening or closing stock. In other words, there will be no effect on account of opening or closing stock i.e. same quantity or same value in opening and closing will mutually cancel each other.
8. Finally, product-mix assumed for construction of break-even chart in the case of multi-product factory shall not undergo any change. To clarify, if the ratio of sales is assumed to be A - 45%, B - 35% and C - 20%, this relationship between the products will be maintained in actual operation too.

The following steps are involved in constructing the break-even chart.

1. Sales volume is plotted on horizontal axis. Sales volume may be expressed in terms of rupees, units or as a percentage of capacity. Equal distances are cut along the

horizontal line to show sales volume at different activity levels.

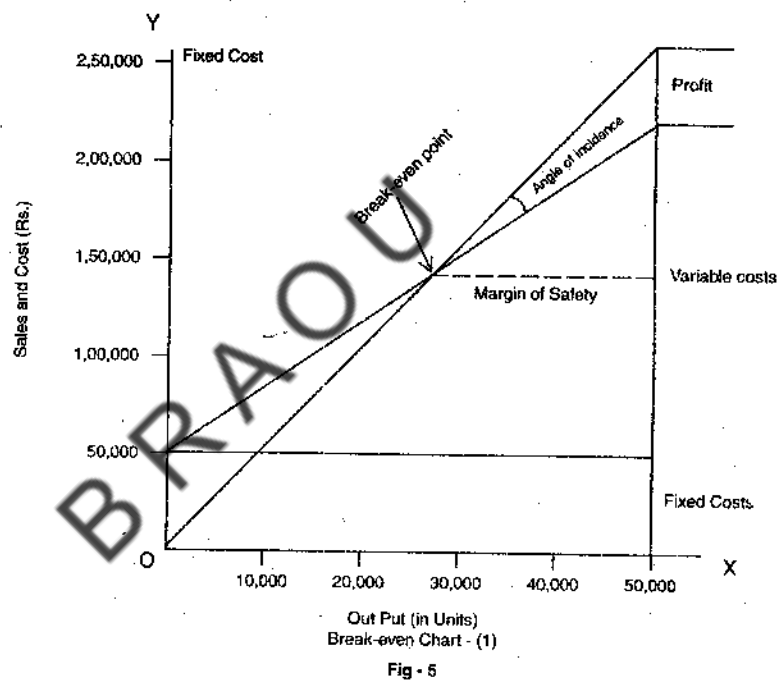
2. Vertical axis is used to represent revenue and fixed and variable costs. The vertical line is also spaced in equal parts. A similar vertical line may be drawn on the right of the chart to complete the square.
3. The fixed cost line, parallel to the horizontal axis, can be drawn through the fixed cost point.
4. The total sales and total costs line can be drawn by marking budget levels on the right side vertical line. To draw total sales line, the zero-sales point should be connected with the sales budget point on the right hand vertical line. Similarly, total costs line can be drawn by connecting fixed costs point with the total costs budget point on the right hand vertical line.
5. If the vertical and horizontal lines are spaced equally with the same distances, the sales line will connect the opposite corners of the graph at 45° .

The point of intersection between the sales and the total cost lines is the break-even point.

The Break-even charts are drawn in two ways with the following data:

Example 5:

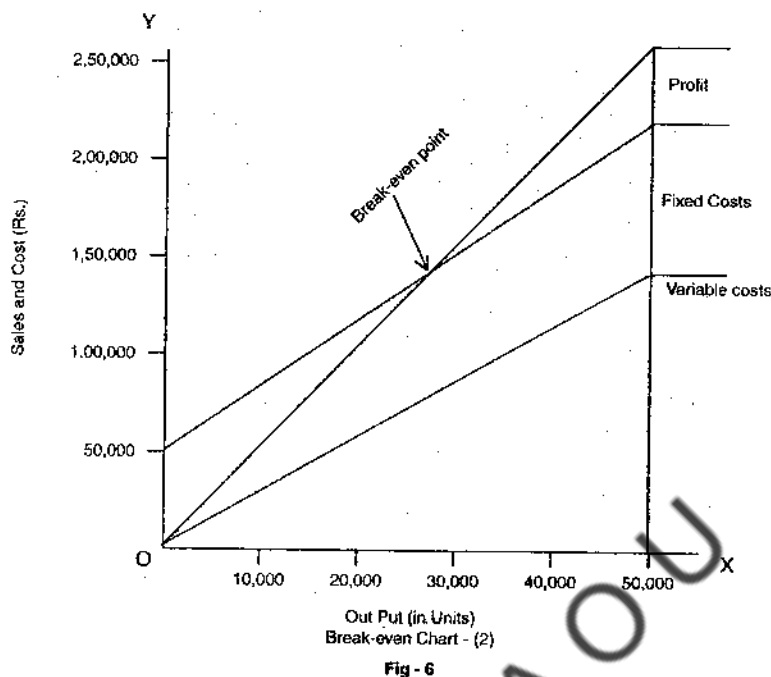
Output & Sales in Units	10,000	20,000	30,000	40,000	50,000
Sales value @ Rs.5 per unit	50,000	1,00,000	1,50,000	2,00,000	2,50,000
Variable cost @ Rs. 3 per unit	30,000	60,000	90,000	1,20,000	1,50,000
Fixed cost	60,000	60,000	60,000	60,000	60,000



x axis - the horizontal line represents the output or capacity, and

y axis - the vertical line represents sales and costs.

The break-even point is at 30,000 units corresponding to sales value of Rs.1,50,000 i.e., at 60% capacity utilisation and the margin of safety is 20,000 units (50,000 - 30,000) valued at Rs.1,00,000 representing 40% of total sales value.



In this presentation fixed cost line has been placed above the variable cost line to show more clearly that below the break-even point fixed costs are not being recovered.

Margin of Safety

This is the amount by which the current volume exceeds the break-even volume. In other words the difference between the break-even sales and the actual sales is known as the margin of safety. Since all fixed costs are recovered at the break-even point, only variable costs will be incurred for any output and sale beyond this point. Therefore, additional sales value minus variable costs equals contribution and contribution is equal to profit. In other words, $\text{Margin of Safety} \times P/V \text{ ratio} = \text{Profit}$.

The margin of safety represents the amount by which a firm's sales can decrease without leading to a loss. In other words, it is a cushion available to the firm and can be taken as a measure of strength of a business. If the gap is large, it indicates that the business is enjoying a sizeable share of the market and even if there is a fall in demand the business would still be earning profits. On the contrary with a shorter margin of safety the business is highly vulnerable and a small drop in sales can cause a violent fluctuation in profit. The margin of safety can be determined as follows:

$$\text{Margin of Safety Ratio} = \frac{\text{Budgeted Sales} - \text{BEP Sales}}{\text{Budgeted Sales}}$$

Ex:- Budgeted Sales Rs.2,50,000/-

BEP Sales Rs.1,50,000/-

$$\begin{aligned} \text{M/s Ratio} &= \frac{2,50,000 - 1,50,000}{2,50,000} = \frac{1,00,000}{2,50,000} \\ &= .40 \text{ or } 40\% \end{aligned}$$

That means, the firm's sales can drop by as much as Rs.1,00,000 from its budgeted level before it has to worry about a loss for the year.

Angle of Incidence

The angle formed at the break-even point by the intersection of the sales line and the actual cost line is called the angle of incidence (see break-even chart). The angle is dependent upon the incidence of cost on revenue and serves as an indication of the amount of profits being earned - if angle is large, high profit situation and if small, it gives an indication that profit is being earned under difficult trading conditions. The size of the angle shows the rate of profit earned after breaking even between profit and loss and a large angle will mean a high rate of profit accruing after the point.

Limitations of Break-even Charts

1. Selling price may not be constant and consequently, the sales value may not always move in direct proportion to output. Higher volume of sales may be achieved at reduced prices.
2. Variable cost per unit may change with the change in output.
3. Fixed cost may change after a certain level of output.
4. Level of efficiency may vary after a certain activity level.
5. With the increased level of output, composition of product-mix not follow the similar pattern as before.

Recognising the limitations as they are, it would not be advisable to use the Break-even chart solely for the purpose of measuring profitability of business at different levels of output. However, with the clear knowledge and insight of the variable factors operating in the business the chart can be considered as a fair picture of the present position and possible trends from which many important conclusions may be drawn.

* Check your progress 2

XYZ Co., is engaged in publishing books and is taking a services and careful look at a new manuscript on cost management systems. Quick estimates show that the variable costs per book will be Rs.20.40 and the total fixed costs will be Rs.1,80,000. The company plans to market the book whole at Rs.38.40 per copy.

Using the above information compute:

- i) The number of copies of the book that are required to be sold to be able to earn a profit of Rs.36,000.
 - ii) Assuming that 21,000 copies of the book can be sold, find the selling price that the company must set to earn a profit of Rs.80,400.
 - iii) Assuming that fixed costs are cut to Rs.1,50,000, determine the number of copies that must be sold to earn a target profit of Rs.57,000.
-
-
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9.5 USES OF BREAK-EVEN ANALYSIS

As already noted, the break-even analysis provides a microscopic picture of the profit structure of a business enterprise. It identifies the areas of economic strength and weakness of the firm, with clear emphasis on certain leverages which can be used

to enhance its profitability. The usefulness of break-even analysis as a managerial tool can be discussed as follows:

1. **Determining Safety Margin:** The break-even chart enables the management to ascertain the profits generated at the various levels of sales. But while deciding upon the volume at which the firm would operate, besides demand, the management should consider the 'Safety Margin' vis-a-vis the budgeted sales. The safety margin refers to the extent to which the firm can afford a decline in sales before it encounters losses. This point is illustrated with the help of an example

Example : Sales 40,000 units

BEP 25,000 units

$$\text{Safety Margin} = \frac{\text{Sales} - \text{BEP Sales}}{\text{Sales}} \\ = \frac{40,000 - 25,000}{40,000} = \frac{15,000}{40,000} = 37.5\%$$

This implies that the firm has a margin of 37.5% in the current level of sales. In other words, the firm incurs losses only when its sales decline by more than 37.5 per cent.

2. **Determination of Sales Volume to Earn the Desired Profit:** Break-even analysis may be conveniently used to determine the volume of sales required to achieve the desired profit. The formula used for determining the Sales Volume required is:

$$\text{Required Sales Volume} = \frac{\text{Fixed Cost} + \text{Desired Profit}}{\text{Contribution per unit}} \text{ or } \frac{\text{FC} + \text{P}}{\text{P/V ratio}}$$

Example :

Fixed cost Rs.10,000/-; price Rs.8; variable cost Rs.4; if the desired profit is Rs.14,000/-, the target sales volume would be calculated as follow:

$$= \frac{\text{Rs.10,000} + \text{Rs.14,000}}{\text{Rs.8} - 4} = \frac{\text{Rs.24,000}}{\text{Rs.4}} = 6,000 \text{ units.}$$

3. **Change in Price :** Most often the management is faced with a problem whether or not to reduce or increase of its product. Before settling this question the management will have to sort out the number of ticklish points, in terms of their implications for the firms.

As already seen, it is true that any change in the sale price of products will have some effect, on total sales volume and profits. If the price, for instance, is reduced the sales will have to go up in order to maintain atleast the previous level of profits. If, on the other hand, the price is increased, sales should not fall below the previous level to maintain atleast the previous level of profits. In this context the break even analysis comes handy for the management in taking a decision relating to price changes. This is however subject to the assumption that the present conditions will continue.

Mathematically the new volume of sales required to maintain the previous level of profit, given a reduction in price can be expressed as follows:

$$Q_n = \frac{\text{FC} + \text{P}}{\text{SP}_n - \text{VC}}$$

Where Q_n = New volume of sales

FC = Fixed Cost

P = Profit

SP_n = New Selling Price

VC = Variable Cost per unit

(n denotes new)

Example :- Continuing with the previous example, if we propose a reduction of 10 percent in price (from Rs.8/- to Rs.7.20) the new sales volume needed to maintain the previous profit of Rs.14,000 would be :

$$= \frac{10,000 + 14,000}{7.20 - 4.00} = \frac{24,000}{3.20} = 7,500 \text{ units.}$$

This would mean an increase of 1500 units or 25 per cent in sales. The management can easily decide whether this increase is feasible or not.

Alternatively, if a price increase is considered the question to be examined is by how much can sales volume can decline before it wipes out the favourable effect of this price increases.

Example : Continuing with the above example, if an increase in price by $12\frac{1}{2}$ percent (i.e., to 9.00) is proposed, then the volume of sales required to maintain the old level of profits would be arrived at in the following manner.

$$Q_n = \frac{10,000 + 14,000}{9 - 4} = \frac{24,000}{5} = 4,800 \text{ units.}$$

In other words, if the decline in sales due to an increase in price is less than 1200 units or 20 per cent, it would be profitable to increase the price. If the decline is more than 1200 units, the proposed price increase would have negative effect on profit.

4. Change in Costs : When costs change, the selling price of the quantity produced, the volume sold and the profits tend to change.

Change in costs include -

- i) Change in variable costs; and
 - ii) Change in fixed costs.
- i) Change in Variable Costs: Any increase in the variable costs would lead to a decline in the contribution. as a result, the break even point will be shifted downwards. Alternatively, any decrease in variable costs would lead to an increase in contribution resulting in the BEP moving upwards. Hence, under the conditions of changing variable costs, a decision is taken regarding the new sale price or new sales volume in order to maintain previous level of profits. Mathematically, the new sales volume can be arrived at as follows:

$$Q_n = \frac{FC + P}{SP - VC_n}$$

The new selling price will be

$$SP_n = SP + (VC_n - VC)$$

Example: Continuing with our previous example, if variable costs increases from Rs.4 to Rs.5 per unit.

$$\begin{aligned} \text{a) } Q_n &= \frac{10,000 + 14,000}{8 - 5} \\ &= \frac{24,000}{3} = 8,000 \text{ units} \end{aligned}$$

$$\text{b) } SP_n = 8 + (5 - 4) = \text{Rs.9.00.}$$

- ii) If fixed cost change : If the fixed costs change either due to internal or external

factors, there will be an increase in contribution and consequently the break even point will move upwards under the assumption that there is no change in sale price of the product. The question is again how to find out the new sales volume or new sale price to maintain previous level of profits. This question can be settled mathematically.

$$1. Q_n = Q + \frac{FC_n - FC}{SP - VC}$$

$$2. SP_n = SP + \frac{FC_n - FC}{Q}$$

Example : If fixed cost increases from Rs.10,000 to Rs.15,000

$$a) Q_n = 6000 + \frac{15,000 - 10,000}{8 - 4}$$

$$= 6000 + 1250$$

$$= 7250 \text{ units.}$$

$$b) SP_n = 8 + \frac{15,000 - 10,000}{6,000}$$

$$= 8 + \frac{5000}{6000}$$

$$= 8 + 83$$

$$= \text{Rs.}8.83$$

5. Change in Capacity: Most often the management encounters the problems of effecting an upward revision in the scale of production to meet the increased demand for its product. It is possible for the management to increase the output without any increase in the fixed cost. But beyond a particular point the fixed costs are bound to increase. Hence the management would be certainly interested in studying and understand the impact of the proposed increase in output on the firms fixed costs and profits. The tool that come handy in studying such an impact is the break even analysis.

This will be clear from the following example.

Company ABC is considering a proposal to expand the production capacity. The proposed increase is expected to increase the sales volume from Rs.60,00,000 per year to Rs.80,00,000 per year. Further if it decides to expand the capacity the fixed costs will go up by 5,00,000. The relevant data for the previous year are as follows:

Sales Rs.50,00,000

Fixed Cost Rs.15,00,000

Variable Cost Rs.32,00,000

Net Profit Rs. 3,00,000

Given the above, should the management go in for the proposed expansion of the Production Capacity?

There are a number of questions to be answered by the management before it decides in favour of against the proposed increase in the Production Capacity of all the most important question to be answered is how does it affect the break-even point? To answer this, we have to find out the BEP for the previous year and BEP after expansion given sales of Rs.50,00,000. They can be computed as follow -

$$(i) \text{ BEP (Previous Year)} = \frac{\text{Fixed Costs}}{P/V \text{ ratio}}$$

$$= \frac{15,00,000}{36\%} = 41,66,666.$$

$$(ii) \text{ BEP (after expansion given sales of Rs.25,00,000)} = \frac{20,00,000}{36\%} = 54,35,554.$$

An analysis of the BEP i & ii would suggest that the management is right in deciding in favour of the proposed increase in capacity only if it can push its sales beyond the present level. Further in order to maintain the present level of profits the firm has to sell a volume whose rupee value is equal atleast to Rs.63,88,888 which is about 28% increase in sales. So the decision whether to expand the production capacity would solely depend on the management's estimate of the possible expansion in sales.

6. Decision Regarding Adding or Dropping a product:

There are many situations in business where the management feels and realise the need for adding or abandoning a particular product. The need for adding a new product may a skin view of the management's expectation that the new product is a money spinner. Alternatively, the management may decide to abandon/drop an existing product since it feels that it has outlined its utility in the market. Further the management is of the opinion that continuing with it any more would only bring losses.

Whenever faced with situation of dropping or adding a product, the management has to do necessary home work to know the likely impact of such a decision on the profitability of the firm. For coming to a conclusion regarding adding or dropping a product, the management cannot rely on their intuition or premonition or lunch. They have to necessarily depend on some scientific method or analysis one such analysis is break even analysis.

The question now is how to use break-even analysis for measuring the impact of dropping or adding a product on the profitability. The measurement of the impact of such a decision is illustrated in the following example :

XYZ Co. is engaged in the manufacture of three products. The details relating to the products are as follows :

Total Fixed Cost (yearly) Rs.3,00,000

Volume of Sales (previous year) Rs.6,00,000

Product	Price per units (Rs.)	Variable Costs per unit (Rs.)	% each product to total sales
Ceiling fans	720	480	50
Pedestal fans	1200	720	30
Heat Convectorors	1600	960	20

The company is considering whether or not to abandon heat convectorors from the existing product-line and replace it with fancy model fans.

The management is very much aware of the fact that if it takes the decision to abandon the heat convectorors and replaces it with fancy model fans, its output and cost would undergo a change as follows.

Total fixed cost (yearly) Rs.3,00,000

Sales for the current year (Anticipated) Rs.10,40,000

Product	Price per units (Rs.)	Variable Costs per unit (Rs.)	% each product to total sales
Ceiling fans	720	480	50
Pedestal fans	1200	720	20
Heat Convector	1700	900	30

In order to decide whether this change worth considering the management has to compare profits before and after the proposed change, which is done as follows :

Situation I : Before the change Contribution ratio of the Products:

$$\text{Contribution ratio} = \frac{\text{Price} - \text{Average Variable Cost}}{\text{Price}} \times \text{Share in total sales}$$

$$(i) \text{ For Ceiling fans : } \frac{720 - 480}{720} \times 50\% = 0.167$$

$$(ii) \text{ For pedestal fans : } \frac{1200 - 720}{1200} \times 30\% = 0.12$$

$$(iii) \text{ For heat Convector : } \frac{1600 - 960}{1600} \times 20\% = 0.08$$

The contribution ratio of existing product line = $0.167 + 0.12 + 0.08 = 0.367$

$$\text{Total contribution} = \text{Rs.}10,00,000 \times 0.367 = 3,67,000$$

$$\therefore \text{ Profit} = \text{Total Contribution} - \text{Total Fixed Costs} \\ = 3,67,000 - 3,00,000 = 67,000$$

Situation II : After the change:

$$(i) \text{ Contribution ratio for ceiling fans:} \\ = \frac{720 - 480}{720} \times 20\% = 0.167$$

$$(ii) \text{ Contribution ratio for pedestal fans:} \\ = \frac{1200 - 720}{1200} \times 20\% = 0.08$$

$$(iii) \text{ Contribution ratio for the fancy model fans:} \\ = \frac{1700 - 900}{1700} \times 30\% = 0.141$$

The contribution ratio for the entire product line would be = $0.167 + 0.08 + 0.141 = 0.388$

$$\text{Total Contribution} = 10,40,000 \times 0.388 = 4,03,520.$$

$$\therefore \text{ Profit} = 4,03,520 - 3,00,000 = 1,03,520.$$

By comparing the results of situation II i.e., after the change with that situation I i.e., before the change, we can come to the conclusion that the management decides to drop heat convectors from the existing line of products and add fancy model fans as the company stands to gain in the form.

7. Make or Buy Decision : In addition to the above discussed situation, a situation may also arise where the management of a firm is faced with the problem whether to make a product/component or to buy. The question whether to make or buy a product is to be appreciated and analysed in terms of the economies associated with it i.e., costs and revenues associated with each one of the two propositions. This question however, is relevant only in the context of an option available to it. Break even analysis certainly

help to resolve such a conflict. The usefulness of BEP in such a situation is illustrated hereunder -

A manufacturer Television sets buys a particular component of his product at Rs.20 each. In case he makes it himself in his factory the Fixed and Variable Costs would be Rs.40,000 and Rs.10 per unit respectively.

The manufacturer proceeds to decide whether to manufacture it himself or buy it from the market depending on the results that emerge from the following exercise.

$$\begin{aligned} \text{BEP} &= \frac{\text{Fixed Cost}}{\text{Purchase Price} - \text{Variable Cost}} \\ &= \frac{40,000}{20 - 10} = 4,000 \text{ units.} \end{aligned}$$

This only means that it is beneficial for the manufacture to make the component himself only when his requirement of that component exceeds 4,000 units only then he will be breaking-even between loss or profit. Otherwise it is advisable for him to buy it at Rs.20 each from the market.

The above decision is correct subject however to conditions such as regular supply, adequacy, market situation in terms of competition and so on.

8. Choosing Promotion-mix: Sellers use several modes of advertising e.g., personal selling, advertising and the like. However, the shares of various modes vary from seller to seller. A retail shop may have to consider whether or not to employ a certain number, say, five additional salesmen or a manufacturer may have to decide if he should spend an additional sum of Rs.20,000 on advertising his product. Break-even analysis helps him to take appropriate decisions by showing how these additional fixed costs would influence the breakeven points and decide about the best promotion-mix policy.

9. Improving Profit Performance: There are four specific ways in which profit performance of business can be improved:

- a) Increasing the volume of sales
- b) Increasing the selling price
- c) Reducing the variable expenses per unit
- d) Reducing the fixed cost.

Check your progress 3

Discuss the uses of break-even analysis

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9.6 LIMITATIONS OF BREAK-EVEN ANALYSIS

The concept of Break-even or C.V.P. analysis is a simple and useful concept. But it is based on certain assumptions which have been discussed earlier. These assumptions limit the utility and general applicability of the break-even analysis and make it unrealistic. Therefore, the analysis should recognise these limitations and adjust the data, wherever possible, to get meaningful results. The cost-volume-profit analysis suffers from the following limitations.

1. Fixed and Variable Costs: All costs may be classified into fixed and variable elements. In actual practice it may be difficult to split perfectly all costs into

their fixed and variable components. Some costs can be grouped under semi variable/semi fixed category too.

2. **Constant Fixed Costs:** Fixed costs remain the same in total for all levels of activity within a certain range. In practice, fixed costs go up in a progressive manner as activity increases.
3. **Constant Variable Cost per unit :** This assumption also does not stand to reason. Variable costs per unit may fluctuate because of overtime working, reductions in the price of materials when quantity discounts are negotiated, or because of an increase in the price of materials when demand outstrips supply. The efficiency of production or a change in production method has also an effect on variable costs.
4. **Constant selling price:** Selling prices are constant at all levels of sales. This assumption is highly fallacious. A high level of sales may only be achieved by offering substantial discounts.
5. **Common activity base:** Since both sales and costs are being measured on the same graph, activity must represent both production and sales. In other words, stock levels do not change. This assumption is perhaps the most unrealistic, particularly in the short term.
6. **Constant product mix:** A cost-volume-profit graph may be drawn for either a single product firm, or a firm which sells its several products at a constant ratio. Thus break-even analysis will not serve any useful purpose if there are changes in the mix of products.
7. **CVP assumes that profits are a function of output ignoring the patent fact that they are also equally affected by other factors such as technological change, quality of management etc.,**

Break-even analysis, inspite of the above discussed limitations is a device- simple, easy to understand and inexpensive and hence quite useful to management.

Check you progress 4

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9.7 SUMMARY

Cost Volume Profit (CVP) analysis provides the broad framework within which the effect of changes in the volume of production on the profit may be examined.

Break even analysis is an important part of CVP analysis. However the former is acorollary to the latter. Break even analysis is very useful in determining margin of safety, the sales volume required to earn a desired profit, the effect of price changes on profit, changes in costs on profit, effect of changes in capacity on profits etc. However in order to be an effective managerial tool, BEP has to overcome some of its limitations.

9.8 FURTHER READINGS

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UNIT 10 FINANCIAL FORECASTING

Objectives

After studying this unit, you will be able to:

- appreciate the need for financial forecast
- understand the importance of financial forecast
- prepare the Cash Budget, Income Statement and Balance Sheet proforma

Structure

- 10.1 Introduction
- 10.2 Uses of financial forecasting
- 10.3 Forecasting sales
 - 10.3.1 Subjective method
 - 10.3.2 Trend forecast
 - 10.3.3 Causal model
 - 10.3.4 Variations in approach
- 10.4 Selection of proper time period
- 10.5 Cash planning tools
 - 10.5.1 Net cash forecast
 - 10.5.2 Cash budget
 - 10.5.3 Uses of the cash budget
- 10.6 Forecasting Balance Sheet and Income Statement
- 10.7 Interrelationship of projected statements
- 10.8 Preparing Proforma Income Statement
 - 10.8.1 Per cent of Sales Method
 - 10.8.2 Budgeted Expenses Method
- 10.9 Preparing the Proforma Balance Sheet
- 10.10 Common Size Balance Sheet
- 10.11 Assessing overall financial forecasts
- 10.12 Sustainable growth without external financing
- 10.13 Summary
- 10.14 Key words
- 10.15 Self-assessment questions
- 10.16 Further readings

10.1 INTRODUCTION

Financial forecasting is a very important component of the total planning process in an enterprise. Capital plays a very crucial role in the conduct of operations, growth and progress of an enterprise and it is very scarce. The cost of capital has also been showing a steadily increasing trend over the years. It is, therefore, essential to ensure all care in utilisation of capital and deploy it productively and economically. Cost and availability of funds are factors of considerable significance in determining business growth rates. And in the process of planning the requirement of funds and their effective allocation and utilisation in business, good financial forecasting is a necessary prerequisite. In the course of the conduct of business, particularly in the case of the large and complex business organisations, unanticipated financial emergencies will often arise, as a consequence of a wide range of internal and external factors, and financial forecasts prove very useful on such occasions in drawing up prompt contingency plans of action to get over the emergencies. A well formulated financial forecast should

therefore be recognised as an essential ingredient of any business plan.

10.2 USES OF FINANCIAL FORECASTING

Financial forecasting is found useful for smooth functioning of business in several ways.

- i. It helps the organisation in avoiding day-to-day crisis. Where substantial funds have to be raised from external sources, it is necessary to decide on the magnitude of the requirements, identify the sources and take advance action to negotiate with the concerned sources or institutions. These funds, by way of loans, debentures or new equity, cannot be obtained at short notice. There are formalities and procedures to be followed and there is need to plan ahead providing for the lead time for obtaining the funds. Similarly, during certain periods when the firm finds itself in surplus funds, the prompt and remunerative investment of these funds will depend on the advance planning that had been done to identify and organise proper avenues for investment during the concerned periods. A formal exercise that will provide the understanding as to when funds are required and as to when they will be in surplus is very essential for optimal procurement and allocation of resources.
- ii. Lack of preparation to meet emergencies can be much more expensive than efforts to anticipate events and trends and prepare plans to meet them. If funds are readily available at all time at low costs, forecasting could be considered as an avoidable, expensive exercise but in the context of paucity of funds and their high costs, forecasting has substantial benefits.
- iii. Financial forecasting enables planning for optimal tax strategy. Decisions on capital investments during periods of high profits will result in lower taxes on profits as tax incentives by way of initial depreciation or other allowances can be availed. There are some expenses which are not very essential but desirable and discretionary, which can be shifted to periods of high profits.
- iv. A firm's budget provides the operating plan and has its emphasis on what would happen if the management functions efficiently and in accordance with the pre-determined targets and norms. Financial forecasting, as an essential ingredient of the budget, will indicate the pattern of flow of funds through the enterprise, if the budget is effectively implemented.
- v. Anticipation and probability assumptions have become very necessary to deal with the uncertainties faced by present day business. To be forewarned is to be forearmed. Financial forecasting helps in meeting exigencies as it would have anticipated events to the best extent possible and considered alternative courses of action to deal with emerging situations.

10.3 FORECASTING SALES

In most cases, the processes of financial forecasts start with sales forecast. The accuracy and reliability of sales estimates determine the production and various operational aspects of the enterprise which are necessary inputs for dependable financial forecasts. The marketing function of the enterprise normally prepares the sales forecast with due care.

In forecasting sales, one of three possible approaches can be adopted.

- i. Subjective method
- ii. Trend forecasts
- iii. Causal model

10.3.1 Subjective method

In this method, estimation of sales is based on the individual's past experience and understanding of the prevailing conditions and prospects of the economy and industry.

These estimates are subjective and are difficult to defend. But in many instances these have been found to be reliable, particularly when they are based on detailed group discussions and are the outcome of the group consensus, representing collective wisdom or the weighted average of the cross section of individual judgements. There are also some gifted individual analysis.

10.3.2 Trend Forecasts

Trend forecasts present a more rational or scientific approach to forecasting sales. These are also known as time series analysis. The method involves simple extrapolation of past trends. The underlying assumption is that the trends observed in the past are indicative of the expected trends for the future and can therefore be taken as the basis for estimating the future. Necessary refinements can then be effected to these estimates, including adjustments for seasonal or cyclical variations in the historical data relating to past performance and the anticipations for the future. Normally greater weightage is given to the observed trends in the immediate past than for the distant past. This being a simple extrapolation exercise in projecting sales, it is bound to be less than optimal in predicting sudden changes in volume of business and sales.

10.3.3 Causal model

In this approach, the attempt is to identify the underlying determinants of sale in a formal statistical model. The forecast is based on an examination of a variety of numerical relationships from the past to formulate a causal model. Causal models are more effective in predicting turning points in sales or major changes in volume of business arising from influences of external factors.

The technique of regression analysis is a handy mathematical procedure that relates one variable, such as sales, to one or more other variables, such as Gross National Product, house construction activity, vehicle population etc. It is a powerful tool that permits the forecaster to measure the statistical impact of each independent variable on the dependent variable, sales. If there appears to be a significant correlation between the dependent variables, sales, and other variables, the regression model is useful in describing the size of the relationship and its predictive value. In order to formulate the equation that will reflect the relationships of the variables, it is necessary to use several years' data so that meaningful correlations can be identified. When more than one variable is being correlated with sales, the number of years of observations should be increased to make sure that the results have reasonable statistical significance.

Among the most common variable that get considered for such analysis are the Gross National Product(GNP), demographic data such as new households, unemployment or age distribution of population or the interest rates which have significant impact on sales of higher priced consumer or capital goods. In validating and interpreting the results, the tests are applied. 'Coefficient of determination' will indicate the proportion of variation in observed sales in prior years that is explained by the regression mode. 't-values' serve as measure of reliability of relationships of the individual variables with the dependent variables. 'Standard error of estimate' shows the degree to which the estimate is good predictor.

Activity 1

Explain the following approaches to sales forecasting

i. Subjective method

ii. Trend forecasts

iii. Causal method

10.3.4 Variations in approach

There can be several variations in each of the three above mentioned approaches to estimation of sales forecasts. For instance, in the subjective methods approach, the forecasts could be based on :

- i. Historical judgement with reference to similar circumstances
- ii. Market research
- iii. Consensus of a group or panel
- iv. A more formal panel consensus based on sequential questionnaires

The time series analysis approach may make use of the moving average or one of the more complex procedures such as Box-Jenkins or X-11 or the mechanical trend line.

The causal model approach may adopt simple regression analysis or econometric models involving simultaneous regression equations or a survey of customer intentions or a life cycle analysis.

10.4 SELECTION OF PROPER TIME PERIOD

It is necessary to make a proper selection of the time period for the forecast. Forecasts can be made monthly and aggregated for the year. In some instances, weekly or daily forecasts may be required as will be the case for effective cash management.

10.5 CASH PLANNING TOOLS

The purpose and policies of cash planning need to be expressed in clear cut forms or statements, outlining the process of receiving and using cash, over short intervals on the time scale. For an understanding of the ebbs and flows that are bound to be experienced during the short-run operating phases, the focus of planning and analysis will have to shift to short-run cash forecasts and cash budgets.

Many are the forms or devices adopted for forecasting or projecting short-run cash flows. The formats are matters of convenience to the individual company and the planner or analyst. But, in broad terms, two approaches can be mentioned. One assumes the form of 'net cash forecast', say, on a quarterly basis. These can be derived from the projected quarterly balance sheets, even as the funds flow statements are prepared from the annual balance sheets. Arising from an appreciation of the projected financial operations as revealed by the proforma balance sheets and cash forecasts, necessary action can be initiated to modify operational plans or to correct management failure with a view to preserving liquidity and promoting profitability.

Another approach is the preparation of the cash budget, which involves detailed estimate, for various intervals of times in the near future, of cash receipts from all sources, cash payment for all purposes and the resulting cash balances. The attention shifts from balance sheet changes or trends to the basic day-to-day transactions of purchases, sales, collections, payments and expenses. A carefully prepared cash budget reveals, for the finance manager, the timing and amount of expected cash inflows and outflows over the period or periods under scrutiny. With this information, he is better equipped to assess the future cash requirements of the company, make adequate arrangements for timely financing of those requirements and keep a grip over the cash and liquidity aspects.

Cash budgets, at monthly intervals, will prove handy to recognise the impact of seasonal fluctuations. But, where the experience indicates that the enterprise has consistent spells of relatively stable cash flows, cash budgets, at quarterly or longer intervals, may prove adequate. On the other hand, if the company's past tells a story of abrupt and volatile shifts in cash flows, cash budgets, at weekly or daily rests, will become necessary for immediate future periods. And, even here, where there are doubts about the reliability of predictions, the finance manager has to have a cash or liquidity cushion comprising of cash and marketable securities or a protection in both. Cash forecasts and budgets can have validity and utility only for the near future, not exceeding a year. But, whether they are prepared on a daily, weekly, fortnightly, monthly quarterly or any other convenient basis, it is essential that the related transactions are perceived in detail and recorded, thus enhancing the credibility and accuracy of the forecasts and budgets as planning and control tools.

10.5.1. Net cash forecasts

An exercise involving the preparation of proforma balance sheets and proforma net cash forecasts, for the ensuing quarterly periods, can have justification only if the intention is to direct the course and content of the future net cash flows, in the light of observed experiences of past of net cash flows. A simple illustration may serve to explain the potential uses of net cash forecast as a cash planning tool. Table 14.1 set out the proforma balance sheets and related changes for Random Company Ltd. covering its operations for the first quarter of the current year.

Table 10.2 presents a summary of estimated sources and uses of cash, based on information provided in Table 10.1

Assuming a need for raising the cash balance from Rs. 50,000 to Rs. 75,000 for meeting possible emergency needs in the second quarter, the proforma balance sheet and the net cash forecast particulars indicate how this liquidity goal is proposed to be attained in combination with a general pruning of investments in current assets facilitating the payment of long-term, short-term and suppliers' obligations.

Table 10.1

Proforma Balance Sheets of Random Company Limited

As at the 1st quarter	Beginning	Close	Increase/Decrease
	Rs.	Rs.	Rs.
ASSETS			
Current assets:			
Cash	50,000	75,000	25,000
Quoted investments	50,000		(50,000)
Sundry debtors	1,80,000	1,60,000	(20,000)
Inventories	1,50,000	1,00,000	(50,000)

Prepaid expenses	25,000	25,000	...
Fixed assets:			
Land	80,000	80,000	...
Plant and Buildings, net of depreciation (no additional investment)	3,20,000	2,80,000	(40,000)
Total assets	8,55,000	7,20,000	(1,35,000)
LIABILITIES AND CAPITAL			
Current liabilities:			
Sundry creditors	1,00,000	30,000	(70,000)
Short-term borrowings	1,50,000	90,000	(60,000)
Provisions and others	40,000	35,000	(5,000)
Long-term borrowings	2,10,000	2,00,000	(10,000)
Net worth, including paid up capital and reserves	3,55,000	3,65,000	10,000
Total liabilities & capital	8,55,000	7,20,000	(1,35,000)

If a closer examination shows that the approximate 10 per cent reduction in sundry debtors and 33 per cent reduction in inventories are over-ambitious planning objectives and are likely to impair operations and profitability, the finance manager can reconsider his plan for a drastic reduction in short-term borrowings and may choose to support the desirable higher levels of sundry debtors and inventories by permitting a corresponding higher level of short-term borrowings to remain as the end of the first quarter. Thus there is scope for reviewing and replanning.

Table 10.2

Forecast of Net Cash Sources and Uses - 1st Quarter

	Rs.
Estimated sources:	
Sales of quoted investments	50,000
Reduction in sundry debtors	20,000
Reduction in inventories	50,000
Depreciation	40,000
Net Profits	10,000
Total sources	1,70,000
Estimated uses :	
Reduction in sundry creditors	70,000
Reduction in short-term borrowings	60,000
Reduction in provisions	5,000
Repayment of long-term debts	10,000
Increase in cash balance	25,000
Total uses	1,70,000

10.5.2. Cash Budgets

For a company operating a good system of budgetary control, the preparation of a cash budget is a relatively smooth exercise. The several functional budgets that will be got ready, will normally provide details of the relevant monthly cash receipts or disbursements to be transferred to the cash budget. Certain particulars such as intended borrowing and loan repayments, issue of shares or debentures or payment of dividends will have to be separately determined and incorporated in the cash budget. It must, however, be noted that the operating budgets conceived in summary annual forms or even as average monthly plans will fall very much short of the care and discipline required for preparing short run cash budgets. Estimates of sales, collections, purchases, payments, outputs and related expenses have to be made in detail, with reliable data being available for weekly, monthly or other periods, covering all phases of operations.

Cash sales will have to be estimated separately from credit sales. The cash collections that are expected to flow from credit sales will then have to be set on a weekly or any other chosen interval, giving due consideration to anticipated customer rejections and returns, customer willingness to avail cash discounts and similar relevant factors. The payment habits of customers as observed from their past dealings have to be examined and promptly built into the estimated pattern of collections. New environmental developments, such as tight money conditions, may influence and change the paying habits of customers; such possibilities have to be assessed and reckoned in the workings. Receipts from miscellaneous sources other than regular sales will have to be estimated. These may include interest on short-term investments, dividends, rentals and commissions receivables, which normally can be estimated without difficulty.

Cash payments for raw materials, supplies and services involving cash purchases or payments to trade creditors have to be carefully estimated as to amount and timing. Some are prone to make a glib assumption that these payments have a close linkup with sales estimates but it rarely exists in practice. With clearly spelt out materials consumption, purchase and inventory budgets distinctly compiled as action-oriented plans, the estimation of cash outlays against purchase or settlement of dues to suppliers is not likely to pose much difficulty. The company practice or policy shifts regarding availing cash discount facilities and payment of advances against supplies will have to be anticipated to the extent possible, as these will influence the pattern of cash payments. Payments under and similar items will have to be estimated in detail and with care for the required time intervals. Possible implications of wage negotiations, if any, the trend in the cost of living index as a basic determinant of dearness allowance payment to employees, and likely enhancement of power rates or levies, interest and other service charges, have to be anticipated with as much clarity as possible. Fixed expenses such as executive salaries and property insurance can be easily and accurately determined. The degree of variability, of the other categories of expenses, to sales or production will have to be examined and the findings used as a reasonable basis for estimating the cash outlays relevant to them.

Difficulty is bound to be experienced in estimating semi-variable expenses, which show a disproportional pattern of variation in relation to the level of activity or the volume of sales. But, if the operational budgets have been carefully drawn up and if flexible budgetary control is in vogue, these difficulties will be minimal. Pre-payments and accruals are aspects that need careful consideration in forecasting cash outlays but these generally follow a set pattern and can be easily identified.

An illustration will be useful :

A firm has the practice of preparing cash budget for a six month period with monthly

intervals. You have the following information about its operations.

TABLE 10.3

	Rs. Lakhs					
	Months					
	1	2	3	4	5	6
Sales	80	100	120	120	120	80
Raw Materials & supplies (30 days' credit)	30	33	36	36	36	32
Direct labour	12	14	16	16	16	12
Manufacturing overheads	26	27	28	28	28	26
Administrative expenses	4	4	4	4	4	4
Distribution expenses	4	6	8	8	8	4

Also take note of the following financial flows during the period:

Inflows:

- Interest received in month 1 - Rs. 2 lakhs and in month 6 - Rs. 2 lakhs.
- Dividends received during months 3 and 6 are Rs. 4 lakhs each.
- Sale of shares in month 6 amounts to Rs. 320 lakhs.

Outflows:

- Interest paid during month 1 is Rs. 0.80 lakh.
- Dividends paid during months 1 and 4 are Rs. 4 lakhs each.
- Instalment payment on machine in month 6 is Rs. 40 lakhs.
- Repayment of loan in month 6 is Rs. 160 lakhs.

Assume that 10 per cent of each month's sales is for cash; the balance 90 per cent are on credit. The terms and credit experience of the firm are:

- No cash discount.
- 1 per cent of credit sales is returned by the customers.
- 1 per cent of total accounts receivable is bad debt.
- 50 per cent of all accounts that are going to pay do so within 30 days.
- 100 per cent of all accounts that are going to pay do so within 60 days.

Using the above information prepare a cash budget for the six months' horizon.

The cash budget for six months will appear as below:

TABLE 10.4

CASH BUDGET FOR SIX MONTHS

	(Rs.Lakhs)					
	Months					
	1	2	3	4	5	6
i. CASH INFLOWS:						
a. Cash sales (10% of total)	8.00	10.00	12.00	12.00	12.00	12.00
b. Receivables collection	-	35.28	79.39	97.02	105.85	105.85
c. Interest received	2.00	-	-	-	-	2.00

d. Dividends received	-	-	4.00	-	-	4.00
e. Sale of shares	-	-	-	-	-	320.00

Total (i)	10.00	45.28	95.39	109.02	117.85	443.85
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ii. CASH OUTFLOWS:

a. Raw materials and supplies	-	30.00	33.00	36.00	36.00	36.00
b. Labour	12.00	14.00	16.00	16.00	16.00	12.00
c. Manufacturing overheads	26.00	27.00	28.00	28.00	28.00	26.00
d. Administrative expenses	4.00	4.00	4.00	4.00	4.00	4.00
e. Distribution charges	4.00	6.00	8.00	8.00	8.00	4.00
f. Interest paid	0.80					
g. Dividends paid	4.00	-	-	4.00	-	-
h. Instalment of machine	-	-	-	-	-	40.00
i. Repayment of loan	-	-	-	-	-	160.00

Total (ii)	50.80	81.00	89.00	96.00	92.00	282.00
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iii. Net receipt or payment (i - ii)	(40.80)	(36.72)	6.39	13.02	25.85	161.85
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From the Table, we observe that the firm will need temporary financing from outside sources during first two months, which it will be able to repay in subsequent months. there will be some excess cash in month 6, for which short term investment opportunity will have to be found.

Since a variety of assumptions in respect of quantities, costs and prices would have entered into the planning process, it would be worthwhile to examine the impact of certain changes in these assumptions or external market conditions. This is done through sensitivity analysis which is a process of asking 'what if' in respect of the assumption variables. As an outcome of sensitivity analysis, three-time estimates could emerge

- i. Most likely : This will be the base case, which is most probable expectation
- ii. Worst case : the outcome of pessimistic assumptions
- iii. Best case : the outcome of very optimistic assumptions

Activity 2

Describe.

i. Net cash forecasts

ii. Cash budget

10.5.3 Uses of the cash Budget

The primary use of cash budget is to estimate funds requirements and also determine surplus cash balances at different periods under a variety of circumstances. These insights will facilitate the formulation of appropriate action plans and financial strategies. The following are among the decision areas in which cash budgeting will enable advance planning.

- i. Timing the declaration and payment of dividends. It is likely that in some instances the cash budget reveal situations where resources will not be adequate to pay dividends.
- ii. Selecting short term and/or long term sources of funds and negotiating loan repayment terms.
- iii. Evaluating cash effects of various accounts receivable policies and deciding on offer of cash discounts etc.
- iv. Planning and modifying capital expenditure policy.
- v. Timing short term investments, particularly marketable security investments.

10.6 FORECASTING BALANCE SHEETS AND INCOME STATEMENTS

On completion of Cash Budget, projected financial statements can be prepared. The Proforma Balance Sheets and Income Statements will then be used for reviewing and deciding on a range of decisions, which could cover

- i. Estimate profit(or loss) for the period concerned.
- ii. Test alternative strategies and their financial effects on reported results
- iii. Make estimates of assets requirements.
- iv. Make estimates of financing requirements in terms of equity, or debt, long term or short term.
- v. Predict financial bottlenecks and formulate appropriate plans.

10.7 INTERRELATIONSHIP OF PROJECTED STATEMENTS

Since forecast Balance Sheet and Income Statements are mutually dependent, the process may be somewhat circular, Circularity is attributable to the fact that it is necessary to know the expected profits for the period before estimating the amount of borrowed funds that will be needed and, in turn, the profit estimated will be influenced by the interest payable on the estimated borrowings. If the incremental financial requirements are not much, the interest aspect can be ignored on the pleas

that it will not materially affect the results. But if it is sizeable, the calculations have to be made.

It will be advisable to start with the income statement. Where the interest charges are significant, which can be judged by inspection, the income statement can be reformulated after the Balance Sheet has been partially estimated and a closer estimation of interest payable can be incorporated. Or else a set of simultaneous equations may bring the Balance Sheet and Income Statement into alignment.

10.8 PREPARING PROFORMA INCOME STATEMENT

There could be two approaches for estimating the expenses in the projected Income Statement.

- i. Percent of Sales Method
- ii. Budgeted Expense Method

10.8.1 Percent of sales method

This is a simple method, where the historical expense ratios are applied to the forecast sales. The average of ratios for the past three or five years could be adopted.

10.8.2 Budgeted expense method

Where major shifts in volume and product mix of sales are expected and the future expenses are expected to deviate substantially from historical expenses, the more appropriate approach will be to prepare the detailed budgets for the expense items.

10.9 PREPARING THE PROFORMA BALANCE SHEET

The Projected Balance Sheet will incorporate the effect of the Projected Income Statement on Equity and the effect of the cash budget on the cash position. It will reflect the financial condition of the firm as a result of the anticipated financial performance.

It should also be ensured that the three statements, the Cash Budget, the Income Statement and the Balance Sheet are consistent and reconcile with each other.

The Proforma Balance Sheet can be used to assess the financial feasibility of the plan. Where the pattern of growth in liabilities as projected appear to be imprudent, appropriate modified plans can be drawn up, which may include:

- i. New equity financing
- ii. Postponement of capital expenditure
- iii. Reduced dividend commitment
- iv. Increase in prices to improve profits and increase retained earnings.

10.10 COMMON SIZE BALANCE SHEET

The common size Balance Sheet is a financial forecasting tool that serves to identify some of the trends that will take place under the proposed plan. Significant items such as the level of debt, assets and equity, when portrayed in percentage terms over the forecast period, will serve to make necessary corrections or changes in the plan, so that what emerges is a feasible financial plan.

10.11 ASSESSING OVERALL FINANCIAL FORECAST

One of the most frequent uses of the financial forecast is the assessment of the feasibility of the plans for growth. Since access to external sources of funds cannot be taken for granted, there has to be considerable emphasis on internal generation of funds. In

order to focus attention on this aspect of selfreliance, the concept of 'sustainable' or feasible growth is developed as a financial forecasting tool.

10.12 SUSTAINABLE GROWTH WITHOUT EXTERNAL FINANCING

A few basic financial ratios can be regarded as the key components of overall financial results. Each of these can be viewed as the control lever in the guidance system of the firm and suitable strategies can be evolved in order to improve each of these select ratios. Each of these ratios can be considered as prime variable and the relevant strategy variables identified, as illustrated below.

Prime variable	Strategy variables
A. Profit/Sales (operating profit margin margin after tax/sales)	Pricing strategy Labour expenses Interest charges General overheads Depreciation Taxes (Price increase and expense reduction can help improve profits)
B. Sales/Assets	Cash level Book Debts level Inventory level; Raw Materials Work in progress Finished Goods Level of Fixed Assets Level of other Assets (by increasing sales for the given level of investment is assets or reducing investment in assets for given sales, profits can be improved)
C. Assets/Equity	Short term borrowing Long term borrowing (right balance between debt and equity has to be maintained)
D. Earnings Retained/Profits	Dividend Policy (Dividend policy could be so adopted as to retain maximum possible earnings)

Any or suitable combinations of above strategies will have to be planned and adopted for improving the growth potential of the enterprise. The forecasts will reflect the specific courses of action contemplated to achieve this goal.

10.13 SUMMARY

Good financial forecasting is among the prerequisites to the conduct of successful

business. It helps in avoiding day to day crisis in management due to cash crunch or other unanticipated exigencies and also proves useful for tax planning. Forecasting sales could be by subjective method, or through trend forecasts or with the help of a formal causal mode. Cash planning tools that could be adopted include Net Cash Forecasts and Cash Budgets. The forecasts could be further refined or modified using sensitivity analysis which involves a process of asking 'what if' with regard to the impact of certain changes in the planning assumptions or in expected market conditions. The three important statements in financial forecasting, Cash Budget, Projected Income Statement and Projected Balance Sheet have to be reviewed for consistency and they have to reconcile with each other. The preparation of the forecasts and the review of the assumptions therein in the process of their finalisation will assist in the preparation of feasible future plans for the enterprise.

10.14 KEY WORDS

Subjective method of forecasting sales	Estimation of sales based on the past experience of the individual and his understanding of the expected trends in the future.
Trend forecast	Extrapolation of past trends on the assumption that they are indicative of the expected trends for the future.
Causal model	A statistical model for forecasting sales on the basis of identification of determinants of sale.
Regression analysis	A statistical technique which relates one variable, such as sales, to one or more other variables such as Gross National Product, house construction activity etc., to facilitate forecasting of sales.

10.15 SELF-ASSESSMENT QUESTIONS

- Discuss the importance and uses of financial forecasting for an enterprise.
- Explain the methods commonly used for forecasting sales.
- What are the cash planning tools available for forecasting the financial position of a company. Explain their significance and uses.
- The three statements, the Cash Budget, the Projected Income statement and the Projected Balance Sheet should be consistent and should reconcile with each other. Explain.

BLOCK 4 CAPITAL STRUCTURE DECISIONS

This block comprises of three units. Unit 11 Capital Structure Theories, begins with a description of the term capital structure with reference to basic types of capital and then pinpoints the linkages of capital structure with financial risk, business risk and share value. It highlights important factors to be considered for determining the capital structure and explains in-detail the EBIT-EPS approach to evaluate alternative capital structures. A summary of the Modigliani-Miller position vis-a-vis traditional position regarding the ceaseless debate on the relevancy-irrelevancy of capital structure decision is also given in this unit.

Unit 12 Cost of capital and capital structure, explains the underlying risk assumptions, the role of corporate taxes and key factors affecting firm's cost of capital. It discusses the basic concepts of cost of capital and illustrates the computation of cost of specific sources of long-term finance viz. long-term debt, preference shares, equity shares and retained earnings and the overall cost of capital of the firm. It also pinpoints the uses of cost of capital in capital structure decision of the firm.

Dividend decision is the theme of the unit 13 the third and last unit of Block 4. It begins by explaining the nature of dividend decision, which is essentially a financing decision. It then discusses factors which affect the dividend decision of a firm. These factors, inter-alia, are: legal; contractual and internal constraints, profitability of the firm's investment opportunities, shareholders and market considerations and the cost of external financing. Diverse dividend policies followed by Indian firms are also discussed. The essence of the debate regarding the relevancy and irrelevancy of dividend decision to the maximisation of shareholders wealth is also presented in this unit. The unit 13 concludes with a brief description of the residual dividend policy and mention of shares, giving of gifts, or discount coupons to buy firm's merchandise.

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UNIT 11 CAPITAL STRUCTURE THEORIES

Objectives

After you have gone through this unit, you should be able to:

- Define capital structure with reference to the basic types of capital
- Analyse the effect of capital structure on financial risk, when business risk is assumed constant
- Apply EBIT-EPS approach to evaluate alternative capital structures
- Pinpoint the linkages of the capital structure, risk and value and describe other important factors to be considered when determining the capital structure.

Structure

- 11.1 Introduction
- 11.2 Optimal Capital Structure: Traditional Position
- 11.3 Risk and Capital Structure
- 11.4 EBIT-EPS Analysis for Capital Structure
 - 11.4.1 EBIT-EPS Approach to Capital Structure—A Graphical Analysis
- 11.5 Modigliani-Miller Analysis of Tax Factor
- 11.6 Choosing the Optimal Capital Structure—An Example
- 11.7 Other Considerations
- 11.8 Relevance of Debt Equity Ratio in Public Enterprises
- 11.9 Summary
- 11.10 Self-assessment Questions/Exercises
- 11.11 Further Readings

11.1 INTRODUCTION

Planning the capital structure is one of the most complex areas of financial decision-making because of the inter-relationships among components of the capital structure and also its relationship to risk, return and value of the firm. The term "capital" denotes the long-term funds of the firm.

Two basic classes of capital are debt capital and equity capital. Equity capital comprise equity share capital and retained earnings. Preference share capital is yet another distinguishing components of capital. Let us recapitulate the characteristics of each of these.

Debt capital consists of the long-term funds obtained by borrowing. When a business firm raises money by borrowing, it promises to repay the principal plus interest. These principal and interest payments are spelt out in the debt agreement, which stipulates conditions regarding the repayment. The discussion of the cost of various types of capital, to be discussed in detail in unit 8, will show that the cost of debt is less than that of equity capital because the holders of debt instruments or creditors take less risk than providers of equity funds to the company. *Firstly*, the creditors have a higher priority of claim against any earnings or assets available for payment; *secondly*, as per conditions included in the debt agreement regarding mortgage etc., they can exert greater legal pressure on the company to make repayments than equity or preference shareholders would be able to do. *Thirdly*, the interest payments are tax-deductible expenses. Hence the after tax or effective cost of debt comes down considerably.

Equity includes the long-term funds provided by the shareholders who are the firm's owners. Borrowed funds should be repayed within a specified limit of time. The equity capital is expected to remain for the life of the firm.

The three basic components of owners' capital are preference shares, equity (or ordinary) shares and retained earnings. Many financial analysts and managers tend to think of preference shares as a substitute of debt, as the amount of dividend to be paid is fixed. The difference is that the preference dividend unlike debt interest is not a tax-deductible expense. It does not have a fixed maturity date. Preference

shareholders have a prior claim to receive income from the firm's earnings through dividends. Convertible debentures have the features of both debt and equity capital.

The main focus in the discussion that follows is on deciding the mix of debt and equity which a firm should employ in order to maximise shareholders wealth. Because of its secondary position relative to debt, suppliers of equity capital take greater risk and therefore must be compensated with higher expected returns. The distinguishing characteristics of Debt, Preference share capital, Equity share capital and Retained Earnings are summarised in Table 7.1.

Table 7.1: Characteristics of Long-term Sources of Funds

Debt	Preference share capital	Equity share capital	Retained Earnings
1) Firm must pay back money with interest.	1) Similar to debt in that preference dividends are limited in amount to rate specified in the agreement.	1) Money is raised by selling ownership rights	1) Lowers amount of money for current dividends but can increase future dividends.
2) Interest rate is based on risk of principal and interest payments as perceived by lenders.	2) Dividends are not legally required, but equity dividends are not paid unless preference dividends are paid; also, usually cumulative and passing dividend for a stated number of years may give preference shareholders voting rights.	2) Value of the share is determined by investors.	2) Shareholders forgo dividend income but they do not lose ownership rights, if new equity shares are issued.
3) Amount of money to be repaid is specified by debt contract.	3) No maturity but usually callable.	3) Dividends are not contractually payable. No maturity.	3) Funds are internal no need for external involvement.
4) Lenders can take action to get their money back.	4) Usually no voting rights except as per (2) above.	4) Voting rights can create change in ownership.	4) Cost of issuing securities is avoided.
5) Lenders get preferred treatment in liquidation.	5) Preference shareholders come next, when lenders are paid in liquidation.	5) Equity shareholders get the residual assets prorata after lenders and preference shareholders claims are met in liquidation.	—
6) Interest payments are tax-deductible.	6) Preference Dividends are not tax-deductible.	6) Equity dividends are not tax-deductible.	—

11.2 OPTIMAL CAPITAL STRUCTURE: TRADITIONAL POSITION

The theory of capital structure is related to the firm's cost of capital. The debate regarding the capital structure has been around the issue whether an 'optimal' capital structure exists. This debate began in late 1950's and is yet unresolved. Those who assert that an 'optimal' capital structure exists are known to take a traditional view, while the supporters of what is called M-M approach (named after Modigliani and Miller, who advocated this approach) maintain that the 'optimal' capital structure does not exist.

What is an optimal capital structure? In the traditional approach to the capital structure, the value of the firm is maximised, when the cost of capital is minimised. Using the simple zero growth valuation model for determining the value of the firm,

$$V = \frac{EBIT}{K_0}$$

Where, V = Value of the firm
EBIT = Earnings Before Interest and Taxes,
Ko = Weighted average cost of capital.

If the earnings before Interest and Taxes are constant, the value of the firm is maximised by minimising the weighted average cost of capital or overall cost of capital of the firm. We shall dwell on this concept of weighted average cost of capital in unit 8. We may however state that maximisation of value of the firm (V) is achieved when weighted average cost of capital, Ko, is at a minimum, and that specific mix of capital at which the weighted average cost of capital is minimised and value of the firm maximised is called optimal capital structure.

The basic relationship between overall cost of capital and value of the firm may be stated as: The lower the firm's overall or weighted average cost of capital, the higher the returns to the shareholders. For a given capital budget of the firm, lesser the costs of required funds or the greater the difference between the return of a project and the cost of required funds, greater the profits from the project. Reinvesting these increased profits will increase the firm's future earnings and therefore its value.

Activity 1

- 1) List out two basic sources of long-term finance used by Indian Companies.

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.....
.....
.....

- 2) Define optimal capital structure.

.....
.....
.....
.....

- 3) 'Maximisation of value of the firm is achieved when overall cost of capital of the firm is minimum'. Do you agree? Give one reason.

.....
.....
.....
.....

11.3 RISK AND CAPITAL STRUCTURE

A firm's capital structure should be developed with the consideration of risk, because the risk affects the value of the firm. Risk can be considered in two ways:

- The capital structure should be consistent with the business risk of the firm, and
- The capital structure results in a certain level of financial risk to the firm.

Thus, on one hand, the business risk determines the capital structure decision of the firm, while on the other hand, the capital structure decision gives rise to certain financial risk.

Business risk is the relationship between the firm's sales and its earnings before interest and taxes (EBIT). In general, the greater the firm's operating leverage i.e. the use of fixed operating costs—the higher is the business risk. In addition to **operating leverage**, **revenue stability** and **cost stability** also affect the business risk of the firm. The revenue stability means the variability of the firm's sales revenues, which

depends on the demand and the price of the firm's products. Cost stability refers to the relative predictability of input prices such as labour and material. The more predictable these prices, the less the business risk. Business risk varies among firms. Whatever their lines of business, the business risk is not affected by capital structure decisions. In fact, capital structure decisions should depend on the business risk. Firms with high business risks, tend to have less levered capital structure i.e. they tend to have less fixed operating costs. Let us take an example to illustrate the implications of business risk for capital structure decision.

Example

Krishna Cosmetics Ltd., in the process of planning its capital structure, has obtained estimates of sales and associated levels of EBIT. The sales forecasting group feels that there is a 25 per cent chance that sales will be Rs. 4,00,000, a 50 per cent chance that sales will be Rs. 6,00,000 and 25 per cent chance that sales will total Rs. 8,00,000. These data are summarised in Table 7.2.

Table 7.2: Estimated Sales and Associated levels of EBIT

Probability of Sales	0.25	0.50	0.25
	(Rs. in '000)		
Sales	400	600	800
—Variable operating costs (50% of sales)	200	300	400
—Fixed operating costs	200	200	200
Earnings before interest and taxes (EBIT)	0	100	200

The EBIT data, i.e. Rs. 0, 100 or 200 thousands at probability levels of 25%, 50% and 25% respectively reflect the business risk of the firm and has to be taken into consideration when designing a capital structure.

The firm's capital structure affects the firm's financial risk which results from the firm's use of financial leverage, which is indicated by the relationship between earnings before interest and taxes (EBIT) and earnings per share (EPS). The more fixed cost financing, i.e. debt and preference capital in the firm's capital structure, the greater is the financial risk. Suppliers of funds will raise the cost of funds if the financial risk increases. Let us take an example to illustrate this point.

Krishna Cosmetics Ltd. is now considering seven alternative capital structures. Stated in terms of debt ratio (i.e. percentage of debt in the total capital) these are 0, 10, 20, 30, 40, 50, and 60 per cent. Assume that (1) the firm has no current liabilities, (2) that its capital structure currently contains all equity (25,000 equity shares are outstanding at Rs. 20 par value), and (3) the total amount of capital remains constant at Rs. 5,00,000.

Table 7.3: Capital Structures Associated with Alternative Debt Ratios

Debt Ratio %	Total Assets (Rs. '000)	Debt (Rs. '000)	Equity (Rs. '000)	Equity Shares Outstanding (Numbers '000) (4 ÷ Rs. 20)
1	2	3	4 = 2 - 3	
0	500	0	500	25.00
10	500	50	450	22.50
20	500	100	400	20.00
30	500	150	350	17.50
40	500	200	300	15.00
50	500	250	250	12.50
60	500	300	200	10.00

As debt increases, the interest rate also increases with the increase in financial leverage (i.e. debt ratios). Hence the total interest on all debt also increases (as successive debenture issues carry higher interest rates) as shown in Table 7.4

Table 7.4: Interest Amount at various levels of Debt

Capital structure %	Debt (Rs. '000) (1)	Interest rate on all debt % (2)	Interest amount (Rs. '000) (3=1×2)
0	0	0.0	0.00
10	50	9.0	4.50
20	100	9.5	9.50
30	150	10.0	15.00
40	200	11.0	22.00
50	250	13.5	33.75
60	300	16.5	49.50

11.4 EBIT-EPS ANALYSIS FOR CAPITAL STRUCTURE

Using the levels of earnings before interest and taxes (EBIT) in table 7.2, number of equity shares in the column 5 of Table 7.3 and interest values calculated in Table 7.4, the calculation of earnings per share (EPS) for debt ratios of 0, 30, and 60 per cent respectively is shown in Table 7.5. The effective tax rate is assumed to be 40 per cent.

Table 7.5: Calculation of EPS for alternative Debt ratios

Probability	in Rs.'000		
	0.25	0.50	0.25
When Debt ratio = 0%			
EBIT (Table 7.2)	0.00	100.00	200.00
Less Interest (Table 7.4)	0.00	0.00	0.00
Earnings before taxes	0.00	100.00	200.00
Less Taxes (0.40)	0.00	40.00	80.00
Earnings after taxes	0.00	60.00	120.00
EPS (25,000 shares (Table 7.3))	Rs. 0.00	Rs. 2.40	Rs. 4.80
When Debt ratio = 30%			
EBIT	0.00	100.00	200.00
Less Interest	15.00	15.00	15.00
Earnings before taxes	(15.00)	85.00	185.00
Less Taxes (0.40)	(6.00) (a)	34.00	74.00
Earnings after taxes	(9.00)	51.00	111.00
EPS (17,500 shares)	Rs. (0.51)	Rs. 2.91	Rs. 6.34
When Debt ratio = 60%			
EBIT	0.00	100.00	200.00
Less Interest	49.50	49.50	49.50
Earnings before taxes	(49.50)	50.50	150.50
Less Taxes (0.40)	(19.80) (a)	20.20	60.20
Earnings after taxes	(29.70)	30.30	90.30
EPS (10,000 shares)	Rs. 2.97	Rs. 3.03	Rs. 9.03

Notes: a) It is assumed that the firm receives the tax benefit from its loss in the current period, as a result of carrying forward and setting off the loss against profits in the following periods.

Following the same procedure as in Table 7.5 we may obtain EPS for other debt ratios. Table 7.6 gives expected EPS at 50% probability level (to be viewed as typical level) for seven alternative debt ratios alongwith the Standard deviation and co-efficient of variation of expected EPS.

Table 7.6: Expected EPS, Standard deviation and Co-efficient of variation of EPS at 50% probability level for alternative debt ratios

Capital structure debt ratio (%)	Expected EPS (Rs.) (1)	Standard deviation of EPS (Rs.) (2)	Co-efficient of variation (2) ÷ (1) = (3)
0	2.40	1.70	0.71
10	2.55	1.88	0.74
20	2.72	2.13	0.78
30	2.91	2.42	0.83
40	3.12	2.83	0.91
50	3.18	3.39	1.07
60	3.03	4.24	1.40

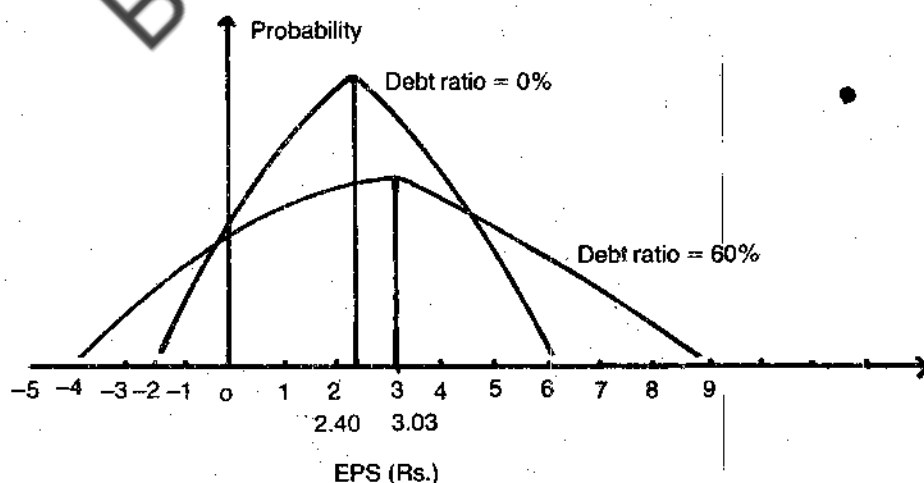
Note: The standard deviation (σ) represent the square root of the sum of the product of each deviation from the mean or expected value squared and the associated probability of occurrence of each outcome. This is the most common statistical measure of assets risk.

The co-efficient of variation is calculated by dividing the standard deviation (σ) for an asset by its mean or expected value. The higher the co-efficient of variation, the riskier is the asset.

Table 7.6 shows that as the firm's financial leverage increases, its co-efficient of variation of EPS also increases, signifying that the higher level of risk is associated with higher levels of financial leverage.

The relative risk of the two of the capital structures at debt ratios = 0% and 60% respectively is illustrated in Figure 7.1 by showing the subjective probability distribution of EPS associated with each of them. As the expected level of EPS increases with increasing financial leverage the risk also increases which is reflected in the relative dispersion of each of the distributions. As the higher levels of financial leverage are employed, the uncertainty of the expected EPS increases. There are chances that there will be negative EPS depending on the probabilities of occurrence of the expected results.

Figure 7.1: A Graphic Presentation of Probability Distribution of EPS at Alternative Debt Ratios.



11.4.1 EBIT-EPS Approach to Capital Structure—A Graphical Analysis

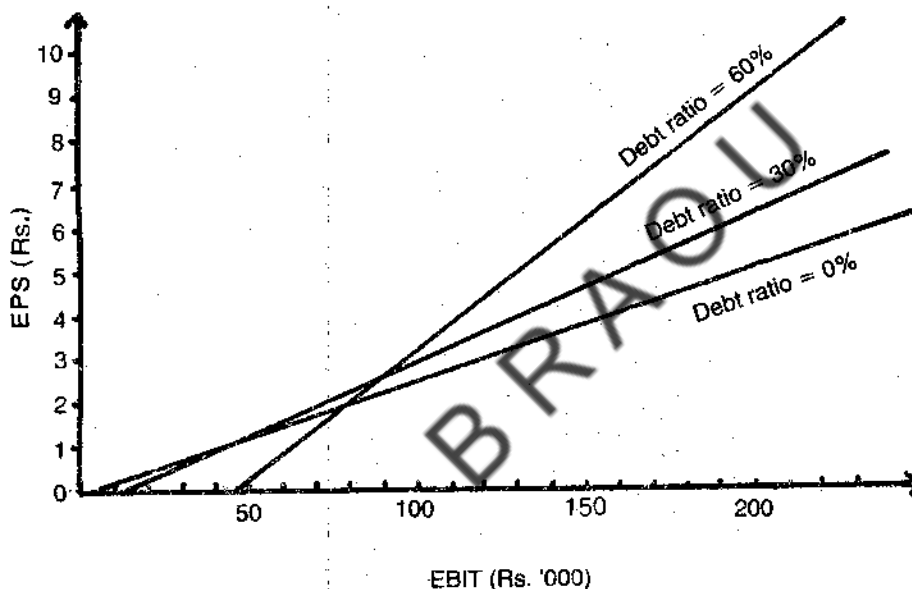
The EBIT-EPS analysis helps in choosing the capital structure which maximises EPS over the expected range of EBIT. As EBIT is one of the major factors which affects the market value of the firm's shares, EPS can be as well used to measure the effect of various capital structure on shareholders' wealth. The relationship between EBIT and EPS of the firm to analyse the effect of capital structure on returns to the shareholders has been graphically shown in Figure 7.2 where data from Table 7.7 are used.

Table 7.7: EBIT-EPS Co-ordinates for Krishna Cosmetics Ltd. Selected Capital Structures

Capital Structure Debt ratio (%)	EBIT	
	Rs. 1,00,000	Rs. 2,00,000
	Earnings per share (EPS)	
	Rs.	Rs.
0	2.40	4.80
30	2.91	6.34
60	3.03	9.03

Expected earnings before interest and taxes are assumed to be constant because only the effect of financing costs such as interest and preference dividends on equity shareholders' earnings is to be analysed. Thus the business risk is assumed constant.

Figure 7.2: A graphic comparison of selected capital structures for Krishna Cosmetics Ltd.



Graphically, the risk of each capital structure can be seen in the context of the financial break even point. (i.e. EBIT-axis intercept). Below the x-axis, negative EPS would result. The higher the financial break even point and the steeper the slope of the capital structure line, the greater the financial risk.

The assessment of the capital structure can also be made by using ratios. With increased financial leverage, the ability of the firm to service its debt decreases. Thus the Times Earned Interest Ratio (i.e. EBIT divided by interest) can be used for this purpose. The Debt-Equity ratio also measures firm's financial leverage and associated risk.

Activity 2

- 1) 'Leverage decision is the same as capital structure decision'. Do you agree? Give one reason.

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- 2) Distinguish between EBIT and EPS.

11.5 MODIGLIANI-MILLER ANALYSIS OF TAX FACTOR

Modigliani and Miller (M-M) have analysed the impact of corporate taxes. They found that the debt provides a benefit to the firm because of the tax deductibility of interest payments.

The results of the MM analysis are:

- 1) The only benefit of debt financing (relative to equity financing) is the reduction in corporate income taxes due to the tax deductibility of debt interest.
- 2) There is no disadvantage of debt financing relative to equity financing.

The implications of MM analysis is that if a firm is not paying corporate income taxes, then the financing decision (and consequently choosing of the optimal capital structure) is irrelevant. It does not matter whether debt is used or not. A company paying income taxes should use debt as it is superior to all other financing sources.

However, MM model assumes away many factors that imply that an optimal capital structure, with a certain blend of debt and equity exists. For example, MM assumes that there are no costs if debt repayments are defaulted or the company goes bankrupt. They assume that if investors want higher return, they can use "homemade leverage" by borrowing to finance their investment in shares rather than depending on the firm to do the borrowing. They maintain that the personal taxes are neutral between debt and equity.

The MM hypothesis is criticised because of the unreality of the assumptions. Corporate leverage and individual 'homemade leverage' are two different things. An individual will lose all his assets if he goes bankrupt, while he will lose only his investment if the corporation goes bankrupt.

Thus the MM hypothesis gives only a partial explanation of empirically observed financing behaviour of firms. Thus it is difficult to measure the impact of leverage on the firm's value. Capital structures differ across the industries and it is found that within an industry, the firms have similar capital structures. This may be because of the tendency of "follow the leader" or the technological requirements, or the influence of financial institutions which dictate industry-wise debt-equity ratios. Thus the question of the optimal capital structure remains still unresolved.

11.6 CHOOSING THE OPTIMAL CAPITAL STRUCTURE—AN EXAMPLE

To choose optimal capital structure, the risk associated with each capital structure should be linked to the required rate of return which the market demands. The firm must determine the level of returns which would compensate the investors for the risk being incurred. As the risk increases, the required rate of return also increases. The required rates of return can be estimated in a variety of ways as will be explained in unit 8.

Example

Krishna Cosmetics Ltd. has estimated the following required rates of return (Column (3) of the Table 7.8). Table 7.8 also gives the seven capital structures from the debt ratios ranging from 0% to 60% and expected EPS in Rs. (from Table 7.6).

From these data, it is possible to work out the expected share values in each of the alternative capital structures. Calculations are given in Column 4 of the Table 7.8.

Table 7.8: Calculation of Share value Estimates Associated with Alternative Capital Structures for Krishna Cosmetics Ltd.

Capital Structure Debt ratio (%)	Expected EPS (Rs.) (from Table 7.6)	Estimated required rate of return (Estimated by the Co.)	Estimated Share value Rs. (2) ÷ (3)
(1)	(2)	(3)	(4)
0	2.40	0.115	20.87
10	2.55	0.117	21.79
20	2.72	0.121	22.48
30	2.91	0.125	23.28
40	3.12	0.140	22.29
50	3.18	0.165	19.27
60	3.03	0.190	15.95

Table 7.8 shows that the maximum share value occurs at the capital structure associated with the debt ratio of 30%. This is the optimal capital structure. It is seen that EPS is maximised at 50% debt ratio, while the share value is maximised at 30% debt ratio. This discrepancy arises because EPS maximisation approach does not consider the risk as reflected in required rates of return.

11.7 OTHER CONSIDERATIONS

In addition to the quantitative analysis of the financial leverage, EBIT-EPS, required rates of returns and share value, certain other factors are also taken into account in determining the capital structure for the firm. These are listed below:

- Adequacy of cash flow to service debt and preference shares
- Having stable and predictable revenues
- Limitations imposed by previous contractual obligations
- Management preferences and attitudes towards risk
- Assessment of the firm's risk by financial institution and other agencies
- Capital market conditions and investor preferences
- Considerations of corporate control.

Activity 3

- 1) In what manner are the corporate taxes relevant to capital structure decision?

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- 2) Contrast traditional and M-M position regarding optimal capital structure.

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- 3) Name the single most important factor which determines the capital structure of a company.

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- 4) Try to know from the Finance Manager of any two companies:
 - i) What is their present capital structure?
 - ii) What are the factors which determine their capital structure?
 - iii) Do they intend to change their capital structure in the near future? Why?

1.8 RELEVANCE OF DEBT-EQUITY RATIO IN PUBLIC ENTERPRISES

One of the measures of the make-up of capital structure is, of course, the Debt-Equity ratio (leverage or gearing). It has been argued that the practical significance of the debt-equity ratio is limited in the case of public enterprises in many countries because most of the loans are derived from the government itself or from public sector financial institutions. The government as the owner as well as the lender, has access to all the information it needs about the financial health of the enterprise and does not need to refer to any favourable ratio to derive confidence before making loans to it. Even when the public enterprises are allowed to borrow from private banks or from foreign financial institutions, there is a government guarantee in one form or another that the loans will not be repudiated and that the enterprise's financial embarrassments, if any, will be removed and lightened by adoption of an appropriate policy measure. Since all this has, the effect of making institutional arrangements for sharing risk and thus reducing the disadvantages of debt, a case could be made for justifying higher debt-equity ratios for public enterprises.

But since not all of the public enterprises are wholly owned and financed (through loans) by government and there are many joint ventures, so that institutional arrangements for diluting risks are not always available to these enterprises, it has to be appreciated that in real life, public enterprises have to face the bias of the lending agencies (local or foreign) towards this measure of the strength of their capital structure. Much as their parent ministries would like to proceed with a particular investment, for political or other reasons, in most of the countries they have to approach other ministries e.g. planning and finance, for a critical scrutiny and appraisal of their proposals. In any case, the government owned financial institutions can and should be expected to raise points about the risk of further lending to an enterprise, the debt-equity ratio of whose capital structure is not in line with the normal or which does not appear to be quite sound in context of its financial prospects. Many of the worthwhile plans of investment in public enterprises, whether for replacement and rehabilitation of existing assets or for expansion and diversification, require significant amounts of foreign exchange. If this resource is arranged from foreign lending agencies like the World Bank/IDA, the creditors make it a point to specify adherence to a range of "healthy" debt-equity ratios (and also to a conservative dividend disbursement policy) till their loans are repaid. It is also desirable from the enterprise's own point of view to see that a sufficiently high proportion of equity is maintained in its capital structure because it should enable it some freedom of action in the matter of retaining its earnings for its "self-financed" projects or for financing a part of its working capital, provided, of course, that it is in the happy position of making profits. In the case of other enterprises which operate at a loss (whether because of government imposed pricing policies or because of their inefficiencies) there is usually a demand for converting at least a part of their loan capital into equity capital. When such proposals are being formulated and examined, the question of a reasonable or proper debt-equity ratio for the type of enterprises under consideration is raised sooner or later.

Another point to be kept in view is that with an inappropriately high debt-equity ratio, the initial cost of a project/manufacturing facility put up by a public enterprise has the effect of increasing the fixed costs of operation through the capitalisation of interest during construction. This is likely to place the enterprise in a disadvantageous

position vis-a-vis its competitors and can lead to a vicious cycle of accumulation of losses, under utilisation of capacity, low morale of workers and management inefficiencies, short-term (and strategically unsuitable) solutions and further losses. Having once been trapped in this situation, it is difficult indeed for the enterprise to extricate itself and rehabilitate its capital structure, particularly when the Government departments ministries are not very prompt in analysing the causes of these problems and providing the requisite reliefs.

There cannot be much argument with the proposition that, in long run, the equity portion of a public enterprise must not be regarded as a device of cash convenience and as a no-cost input, because it certainly has an opportunity cost for the economy as a whole. Public enterprises have, as a general rule, to operate under pricing and operating policies dictated by their owner governments' socio-economic (and political) objectives debt-equity ratio is one device by which the enterprise can be considered to have been compensated for its expenses/losses on meeting these additional obligations. If a certain range of debt-equity ratios is adopted for enterprises in a particular sector of the economy, it can result in fixing a concessional rate of interest/return on the capital mix (loan at market rate plus equity at zero per cent).

We may thus conclude that the view that the practical significance of the debt-equity ratio is limited in the case of public enterprises is not based on a complete appreciation of all the factors in which these enterprises have to operate in many developing countries. While the private sector analogy in this respect may have to be qualified suitably when applied to the public enterprise situation in a particular country, it will remain a useful indicator, both with the administrative ministers and with the enterprise managements, to assess the strength of their capital structures.

11.9 SUMMARY

Leverage is the use of fixed-cost assets or sources of funds (e.g. debt or preference shares) to increase the returns to the equity shareholders.

Financial leverage is the ability of the firm to use fixed financial costs to enhance the effects of changes in earnings before interest and taxes on earnings per share. The higher the interest and preference dividends, which are fixed costs, the greater is the financial leverage.

A firm's capital structure is determined by the mix of long-term debt and equity it uses in financing its operations.

The basic differences in debt (including preference shares) and equity capital are related to the voting rights, the claims on income and assets, and the tax treatment.

The traditional approach to capital structure indicates that the optimal capital structure for the firm is one in which the overall cost of capital is minimised and the share value is maximised.

The cost of debt increases beyond a certain level of leverage.

A firm's capital structure should be consistent with its business risk and result in an acceptable financial risk.

The EBIT-EPS analysis can be used to evaluate various capital structures in the light of the degree of financial risk and the returns to the equity shareholders. The EBIT-EPS analysis shows how the desirable capital structure gives the maximum EPS.

However, the optimal capital structure, which is selected from among alternative capital structures, links the return and risk should result in the highest estimated share value and not just EPS (profits).

Certain qualitative considerations such as cash flow corporate control, contractual obligations, management's risk tolerance, etc. are taken into consideration in determining the capital structure.

The MM analysis suggests that the optimal capital structure does not matter and that as much debt as possible should be used, because the interest is tax-deductible. The MM hypothesis is attacked because of its unreal assumptions.

11.10 SELF-ASSESSMENT QUESTIONS/EXERCISES

- 1) What is financial leverage? What is a firm's capital structure?
- 2) Under the traditional approach to capital structure, what happens to the cost of debt and cost of equity as the firm's financial leverage increases?
- 3) Define business and financial risks.
- 4) Explain the EBIT-EPS approach to the capital structure. Do maximising value and maximising EPS are the same?
- 5) Khosla Ltd. had made the following forecast of sales, with the associated probability of occurrence.

Sales Rs.	Probability
2,00,000	0.20
3,00,000	0.60
4,00,000	0.20

The company has fixed operating costs of Rs. 1,00,000 per year and variable operating costs represent 40% of sales. The existing capital structure consists of 25,000 equity shares of Rs. 10 each. The market place has assigned the following discount rates to risky earnings per share.

Coefficient of variation of EPS	Estimated Required Returns %
.43	15
.47	16
.51	17
.56	18
.60	22
.64	24

The company is considering changing its capital structure by increasing debt in the capital structure vis-a-vis equity capital. Different debt ratios are considered, given here with the estimate of the required interest rate on all debt.

Debt Ratio	Interest on all debt
20%	10%
40%	12%
60%	14%

The tax rate is 40% per cent.

- a) Calculate the expected earnings per share, the standard deviation of EPS and the co-efficient of variation of EPS for the three proposed capital structures.
- b) Determine the optimal capital structure, assuming (i) maximisation of EPS and (ii) maximisation of share value
- c) Construct a graph showing relationship in (b)

11.11 FURTHER READINGS

- Dani, Hemant R. 1973, *Balance Sheets and How To Read Them*, Hemant R. Dani. Bombay.
- Gitman Lawrence J. 1985, *Principles of Managerial Finance* Fourth Edition. Haper & Row Publishers, Singapore, New York.
- Schall Lawrence D & Haley Charles W. 1986, *Introduction to Financial Management* Fourth (International student) edition, Mc-Graw Hill Book Co., New York.

BRAOU

UNIT 12 COST OF CAPITAL AND CAPITAL STRUCTURE

Objectives

The objectives of this unit are to:

- explain the underlying risk assumptions, the role of taxes, and the key factors affecting firm's cost of capital,
- discuss the basic concepts of cost capital
- illustrate the computation of cost of specific sources of long-term finance viz. long term debt and debentures, preference shares, equity shares, and retained earnings
- discuss and illustrate the various weighting approaches and the weighted average cost of capital (WACC)
- highlight the uses of cost of capital

Structure

- 12.1 Introduction
- 12.2 Risk and Cost of Capital
- 12.3 Concepts of Cost of Capital
- 12.4 The Cost of Specific Sources of Funds
- 12.5 Cost of Long-term Debt
- 12.6 Cost of Preference Capital
- 12.7 Cost of Equity Capital
- 12.8 Cost of Retained Earnings
- 12.9 Choice of Weights
- 12.10 Calculating the Weighted Average Cost of Capital: An example
- 12.11 Summary
- 12.12 Self-assessment Questions/Exercises
- 12.13 Further Readings

12.1 INTRODUCTION

A company's cost of capital is the average rate of return required by investors on the company's securities. This average rate is often used by the company as the minimum acceptable rate of return for new investments being considered by the firm. If a project's Internal Rate of Return is greater than or equal to the company's cost of capital, the project is considered acceptable. The cost of capital is an important financial concept. It links the company's long-term decisions with the wealth of the shareholders as determined in the market place.

Two basic conditions must be fulfilled so that the company's cost of capital can be used to evaluate new investments:

- 1) The new investments being considered have the same risks as the typical or average investment undertaken by the firm
- 2) The financing policy of the firm is not affected by the investment that are being made.

12.2 RISK AND COST OF CAPITAL

The two types of risk may be considered: **Business Risk** and **Financial Risk**. Both of these, according to the assumption of the traditional cost of capital analysis are unaffected by the acceptance and financing of projects.

The response of firm's Earnings Before Interest and Taxes (EBIT) or operating profits to changes in sales indicates business risk. If this degree of responsiveness of EBIT to change in sales is the same for new projects as for the earlier ones, the business risk of the firm does not change. However, if the firm accepts a new project which is considerably riskier than the average ones, the suppliers of funds, (debt or equity) will increase the cost of these funds to compensate themselves for the increased risk. The firm's cost of capital will also increase thereby. Hence, for analysing firm's cost of capital, the business risk is assumed to be unchanged.

The response of the firm's Earnings Per Share (EPS) to changes in Earnings Before Interest and Taxes indicates the degree of the financial risk of the firm. The financial risk is affected by the capital structure (i.e. the mix of long term sources of funds viz. debt, equity etc.). By increasing the proportion of debt, preference shares, leases, the firm will increase its financial risk, as these are fixed cost sources and reduction in EBIT can affect EPS. Financing costs will also increase as the suppliers of equity capital will expect higher return to compensate for the increase risk. Hence to analyse the cost of capital, the firm's financial risk is assumed to be unaffected, i.e. the proportion of various types of funds in future is supposed to be the same as the one in the existing capital structure.

Activity 1

1) Define the following:

i) Overall cost of capital

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ii) Cost of specific sources of Capital

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2) List three uses of cost of Capital.

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12.3 CONCEPTS OF COST OF CAPITAL

The cost of capital is used in capital expenditure decisions to justify expenditures having long term impact. Thus, as the firm estimates the initial investment and cash flows of a capital expenditure, it must also estimate its cost of capital. The firm will have a target capital structure though it raises money in lumps, sometimes issuing debentures, sometimes equity shares. The firms tend towards some desired mix of financing to maximise shareholders wealth. Hence one should look at the **overall cost of capital** rather than the cost of a specific source of finance. The following example will explain the concept.

Example

A firm is considering the following investment opportunity:

Project A

Initial Cost = Rs. 1,00,000

Life = 20 years

I.R.R. = 12%

Cost of the least-cost financing source available i.e. Debt = 11%

Since the firm can earn 12% on the investment of funds costing 11%, the firm invests in the Project A.

After a couple of months, there is an opportunity to invest in the Project B.

Project B

Initial Cost = Rs. 1,00,000

Life = 20 years

I.R.R. = 16%

Cost of Equity = 18%

In this example, the firm would reject the project B, as the 18% financing cost is greater than 16% return expected.

The above action of the firm were not in the best interest of its shareholders. It has accepted a project yielding 12% return and rejected the project likely to give 16% return. Because financing decisions are intermingled, the firm must use a combined cost which over the long run would provide a better yardstick for decisions. Assuming a 50-50 mix of debt and equity, the weighted average cost would be $(11\% \times .50) + (18\% \times .50) = 14.5\%$. By using this yardstick, the firm would have rejected the project A and accepted the project B.

Thus, a company's cost of capital is the weighted average of the costs of the various sources of long-term funds employed. Assume that a firm has used debt with 10 per cent cost and equity shares with 15 per cent cost. Assuming the proportion of debt to equity is 60:40, then the cost of capital, K_o , is as follows:

Firm's cost of capital = debt proportion $\times$ the cost of debt + equity proportion $\times$ the cost of equity

$$\begin{aligned} \text{i.e. } K_o &= 0.60 \times 10\% + 0.40 \times 15\% \\ &= 6\% + 6\% \\ &= 12\% \end{aligned}$$

The weighted average cost of capital can also be used as minimum acceptable rate of return. Let us illustrate.

Assume a firm is considering an investment such as purchasing new machinery worth Rs. 1 crore which will be financed by a debenture issue of Rs. 40 lakhs and the equity share issue of Rs. 60 lakhs. The after tax interest cost of debentures is 5 per cent and the equity shareholders require an expected return of 15 per cent on their investment of Rs. 60 lakhs. The cash returns from the investment are expected to be at the same level forever. All of them are paid out in interest and dividend. How large must the annual cash flow be to justify an investment of Rs. 1 crore.

The first condition is that the cash flow from the investment should cover at least the interest payable on debt and to give satisfactory return to shareholders.

$$\begin{aligned} \text{Minimum acceptable cash flow} &= \text{Interest cost} + \text{Minimum dividends} \\ &= \text{Interest rate} \times \text{debenture issue} \\ &\quad + \text{expected dividend rate} \times \text{equity share issue} \\ &= 5\% \times \text{Rs. 40 lakhs} + 15\% \times \text{Rs. 60 lakhs} \\ &= \text{Rs. 11 lakhs} \end{aligned}$$

The minimum acceptable rate of return on this investment is the minimum acceptable cash flow divided by the amount of investment.

$$\text{i.e. } \frac{\text{Rs. 11 lakhs}}{\text{Rs. 100 lakhs}} = 11\%$$

$$\text{or } \frac{\text{Rs. 2 lakhs} + \text{Rs. 9 lakhs}}{\text{Rs. 100 lakhs}} = 11\%$$

$$\text{or } \frac{5\% \times \text{Rs. 40}}{\text{Rs. 100}} + \frac{15\% \times \text{Rs. 60}}{\text{Rs. 100}} = 11\%$$

$$\text{or } 5\% (0.4) + 15\% (0.6) = 11\%$$

This can be expressed in a general formula.

If the firm uses different types of financing, each type with its own cost, K_j , and in proportion, P_j , then the firm's cost of capital, K_o , is:

$$K_o = P_1 K_1 + P_2 K_2 + \dots + P_n K_n$$

If the firm uses three types of financing (for example, debentures, preference shares and equity shares) with costs 5, 8 and 12 per cent and in proportions 30, 20 and 50 per cent, respectively, then

$$\begin{aligned} K_o &= P_1 K_1 + P_2 K_2 + P_3 K_3 \\ &= 0.30 (5\%) + 0.20 (8\%) + 0.50 (12\%) \\ &= 1.5\% + 1.6\% + 6\% \\ &= 9.1\% \end{aligned}$$

12.4 THE COST OF SPECIFIC SOURCES OF FUNDS

The cost of specific sources of funds are basic inputs for measuring the overall cost of capital of the firm.

There are four basic sources of long-term funds for a business firm: long-term debt and debentures, (including financial leases), preference capital, equity capital and retained earnings.

Though all of these sources may not be tapped by the firm for funding its activities, each firm will have some of these sources in its capital structure.

The specific cost of each source of funds is the after-tax cost of financing. It can be before-tax, provided the basis is the same for all the sources of finance being considered for calculating the cost of capital. The procedure for determining the costs of debt, preference and equity capital as well as retained earnings is discussed in the following sections:

12.5 COST OF LONG-TERM DEBT

The firm uses more than one type of debt. For example, there are several kinds of debentures viz. convertible, non-convertible that the firm may issue. The firm may also borrow from financial institutions. The interest and principal payment on a debenture issue may be subordinated to those taken from the financial institutions and other debt issues, so that the investors in a subordinated debenture get paid only after the others have been paid. Since these debentures are more risky than ordinary debentures, a higher interest rate will be expected on them. When there is more than one debt issue outstanding, the cost of debt is estimated by calculating the average cost.

Example

The Ravi Textiles Ltd. has issued two types of debentures. The following data are assumed:

	Convertible Deb.	Non-Convertible Deb.
Maturity value	Rs. 200 lakhs	Rs. 100 lakhs
Market value	Rs. 180 lakhs	Rs. 100 lakhs
Rate of interest	9%	11%
Yield to maturity	10%	11%

The average interest rate required by the debentureholders of the firm is calculated by using the market values of both kinds of debentures and their yields to maturity as follows:

Total market value of debentures (in lakhs) = Rs. 180 + Rs. 100 = Rs. 280

Average rate of Interest on debentures = $10\% \left(\frac{180}{280} \right) + 11\% \left(\frac{100}{280} \right)$
= 10.36%

(Note: Yield to maturity means the rate of return which equals the present value of interest amounts paid and the maturity value of the debentures to the current selling price).

The current market value and yields to maturity are used because these reflect current interest rate in the market.

Companies borrow from the financial institutions the amount which they require as debt. However, recently a number of companies have chosen to raise debt by sale of debentures. The net proceeds from the sale of debenture are the funds received from the sale after all the underwriting and brokerage fees have been paid. Sometimes the net proceeds from the sale of a debenture are greater than the debenture's par or face value. This is when the debenture is sold at a premium (i.e. more than its par value) in order to equate the actual interest yield with the yields prevailing in the market. Debentures sold at a discount (i.e. below par) have coupon (stated) interest rates

below the prevailing rates for similar-risk debt instruments. Selling debentures at a premium or at a discount equates the effective yield (i.e. yield to maturity) to the purchaser with yields of similar-risk debt instruments. Floatation costs (i.e. total cost of issuing and selling a security) reduce the net proceeds of a debenture.

The before-tax cost of debt can be found by determining the IRR (internal rate of return) which equates the present value of all the debt-related cash inflows with all the cash outflows. From the point of view of the company which issues the debentures, this value can be called "cost to maturity" of the cash flows associated with the debenture issue. (From the point of view of investors, who have bought the debentures, this is yield to maturity). The cost to maturity is the before-tax percentage cost of the debt to the company and is found by applying the standard discounted cash flow (or present value) methods. Let us take an example to illustrate this point.

The net proceeds to the Ravi Textiles of a Rs. 100, 9 per cent, 20 year debenture were found to be Rs. 96 (The company is selling the debenture at a discount of Rs. 2, i.e. at Rs. 98 per debenture to compensate for the 10% market interest rate. The floatation costs paid to the merchant bankers are Rs. 2 per debenture) The net proceeds to the company are Rs. 96 per debenture.

The cash flows to the company consist of an initial cash flow of Rs. 96 (the net proceeds), followed by a series of annual outlays. In the final year, when the debenture is redeemed (or retired) an outlay representing the repayment of the principal occurs. Thus:

End of Year(s)	Cash flow (Rs.)
0	96
1-20	(-) 9 per year
20	(-) 100

The before-tax cost of debt is determined by finding the discount factor which equates the present value of inflows with outflows. Applying the trial and error method, the internal rate of return is found to be 9.47 per cent which is the before-tax cost of the debt.

Income Tax Effects and After-Tax Cost of Debt

Effective cost of debt is lower than the interest paid to the creditors because the firm can deduct interest amount from its taxable income. The higher the tax rate, the lower the effective interest rate on debt and lower the cost of debt. Let us take an example.

There are two firms, A and B. The firm A has no debt and is totally financed by equity capital. The firm B has Rs. 200 lakhs outstanding debt and pays an interest rate of 10 per cent. The firm's net income after-taxes are calculated using three tax rates, 0, 25 and 50 per cent and the resulting values of net incomes are compared. Assume that the earnings before interest and taxes of both firms is Rs. 100 lakhs each.

Tax Rates and Effective Cost of Debt

	Rs. in lakhs					
	0% tax rate		25% tax rate		50% tax rate	
	Firm A	Firm B	Firm A	Firm B	Firm A	Firm B
1. Earnings before interest and taxes	100	100	100	100	100	100
2. Interest	0	20	0	20	0	20
3. Taxable income	100	80	100	80	100	80
4. Taxes	0	0	25	20	50	40
5. Net income after taxes (NIAT)	100	80	75	60	50	40
(a) Difference		20		15		10
(b) Effective rate		10%		7.5%		5%

Notes:

NIAT of firm A-NIAT of firm B.

(a) ÷ Rs. 200 lakhs of outstanding debt of firm B.

If no taxes were paid, the only difference between the net incomes of the two firms would be the interest expense incurred by the firm B. As the tax rate increases, this

difference diminishes. In the case of 0% tax rate, we can say that the effective rate of debt is 10% (Rs. 20/ Rs. 200 = 10%). In the case of 25% and 50% it is 7.5% and 5% respectively.

A simple formula computing the cost of debt may be stated as follows:

Effective cost of debt

$$= \text{Interest rate} \times (1.0 - \text{tax rates})$$

Substituting the data from the above example.

- 1) Effective cost of debt at 0% tax rate
 $= 10\% \times (1.0 - 0.00)$
 $= 10\%$
- 2) Effective cost of debt at 25% tax rate
 $= 10\% \times (1.0 - 0.25)$
 $= 7.5\%$
- 3) Effective cost of debt at 50% tax rate
 $= 10\% \times (1.0 - 0.50)$
 $= 5\%$

12.6 COST OF PREFERENCE CAPITAL

The Preference share represents a special type of ownership interest in the firm. Preference shareholders must receive their stated dividends prior to the distribution of any earnings to the equity shareholders. In this respect preference shares are very much like bonds or debentures with fixed interest payment. That is why in the stock-market parlance, the preference dividends are called "widows' income". Only pensioners and widows would invest their savings in preference shares for the assured income, though they have no voting rights and legal enforcement for getting return. The cost of preference shares can be estimated by dividing the preference dividend per share by the current price per share, as the dividend can be considered a continuous level payment.

$$\text{Cost of Preference Capital} = \frac{\text{Dividend}}{\text{Price}}$$

Example

Ravi Textiles is planning to issue 9% preference shares expected to sell at Rs. 85 par value. The costs of issuing and selling the shares are expected to be Rs. 3 per share.

The first step in finding out the cost of the preference capital is to determine the rupee amount of preference dividends, which are stated as 9% of the shares Rs. 85 par value. Thus 9% of Rs. 85 is Rs. 7.65. After deducting the floatation costs, the net proceeds are Rs. 82 per share.

Thus the cost of preference capital:

$$\begin{aligned} &= \frac{\text{Dividend per share}}{\text{Net proceeds after selling}} \\ &= \frac{\text{Rs. 7.65}}{\text{Rs. 82}} = 9.33\% \end{aligned}$$

Sometimes the firms have more than one issue of preference shares outstanding. In this case, the average current rate on all preference issues can be used, as was suggested in the case of debentures.

12.7 COST OF EQUITY CAPITAL

The cost of equity shares is more difficult to calculate than the cost of debt or the cost of preference shares. There are no fixed contractual payments for equity shares as there are for debentures and preference shares. The cost of an equity share is determined by the present value of all future dividends expected to be paid on that share. In the case of equity shares, it is difficult to determine the expected values.

Many firms do not pay dividends for long periods of time, either because they choose to finance their growth through retained earnings, or they are of profitable enough. Some methods for estimating the cost of equity shares in vogue are as follows.

Historical Rate of Return

This method depends on the rate of return actually earned by the shareholders. The most recent five to ten years are taken and the rate of return is calculated for the investor who purchased the shares at the beginning of the study period, held it to the present and sold it at the current prices. This is also called the **realised yield** by the investor. This yield is supposed to indicate the cost of equity share on the assumption that the investor earns what he expects to earn. The limiting factors to the usefulness of this method are the additional conditions that the investors expectation do not undergo change during the study period, no significant change in the level of dividend rates occurs, and the attitudes of the investors towards the risk remain the same. As these conditions are rarely fulfilled, the yield method has severe limitations. In addition, the yield often differs depending on the time period chosen.

Estimating Future Dividends

Under this method, the future dividend stream of a firm as expected by the investor are estimated. The current price of the share is used to determine shareholders' expected rate of return. Thus, if K_e is the risk-adjusted rate of return expected by investors, the present value of future dividends, discounted by K_e would be equal to the price of the share. Thus,

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_n}{(1+K_e)^n}$$

Where, P = price of the share

$D_1, \dots, D_n$ = dividends in periods 1, 2, 3, ..., n,

K_e = the risk adjusted rate of return expected by equity investors.

Given the current price p and values for future dividends ' D_t ', one can calculate K_e by using IRR procedure. If the firm has maintained some regular pattern of dividends in the past, it is not unreasonable to expect that the same pattern will prevail. If a firm is paying a dividend of 20% on a share with a par value of Rs. 10 as a level perpetual dividend, and its market price is Rs. 20, then

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

$$20 = \frac{2}{K_e}$$

$$\therefore K_e = \frac{2}{20} = 10\%$$

Constant Growth Valuation Model or Gordon Model

This method is based on the assumption that the value of a share is the present value of all anticipated dividends, which it will give over an infinite time horizon. The firm is here viewed as a going concern with an infinite life.

Thus:

$$P_0 = \frac{D_1}{K_e - g} \text{ or } K_e = \frac{D_1}{P_0} + g$$

Where, P_0 = the current price of the equity share

D_1 = the per share dividend expected at the end of year 1.

K_e = the risk adjusted rate of return expected on equity shares.

g = the constant annual rate of growth in dividends and earnings.

The derivation of the formula has been given in Appendix 8.1

The equation indicates that the cost of equity share can be found by dividing the dividend expected at the end of the year 1 by the current price of the share and adding the expected growth rate.

Example

Ravi Textiles Ltd. wishes to determine its cost of equity capital, K_e . The prevailing market price of the share is Rs. 50 per share. The firm expects to pay a dividend of

Rs. 4 at the end of the coming year 1990. The dividends paid on the equity shares over the past six years are as follows:

Year	Dividend Rs.
1989	3.80
1988	3.62
1987	3.47
1986	3.33
1985	3.12
1984	2.97

The firm maintained a fixed dividend payout ratio from 1980 onwards. The annual growth rate of dividends, g , is approximately 5 per cent. Substituting the data in the formula.

$$Rs. 50 = \frac{Rs. 4}{K_e - 0.05}$$

$$K_e = \frac{Rs. 4}{Rs. 50} + 0.05$$

$$= 0.08 + 0.05 = 13\%$$

The 13% cost of the equity share represents the return expected by existing shareholders on their investment so that they should not disinvest in the share of Ravi Textiles Ltd. and invest elsewhere.

Using the Security's Beta

The third method for estimating the cost of equity share, K_e , is based on the security's Beta value, which we have discussed in Block 3. However, let us recapitulate what the security's Beta is.

An investor is concerned with the risk of his entire portfolio, and that the relevant risk of a particular security is the effect that the security has on the entire portfolio. By "diversified portfolio" we mean that each investor's portfolio is representative of the market as a whole and that the portfolio Beta is 1.0. A security's Beta indicates how closely the security's returns move with the returns from a diversified portfolio. A beta of 1.0 for a given security means that, if the total value of securities in the market moves up by 10 per cent, the stock's price will also move up, on the average by 10 per cent. If security has a beta of 2.0, its price will, on the whole, rise or fall by 20 per cent when the market rises or falls by 10 per cent. A share with -0.5 per cent beta will rise by 10 per cent, when the market falls by 20 per cent.

A beta of any portfolio of securities is the weighted average of the betas of the securities, where the weights are the proportions of investments in each security. Adding a high beta (beta greater than 1.0) security to a diversified portfolio increases the portfolio's risk, and adding a low beta (beta less than zero) security to a diversified security reduces the portfolio's risk.

Thus Beta, when the investors are well-diversified, is an important indicator of risk and hence determines what people are willing to pay for the security.

How is beta determined? The beta co-efficient for a security (or asset) can be found by examining security's historical returns relative to the returns of the market. As it is not feasible to take all securities, a sample of securities is used. In United States such compilation of beta co-efficients is provided by companies such as Value Line or Merrill Lynch.

The Capital Asset Pricing Model (CAPM) uses these beta co-efficients to estimate the required rates of returns on the securities. The CAPM, specifies that the required rate of return on the share depends upon its beta. The relationship is:

$$K_e = \text{riskless rate} + \text{risk premium} \times \text{beta}$$

Where, K_e = expected rate of return

The current rate on government securities can be used as a riskless rate. The difference between the long-run average rate of returns between shares and

government securities may represent the risk premium. During 1926-1981, this was estimated in USA to be 6 per cent. Beta co-efficients are provided by the published data or can be independently estimated.

The beta for Pan Am's stock was estimated by Value Line to be 0.95 in 1984. Long-term government bond rates were about 12 per cent in November 1984. Thus the required rate of return on Pan Am's stock in November 1984 was—

$$\text{Required Rate} = 12\% + 6\% \times 0.95 = 17.7\%$$

The use of beta to measure the cost of equity capital is definitely a better approach. The major reason is that the method incorporates risk analysis, which other methods do not. However, its application remains limited perhaps because it is tedious to calculate Beta value. Nevertheless, as the competition intensifies and the availability of funds and their cost become a challenge, finance executives will need this or similar approaches.

12.8 COST OF RETAINED EARNINGS

The cost of retained earnings is closely related to the cost of the equity shares. If earnings were not retained, they would be paid out to the common shareholders as dividends. The cost of retained earnings thus is the opportunity cost of the foregone dividends to the existing shareholders.

Retained earnings can be seen as a fully subscribed issue of the equity capital. Thus the cost of retained earnings is the same as that of the equity share. It is not necessary to adjust this cost for floatation costs, etc.

12.9 CHOICE OF WEIGHTS

As stated under 8.3 the weighted average cost of capital is found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure.

The weights to be employed can be book values, market values, historic or target. Book value weights are based on the use of accounting values to assess the proportion of each type of capital in the firm's structure. Market value weights measure the proportion of each type of financing at its market value. Market value weights are preferred because they approximate the current value of various instruments of finance employed by the company.

Historic weights can be book or market weights based on actual data. Such weights however would represent actual rather than desired proportions of various types of capital in the capital structure. Target weights, which can also be based on book or market values, reflect the desired capital structure proportions. If the firm's historic capital structure is not much different from 'optimal' or desired capital structure, the cost of capital in both the cases is mostly similar. However, from a strictly theoretical point of view, the target market value weighting scheme should be preferred.

Activity 2

- 1) List out three methods of computing the cost of equity capital.

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- 2) List out three types of weights which may be used for computing weighted average cost of capital of the firm.

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12.10 CALCULATING THE WEIGHTED AVERAGE COST OF CAPITAL: AN EXAMPLE

Quality products is a consumer products company with well-established brand names. The cost of capital of quality products is estimated at the end of 1990 for use in evaluating investment proposals in 1991. The data for Quality Products Ltd. is as follows:

Financial data for Quality Products Ltd.			Rs. '000
Source	Book Value Rs.	Market Value Rs.	Current Interest rate %
Debentures (7½%)	45	29	13.2
Debentures (9½%)	50	42	13.2
Debentures (14%)	75	78	13.2
Other debt	210	192	13.2
Total debt	380	341	13.2
Preference shares (7%)	20	10	14.0
Equity shares	720	824	

	Equity share Data Years					
	1985	1986	1987	1988	1989	1990
Dividend per share	1.45	1.60	1.77	2.05	2.28	2.48
Earnings per share	2.97	3.73	4.21	4.83	4.86	4.95
Price per share	24					50

Explanatory notes

- Interest rates on the three debentures issues were set at the rate (13.2%) on the recently issued debentures of the firm which is selling close to par. This was considered to be the best estimate.
- Other debt includes different types of loans from financial institutions and other privately placed debentures.
- Market value is based on interest rates provided in the firm's annual report.
- Preference share is Rs. 100 par; current market price is Rs. 50 per share.

Since the firm's dividends and earnings have been growing steadily since 1985, the constant growth model can be used to estimate cost of equity. Though dividends have grown at a slightly higher rate than earnings, one may assume that shareholders would expect them to grow at the same rate as earnings (10.8%). Also assume, on the basis of the past record that the shareholders expect a dividend of Rs. 2.60 in 1991. Thus:

$$\begin{aligned}
 K_e &= \frac{D}{P} + g \\
 &= \frac{\text{Rs. 2.60}}{\text{Rs. 50}} + 0.108 \\
 &= 16\%
 \end{aligned}$$

If the investors expect the dividends to grow at the higher rate (11.3%), the cost of equity capital works out to 16.5%.

Applying the beta method, we obtain a somewhat higher number. Beta for Quality Products is assumed to be 0.85. Interest rate on government bonds (riskless rate) in 1990 would be say, 12 per cent. The market risk premium is 6%. Thus

$$\begin{aligned}
 K_e &= \text{Riskless rate} + \text{Risk premium} \times \text{beta} \\
 &= 12\% + 6\% \times 0.85 \\
 &= 17.1\%
 \end{aligned}$$

Thus, the cost of capital for Quality Products Ltd:

	Amount	Weight	Cost	Weight × cost
Debt	Rs. 341	0.29	7.1	2.1
Preference share	Rs. 10	0.01	14.0	.1
Equity shares	Rs. 824	0.70	17.0	11.9
Total	Rs. 1175	1.00	17.0	14.1

Weighted Average Cost of Capital: 14.1%

Explanation

- ▶ Market values of debt, preference and equity shares are used.
- ▶ Current interest rate on debt is adjusted for tax rate of 46 per cent, which is the firm's effective rate $13.2\% (1 - 0.46) = 7.1\%$.
- ▶ Current preference dividend rate of 14% is used.

Activity 3

- 1) Compute Beta value of equity shares of any one company listed on Indian stock exchanges and list out the problems you faced in this regard.

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- 2) Compute overall cost of capital of an Indian company of your choice. List out the steps you took for this purpose and the problems faced by you.

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- 3) Try to know from the Finance Manager of an Indian Company:
 - i) Do they compute the overall cost of capital of their Company?
 - ii) For what purpose?
 - iii) If not, why not?

12.11 SUMMARY

The cost of capital for a firm is mainly used to evaluate investment projects. It is the minimum acceptable rate of return on new investments. The basic factors underlying the cost of capital for a firm are the degree of risk associated with the firm, the taxes it must pay, and the supply of and demand of various types of financing.

In estimating the cost of capital, it is assumed that, (1) the firms are acquiring assets which do not change their business risk, and (2) these acquisitions are financed in such a way as to leave the financial risk unchanged. In order to estimate the cost of capital, we must estimate rates of return required by investors in the firm's securities, including borrowings, and average those rates according to the market values of the various securities currently outstanding.

While the cost of debt and preference capital is the contractual interest/dividend rate (adjusted for taxes), the cost of equity capital is difficult to estimate.

Broadly, there are three approaches to estimate the cost of equity, namely, the average historical rate of return earned by shareholders (realised yield), expected dividend yield on the share plus the estimated growth rate of dividends, and using the Beta co-efficient of the share, current government security rates, and the market risk premium, to estimate the cost of equity.

12.12 SELF-ASSESSMENT QUESTIONS/EXERCISES

- 1) Why is the cost of capital the minimum acceptable rate of return on an investment?
- 2) Why in using the cost of capital to evaluate investment projects? Is it necessary to assume that the acceptance of projects and the financing structure would not affect the business and financial risks?
- 3) You have just been told, "since we are going to finance this project with debt, its required rate of return should only be the cost of debt". Do you agree or disagree? Explain.
- 4) Which method of calculating the cost of equity shares would be most appropriate for the following firms:
 - a) A profitable firm that has never paid a dividend, but has had steady growth in earnings.
 - b) An electricity company that has paid a dividend every year for the last eighty years.
 - c) A firm that has grown very rapidly until two years ago, when capacity problems in the industry produced severe price cutting in the firm's major product line. At the same time management decided to invest heavily in facilities to manufacture a new product. So far, the manufacturing process has not worked properly. The firm lost Rs. 5 crores last year, and the price of its equity share has dropped by 20 per cent.
- 5) How would you find the cost of capital for proprietorship or partnership? Can you think of any ways to do this? List them.
- 6) Determine the cost of capital for the following securities. These are issued by different firms and the tax rate is 40 per cent.
 - a) A seven year debenture with a coupon interest of 10 per cent. The debenture matures in five years and has a current market price of Rs. 90 as against its par value of Rs. 100.
 - b) A preference share pays 7 per cent dividend. Par value is Rs. 100 per share and its current market price is Rs. 80.
 - c) The historical average rate of return earned by equity shareholders of the firm C has been about 17% per year until very recently. The dividends of the firm have grown at an average rate of 13% per year over the same period. The Financial Express and another financial fortnightly have issued a report indicating the problems of the firm with government's regulatory agencies and forecasted that dividends and earnings of the firm will grow at no more than the overall growth rate of the economy which is 5 per cent. The dividends are likely to be Rs. 5 per share. The price of the firm's share adversely reacted to the report dropping from Rs. 100 to Rs. 50.

12.13 FURTHER READINGS

- Gitman, Lawrence J. 1985, *Principles of Managerial Finance*, Harper and Row Publishers, Singapore, Fourth Edition.
- Schall, Lawrence D and Haley Charles W. 1986, *Introduction to Financial Management*, McGraw Hill Book Company, New York, London, New Delhi Fourth (International Students') Edition.
- Van Horne James W. *Financial Management and Policy*, Prentice Hall Inc. Englewood Cliffs, New Jersey.

Appendix 8.1

Assuming so the most recent dividend, and that g is the growth rate in dividend

$$0 = \frac{D_0(1+g)^1}{(1+K_e)^1} + \frac{D_0(1+g)^2}{(1+K_e)^2} + \frac{D_0(1+g)^\infty}{(1+K_e)^\infty} \dots (1)$$

Multiplying each side of the equation by $(1 + K_e)/(1+g)$ and subtracting the resulting equation from (1),

$$\therefore \frac{P_0(1+K_e)}{1+g} - P_0 = D_0 - \frac{D_0(1+g)^x}{(1+K_e)^x} \quad (2)$$

As K_e is assumed to be greater than g , the second term on the right hand side of (2) is Zero, Thus

$$\therefore P_0 \left(\frac{1+K_e}{1+g} - 1 \right) = D_0 \quad (3)$$

$$\therefore P_0(K_e - g) = D_0(1+g)$$

$$\therefore P_0 = \frac{D_0}{K_e - g} \quad (4)$$

BRAOU

UNIT 13 DIVIDEND DECISION

Objectives

The objectives of this unit are:

- to explain the nature of dividend decision and highlight factors affecting the dividend decision
- to discuss the objectives of dividend policy and the types of dividend policies generally followed by firms
- to discuss the residual theory of dividends and the arguments about whether the dividend policy matters at all.

Structure

- 13.1 Introduction
- 13.2 Nature of Dividend Decision
- 13.3 Dividend Payment Procedures
- 13.4 Factor affecting Dividend Decision
- 13.5 Objectives and types of Dividend Policies
- 13.6 Relevance or Irrelevance of the Dividend Policy—The Debate
- 13.7 Residual Dividend Policy
- 13.8 Alternatives to Cash Dividend
- 13.9 Summary
- 13.10 Self-Assessment Questions/Exercises
- 13.11 Further Readings

13.1 INTRODUCTION

A company can use its earnings to pay dividends to its shareholders or use the same funds for some other purpose. When the dividends are paid to the shareholders the firm's cash is reduced. If there is decrease in dividends, the firm's asset base is increased. A company may decrease its dividends and use the funds to expand its investment, to pay off some of its debt or to increase investment and retire debt. Thus the dividend policy is closely linked up with the firm's investment and capital structure policies.

In addition, the level of dividends is a key factor which leads shareholders and potential investors to determine the firm's share value in the market place. Thus it is necessary that the firm should establish and implement an effective dividend policy. This exercise is fraught with certain theoretical and practical difficulties. To understand the mechanics and importance of the dividend decision, one should understand how retained earnings act as a source of long-term funds for the firm and also understand the dividend payment procedures and certain theoretical viewpoints on the importance of dividend policy.

13.2 NATURE OF DIVIDEND DECISION

Retained earnings are a source of funds. By not paying dividends and retaining all the earnings, the firm need not raise that much amount of funds. Alternatively, some debt can be retired. Paying out dividends, on the other hand, results in the reduction of cash available to the firm. Thus, the dividend decision is essentially a financing decision.

13.3 DIVIDEND PAYMENT PROCEDURE

The Board of Directors of the company announces that a specified dividend will be paid to the shareholders, who will be on the company's record at some particular future date. In India, it is customary to announce the percentage (i.e. 20% or 24%) of the par value of the share rather than an absolute amount (i.e. Rs. 2 on a share of Rs. 10, etc). A shareholder on record on a given date is someone who is recorded on the company's books at the close of business on that date as the shareholders of the

company. For example, say, in the case of Indira Corporation Ltd., it is announced by the Board of Directors on 15th March 1990 that 24% dividend will be payable to the shareholders who are on the books of the company on 20th March, 1990. If the Indira Corporation was informed on or before 20th March, of a transfer of shares, the new shareholders would receive the dividend; if the Corporation were notified of the sale after 20th March, the old owner of shares would receive the dividend.

Because there can be delay of several days from the time a sale transaction takes place to the time the firm is informed of the transaction, if the shares are sold say on 17th March, 1990, the transfer would not be generally recorded on the company's books. Thus the practice of closing the books by the company means its register of members is closed, for a specified period, prior to the issue of dividends (or bonus shares, rights shares and debentures) to shareholders. During this period the company does not accept or register any share transfers. All claims for transfer of shares, duly supported by transfer deeds, are required to be lodged with the company before the date fixed for the closure of books. All claims received by the company after this date are rejected by the company. Claims for transfer of shares lodged with the company after reopening of books are required to be accompanied by fresh transfer deeds.

When the books of a company are to be closed for the payment of dividends, its share prices start being quoted at **ex-dividend** rates. This is normally indicated by suffixing the abbreviation "xd" after the price of the share. An investor who purchases any shares at the ex-dividend (xd) rate, is not eligible to receive the dividend for which the books are to be closed. In such cases, the delivery of the share certificate and the accompanying transfer deeds are generally made to the buyer only after the re-opening of the books of the company. On the other hand, the investor who buys a share at the cum-dividend rate (or "cd" in the abbreviated form) is entitled to the dividend for which the books are being closed. The stock exchange authorities normally fix the dates on which the shares are to be quoted at "cd" or "xd" rates.

Unlike in Western countries, where quarterly dividends are declared and paid, in India the dividends are announced once a year. The practice of paying the interim dividend along with the yearly dividends is also increasingly practised by many companies.

Activity 1

- 1) 'Dividend decision is an investment decision'. Do you agree? Give one reason.

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- 2) Distinguish between ex-dividend and cum-dividend share prices.

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13.4 FACTORS AFFECTING DIVIDEND DECISION

The factors affecting the firm's dividend decision are: legal, contractual and internal constraints, the profitability of the firm's investment opportunities shareholder cost considerations, and the market considerations. Let us elaborate.

Legal, contractual and internal constraints

The contract between the company and its creditors or between the company and its preference shareholders may include restraints on the firm's freedom to declare

dividends and other activities for the protection of lenders' or preference shareholders' investments. For example, term lending institutions, in sanctioning the loan to a new or sick company may restrict the amount of dividends (such as 6% or 10%) which could be paid by the company to its shareholders. This is to ensure the recovery of the loan as well as to prevent possible siphoning off the funds. Preference stock contracts which provide cumulative dividends to preference shareholders, stipulate that there will be no dividend payment to equity shareholders until current and all unpaid preference dividends have been paid.

In U S A, most state laws provide that dividends in the form of cash or property may not exceed retained earnings (accumulated profits) plus paid in surplus. That is, the firm may not pay dividends if the owner's equity (assets minus liabilities) is no greater than the outstanding stock's total par (or "legal") value. This requirement is imposed to ensure that the assets of the firm exceed liabilities by a minimum cushion in order to protect the lenders.

The firm's ability to pay dividends is generally limited by the amount of extra cash available. Of course a firm may borrow cash and then pay dividends. However in that case it is likely that the minimum dividends will be paid.

Profitability of the firm's investment opportunities

If there are other profitable investment opportunities, the firm is likely to pay low dividends and use the retained earnings for investment. Young, rapidly growing firms are known to pay no dividends. In addition, raising external funds, whether loans or equity, involve floatation costs, which can be avoided by financing investment opportunities by retained earnings. Even firms exhibiting little or no growth may periodically need funds to replace or renew assets and thus may prefer retained earnings to finance these activities.

Shareholder considerations

The primary objective of the dividend policy is to maximise the wealth of the majority of shareholders in the long run. Thus the three factors should be mainly considered; the tax status of the shareholders, the shareholders' investment opportunities and the dilution of ownership.

If a firm has a large percentage of wealthy shareholders who are in the high income-tax bracket, the firm may pay out a lower percentage of its earnings as dividends. The shareholders thus get most income by way of capital gains (when they sell the share). If the effective capital gain tax rate is considerably less than the ordinary tax rate, the tax liability of wealthy shareholders would be reduced. On the other hand, if the majority of the firm's shareholders are in the low income-tax bracket, they would prefer regular dividends to capital gains.

Ideally, a firm should not retain funds for investments, if it is likely to get lower returns than what the shareholders would get if they invest the same sum in external investment opportunities of equal risk. It is often suggested, that a low payout ratio is justifiable if the firm is likely to get higher returns than what the shareholders would earn in investments of equal risk and vice-versa.

If higher pay-out proportion of earnings is to be maintained for dividends, then the most common alternative source of financing to retained earnings is equity financing. Such a policy may involve dilution of ownership interests, which the existing shareholders may find unacceptable. The shareholders should be told by the management of the firm's motives for retaining a large percentage of earnings. Otherwise the discontent among shareholders may result in some shareholders selling their shares and a possible seizure of the firm by some outside group.

Costs of external financing and dividend payments

At times, the firms maintain a low payout ratio of dividends to retained earnings to avoid external financing of its investments. The costs of external capital include underwriting costs, brokerage commissions and fees, costs relating to obtaining the loan from the bank, legal and accounting fees, notional cost of management's time in arranging the outside financing. These costs are avoided if financing is done through retained earnings.

Market considerations

The way the stock market would probably respond to various types of dividend policies affects the dividend decision. Shareholders generally are believed to prefer an increasing or at least fixed level of dividends and resent the decline in the dividends per share. Similarly, the stockmarket gives importance not only to a fixed or increasing dividend level but also to a policy of continuous dividend payment. The skipping of dividends may lead to fall in the price of the share. Shareholders also view the firm's dividend payments as an indicator of future success. Thus the stockmarket looks at the firm's dividends as a source of information.

13.5 OBJECTIVES AND TYPES OF DIVIDEND POLICIES

Two major features of a firm's dividend policy are:

- a) stability: whether dividends fluctuate from year to year;
- b) long-run dividend pay-out ratio: the long-run average percentage of earnings paid out in dividends.

The dividend stability and the long-run payout ratio are distinct aspects. The dividend stability is primarily sought for the benefit of shareholders, who may prefer a stable rupee amount every year. The shareholders may be using the dividends for day-to-day consumption expenditure. A sudden fall in dividends may compel them to sell the shares to raise money. Secondly, the level of dividends also conveys certain information to the market. Fluctuating dividends may cause confusion and may even breed distrust about the firm's future. Thirdly, the financial institutions (and mutual funds in recent years) have influenced the dividend policies of firms. Generally these institutions particularly mutual funds, prefer companies with good dividend records and their demand for a particular company's shares can increase its price.

The second feature is the long-run average payout ratio, i.e. the percentage of earnings which firms payout as dividends. It appears that there is no uniformity in this respect. Some firms maintain a high payout ratio, while others pay a very small percentage of their earnings as dividends. Even regarding stability, there is no uniform policy. The question arises as to whether there is a "correct" dividend policy for a firm or indeed for all the firms. The theoretical debate which rages around these issues is discussed below.

13.6 RELEVANCE OR IRRELEVANCE OF THE DIVIDEND POLICY: THE DEBATE

There is a school of thought which holds that the dividends are irrelevant; and that the value of the firm is not affected by its dividend policy. The major advocates of this view are Franco Modigliani and Merton H. Miller (1958) who argue, for a variety of reasons and subject to a number of limiting assumptions, that the way a firm divides its earnings between dividends and reinvestment has no direct effect on its value.

They argue that market imperfections such as transaction costs, and tax biases do not matter much. For example, the tax bias favouring capital gains relative to dividends is not important because, through various types of tax shelters, divided tax rates could be reduced to capital gains tax if the former are higher. In any case a clientele effect will operate. A firm would attract shareholders in particular tax brackets and with particular expectations of dividend stability which correspond to the payment pattern and stability exhibited by the firm. Since the shareholders get what they expect, M and M argue that the value of the firm's shares is unaffected by changes in dividend policies.

M and M also suggest that dividends seems to affect share prices only due to the informational content of dividends with respect to future earnings. However, informed investors (informed by financial analysts who specialise in gathering,

analysing and disseminating information about companies) will value the firm on the basis of its underlying financial health, not on the basis of its dividend policy.

Another school of thought suggests that in the absence of M and M's limiting assumptions, this argument fails. Those who believe that the dividends and the dividend policy matter argue that current dividend payments reduce investor uncertainty about the rate of return on equity and consequently a higher value will be placed on the share. On the other hand, with no payment of dividends, uncertainty increases, shareholders tend to discount the firm's earnings at a higher rate and the share values come down.

Prof. Gordon (1972) who advocates that dividends matter suggests that there is a direct relationship between the dividend policy of a firm and its market value.

Gordon argues that investors tend to avoid the risk and put a higher premium on current as opposed to future capital gains. This 'bird-in-the-hand' argument suggests that a firm's dividend policy is relevant since investors want dividends to reduce their uncertainty. The general behaviour of businessmen and investors seems to suggest that Gordon's arguments are more widely accepted in practice than the theory of M and M.

Some later remarks of Prof. Merton (one of M and M) seem to suggest that their theory favours the sentiment that the role of dividends should be played down because they are more highly taxed than capital gains. Merton writes, "why firms continue to pour out vast quantities of dividends in the face of these tax differentials is one of the great puzzles of our time.... Paying out funds as dividends may bring you applause for your generosity at the annual general meeting from some of the odd-lot holders who have nothing better to do than eat a box-lunch at your expense".

Activity 2

- 1) List out the single most important factor affecting the dividend decision of a firm.

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- 2) 'Dividend Policy is irrelevant as far as maximisation of Shareholders' wealth is concerned.' Do you agree? Give two reasons.

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13.7 RESIDUAL DIVIDEND POLICY

The most prominent dividend policy based on the theory that internal financing is cheaper than external financing is the "residual dividend policy". Funds for corporate investment come from borrowing, retained earnings, and the sale of shares. Retained earnings and sale of shares form the equity investment. In each period, management determines the proportions of new investments to be financed by borrowing and by equity capital. The desired proportions depend on financial market conditions and on target debt level set by management. The dividend under a residual dividend policy equals the amount left over from earnings after internal financing. Let us illustrate this point with an example.

Example**Dividends under Residual Dividend Policy for Surya Industries Ltd.**

Item	Periods / Investment opportunities available		
	I	II	III
	Rs.	Rs.	Rs.
1. New financing or investment	15,00,000	24,00,000	32,00,000
2. Retained earning available (given)	18,00,000	18,00,000	18,00,000
3. Equity needed (70% of (1))	10,50,000	16,80,000	22,40,000
4. Dividends (2) - (3)	7,50,000	1,20,000	—
5. Dividend payout ratio	41.7%	6.7%	0%

Companies follow broadly two approaches under the residual dividend policy. They give residual amount as dividends, in which case the dividends are highly fluctuating. Or they follow a fixed dividend payout ratio and stabilise dividends. In this case, dividends over the long-run equal earnings minus equity investment. Under this approach, dividends are zero if on average equity investment exceeds earnings.

13.8 ALTERNATIVES TO CASH DIVIDEND

Firms sometimes follow a policy of giving low or no dividends, but issue bonus shares from time to time (roughly equivalent to stock dividends in U.S.A.). Along with dividends, some gifts or coupons to buy the company's products at a concessional rate are also given.

In U.S.A., many firms allow the shareholders to request the firm not to pay them a dividend but instead it should automatically reinvest the dividend in the company's shares.

Another attraction to existing shareholders in most countries is the offer to the shareholders the chance to purchase new shares at a discount below the share's market price (e.g. Rights shares in India).

Activity 3

- 1) Briefly explain 'bird-in-the-hand' argument.

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- 2) 'Issue of bonus shares is a perfect substitute for cash dividend.' Do you agree? Why?

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- 3) Try to know from the Finance Manager of an Indian Company:

- i) What has been their dividend policy?
- ii) What factors have guided them in formulating their dividend policy?

13.9 SUMMARY

Any earnings after dividends have been paid become retained earnings, which represent reinvested funds. Because retained earnings is a source of long-term financing, the dividend decision can also be considered financing decision. The dividend decision is normally a yearly decision made by the company's board of directors. The amount or percentage is set by the Board. The factors affecting the dividend decision of the firm are: legal, contractual and internal constraints; the profitability of the firm's investment opportunities; shareholder's cost considerations; and market considerations.

Two main considerations of the firm's dividend policy are: stability and regularity in the payment of dividends; and the long-run average dividend pay-out ratio. The debate about the dividend policy is: Does dividend decision matter? Should a firm have a dividend policy? Proponents of the view that the dividend policy is irrelevant, mainly Modigliani and Miller, maintain that tax biases favouring capital gains and transaction costs are not substantial. A clientele effect operates by which a firm gets the shareholders it deserve and vice versa. On the other hand, Gordon and others maintain that in the absence of its limiting assumptions, M & M hypothesis fails. Investors are risk-averse and they want the dividends to reduce the risk. In the case of no dividends, the share value is likely to be low as investors discount it at a higher return factor, compensating for the perceived risk.

The residual dividend policy assumes that internal financing is cheaper than external financing and that dividends are paid after required internal financing is met out of retained earnings.

Firms sometimes give low or zero dividends, compensating the shareholders by periodic bonus shares. Other dividend policies include, giving gifts, coupons to buy firm's merchandise at discount and the offer of rights shares.

13.10 SELF-ASSESSMENT QUESTIONS/EXERCISES

- 1) In what way are dividend policy and retention of earnings related to the financing of the firm's business?
- 2) What do the terms ex-dividend and cum-dividend mean? Who declares the dividends and sets the payment date?
- 3) Investors presumably buy a firm's shares in order to receive a return on their investment. Further, it would seem that the more profitable are the firm's investments, the higher that returns would be. Since the return to shareholders can be dividends, why do we say that more the profitable investment opportunities for the firm, the lower the firm's dividends?
- 4) How can the shareholder's income tax position affect the dividend policy of the firm?
- 5) What are some contractual and internal constraints on the firm's ability to pay dividends?
- 6) What are the two key positions with respect to the relevance of the dividend policy? Explain.
- 7) What are the two broad objectives of the firm's dividend policy? Discuss whether these objectives are mutually exclusive.
- 8) Describe the "residual theory of dividends". Would following this approach lead to a stable dividend? Explain.
- 9) Bhatia Company Ltd. in 1988 had earnings of Rs. 20,00,000 and retained Rs. 8,00,000 of these. The number of equity shares issued and paid up are 2,00,000. What is the dividend per share?
- 10) Wagle owns 2000 shares of XYZ Ltd., which he bought in 1974 for Rs. 10 per share. The tax rate on Wagle's dividend income is 50 per cent, and the tax rate

on long-term capital gains is 20 per cent. In 1986, Wagle received 6% dividend from his shares in XYZ Ltd. Wagle sold 500 shares of XYZ Ltd. at the end of 1986. Answer the following:

- (a) What were Wagle's dividends and capital gains in 1986 on XYZ shares?
- (b) What taxes did Wagle pay on XYZ shares?

13.11 FURTHER READINGS

Gitman, Lawrence J. 1985, *Principles of Managerial Finance*, Harper and Row Publishers. Singapore. Fourth Edition.

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Schall, Lawrence D and Haley Charles W. 1986, *Introduction to Financial Management*, McGraw-Hill Book Company, New York, London, New Delhi. Fourth (International Student Edition).

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BRAOU

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BLOCK 5 PRINCIPLES OF WORKING CAPITAL MANAGEMENT

This block helps you to develop an understanding about the working capital. The important components of working capital and their effective utilisation are presented in this block.

The first unit discusses the meaning and concept of working capital. The determinants of working capital are explained.

The second unit deals with the management of cash and receivables. The different techniques that are applied in cash and receivable management are analysed.

The third unit exclusively covers the objectives of inventory management. The inventory control techniques are extensively discussed.

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UNIT 14 WORKING CAPITAL REQUIREMENTS

Objectives

This unit is designed to enable you to understand:

- ★ the definition of working capital in an enterprise
- ★ the need for and the characteristics and determinants of working capital.
- ★ the components and types of working capital
- ★ the sources of working capital finance and their implications
- ★ the importance and the process of working capital control

Structure

- 14.1 Introduction
- 14.2 Working capital management - an overview
 - 14.2.1 Flow of funds
 - 14.2.2 The volume, the rate and the spread
 - 14.2.3 The profitability-solvency dilemma
 - 14.2.4 Adequacy is a virtue, surfeit is not
- 14.3 Types of working capital
- 14.4 Determinants of working capital
- 14.5 Working capital sources-uses link-up
- 14.6 Operating cycle
- 14.7 Working capital finance
 - 14.7.1 Trade dues and other sundry creditors
 - 14.7.2 Current provisions and non-bank short-term borrowings
 - 14.7.3 Short-term bank borrowing
 - 14.7.4 Net working capital from equity and long-term borrowings
- 14.8 Summary
- 14.9 Key words
- 14.10 Self-assessment questions
- 14.11 Further readings

14.1 INTRODUCTION

Working capital management is an integral part of overall corporate management. Many finance managers, who are quite at home and competent in dealing with episodic decisions such as capital investments, are at sea when they have to scout for funds to meet the day-to-day working needs. In many cases, this is attributable to reluctance to develop available skills and apply known techniques of financial management to advantage.

14.2 WORKING CAPITAL MANAGEMENT - AN OVERVIEW

Working capital is the amount of funds which a company must have to finance its day-to-day operations. It can also be regarded as that proportion of the company's total capital which is employed in short term operations. It can take the form of cash, near cash and other assets in the process of moving towards the cash form in a short period. These other assets are stocks of raw materials and supplies needed for manufacture, stocks of finished goods awaiting sale, semi-processed items or components that will soon emerge as final products, sundry debtors pending collections against credit sales and short-term investments, if any. All these constitute current assets, also known as current capital or circulating capital or gross working capital, and are items that would

get converted into cash in the short run, say, within one year, or within the normal operating cycle of the business. The aim is to maintain a proper balance between the magnitude of working capital and the general scale of operations of the company.

14.2.1 Flow of Funds

The initial inflow of funds for an enterprise comes from the shareholders, often supplemented by long term borrowings. Soon follow arrangements for further funds in the form of bank loans or credit facilities with suppliers of goods and services. The funds in the form of cash and credit would then start on their journey through the enterprise operations, involving a series of transformations or change of forms. Raw materials that are purchased stay for a while as inventories and then move into production streams. Labour and other manufacturing expenses enter the conversion process. The raw materials pass through the interim stages of work-in-process to finished goods. The enterprise values thus shift from one form to another. Finished goods pass through the phase of accounts receivables, until the collection of outstanding cause the reappearance of cash at the completion of the cycle. This is the cash-to-cash journey constituting the working capital flow or cycle, also referred to as operating cycle.

Problems arise because the working capital flows are seldom steady and the frequency of the change of forms often fluctuate. They have to be carefully watched and regulated. In trying to keep them in tune and in step, the finance manager has an exacting task.

14.2.2 The Volume, the rate and the spread

The volume, the rate and the spread are the three critical elements of working capital flow deserving close and continuous attention of the finance manager. The working capital stream is a link up of 'stocks' and 'flows'. It is a sequence of storages and releases. The number of intermediate storage points and their relative shifts in size come for consideration when reviewing the working capital spread.

What is the relevance of 'volume' of working capital? The stocks of cash, materials and finished goods and the book debts, as reflected in a balance sheet, can be said to be 'halting points' or 'tanks' in the flow process. These 'tanks' should not run dry or overaccumulate. They have a constructive and regulatory role to play and have to maintain an optimum level. The finance manager has to assess the needs constantly and implement decisions and actions to ensure optimal investment in working capital conforming to shifting needs from time to time.

What is the significance of 'rate' of working capital flow? The turnover of working capital is a function of its rate of flow. To get the best out of the investment in working capital, its turnover has to be kept as high as possible. This calls for conscious management effort in watching out for breaks and blocks in working capital flow. If management efforts succeed in sustaining an active rate of working capital flow, the working capital investment for the given level of enterprise activity can be reduced, with profitable results. An accelerated rate of flow of funds also ensures that current obligations are promptly met when they become due.

Of what relevance is the 'spread of working capital'? This concerns the structural aspects of the components of working capital. The balanced allocation of the total working capital funds between inventories, book debts and other components of working capital is a crucial phase of working capital management, involving actions based on careful analysis of facts and trends pertaining to the operations of the enterprise.

Activity 1

Comment on the significance of the three critical elements of working capital:

The volume:

The rate:

The spread

14.2.3 The Profitability - Solvency Dilemma :

Profitability and solvency are the twin objectives of working capital management. Solvency is a continued state of readiness to meet maturing obligations. Risk-taking is an approach to profitability but risk-avoidance is the way to solvency. The finance manager is on the horns of a dilemma as he has to maintain an optimal balance between profitability and solvency, which tend to work at cross purposes.

The excess of investment in current assets or working capital can be brought to light only with the help of some study, research and analysis of the internal data of the company. Pruning of stocks and speedier collection of debts will release tied-up resources and by facilitating faster turnover of working capital, will enhance returns.

Danger lurks in the tendency to play safe by allowing surplus inventories to be held or by extending credit very generously or by being permissive in follow up and collection of accounts receivable. This goes contrary to the desire to get the best mileage possible out of funds which are by themselves scarce and expensive to get. Besides this locking up or freezing up of funds, the company's profitability also gets affected adversely as increasing stock levels might conceal slow-moving, non-moving and obsolete items which cannot be termed current in character and mounting debtors' balance might contain prospects of increasing incidence of bad debts.

If the company defaults in its commitments and loses its credit reputation, it might be shutting itself off from ready sources of supplies and funds. The need to maintain reasonable level of liquid and near-liquid assets at all times is, therefore, imperative.

If a liberal view is taken of the need to permit some additional level of stocks and debtors to aid unhindered production and accelerated sales, solvency may be impaired. If solvency is regarded as of over-riding importance and investment in current assets is slashed down substantially, some profit opportunities may have to be foregone, owing to production interruptions and rigid credit policies.

Effective management will entail predetermination of the minimum funds required, study of the pattern of receipts and payments and advance planning of short term borrowings and investments.

14.2.4. Adequacy is a Virtue, Surfeit is not :

If excessive working capital leads to unremunerative use of scarce funds, inadequate

working capital interrupts the smooth run of business activity and impairs profitability.

Paucity of working capital has been a major contributing factor for many business failures. With the company struggling to meet its day-to-day commitments and even essential outlays having to be postponed for want of funds, its growth is arrested. Delays and inefficiencies creep in and demoralisation sets in. The rate of return on investment drops. The suppliers and creditors who have to wait longer to realise their dues feel inclined to give the company an adverse credit rating and tighten up credit terms. The company cannot cash in on opportunities of bulk purchase at very favourable prices. Curtailed outputs and under-utilisation of equipment and manpower resources affect revenues adversely and the company's dividend policy is likewise affected. Starved of working capital, the company slides down to failure.

Surfeit of working capital poses dangers too. Seeming abundance of funds promote unchecked accumulation of inventories, permissive credit policies and slack collection procedures. Increased risk of inventory losses and higher incidence of bad debts gradually appear with obvious adverse effects on profits. Complacency develops and management efficiency deteriorates. Speculative tendencies grow and dividend policy tends to be liberal. The tempo of inefficiency will rise progressively and the company may be in for serious trouble.

Conscious management of working capital, therefore, involves constant vigilance to ensure that the right quantum and the right composition of working capital is available on a continuing basis to support and promote the activities of the enterprise.

14.3 TYPES OF WORKING CAPITAL

There are varying concepts or perceptions of working capital, which have relevance to specific situations.

i. Gross Working Capital

Gross working capital is represented by the sum total of all current assets of the enterprise. Enough funds will have to be provided to sustain the movement of raw materials through the work-in-process to the finished goods stage and then to accounts receivables and upto the realisation of cash. In other words, the funds needed would total up to the constituent components, namely stocks of raw materials and supplies, work-in-progress, finished goods, accounts receivable and minimal cash and bank balances, constituting working capital. In managing gross working capital, the shifts in investment in current assets are under constant scrutiny, close attention and prompt correction. Excessive investment in current assets is to be carefully avoided as otherwise profits would be impaired.

ii. Net Working Capital

Net Working capital is the difference between the current assets and current liabilities. While current assets are short term assets that are expected to get converted into cash within one year, current liabilities are short term liabilities that are expected to fall due or mature for payment in a short period, generally within a year, and represent short term sources of funds. The concept of net working capital, as the excess of current assets over current liabilities, highlights the character of the sources from which the funds have been obtained to support that portion of current assets in excess of current liabilities. This part of working capital may be provided by way of share capital, from internal sources such as reserves or plough-back of profits or from external sources in the form of long term borrowings. There are two current implications. The management has to examine what proportion of the current assets

has to be financed by permanent capital and/or long term borrowings. Then there is the eagerness of short term creditors to verify whether the total current assets, representing the ultimate source of funds for the recovery of their dues, maintains a convincing level above the total current liabilities or obligations. A judicious mix of long term and permanent as distinct from short term sources should be formulated to finance investment in current assets.

iii. Permanent Working Capital

In actual operations of a typical going concern, the current assets and each component of it, are subject to continuous and rapid pace of replacement. Over a period of time, there is a constant or minimum level, below which the total investment in current assets does not fall. This minimum level of current assets, that has an attribute of fixity, can be called the hard core or 'fixed' or 'constant' or 'permanent' working capital and should normally be financed by long term debt and equity. The Reserve Bank guidelines require 25 per cent of the current assets to be funded by permanent and long term sources of funds.

iv. Variable Working Capital

In a given period of business operations, seasonal humps and troughs are bound to be experienced. The amount of funds needed over and above the 'fixed working capital' to take care of such seasonal shifts, constitutes the 'variable working capital'. These are also referred to as 'fluctuating' or 'temporary' working capital and may be financed by short term sources of appropriate amount and duration. In fact, it would be wise to cover also a part of this seasonal requirement from long term sources, as insurance against unexpected shifts in cash flows.

Activity 2

Explain the meaning and significance of the following types of working capital:

Gross working capital

Net working capital

Permanent working capital

Variable working capital

14.4 DETERMINANTS OF WORKING CAPITAL

A wide variety of factors influence the total investment in working capital in an enterprise. Significant among them are:

a. Promotional and Formative Phase

The start-up of a new project and initial years constitute the most crucial phase for planning and provisioning of working capital funds. By neglecting this, many ventures run into financial difficulties in their early operating years. The rather casual approach to assessment of working capital needs during the periods when industry and business functioned in a sellers' market could be understood as the impact of miscalculations could be passed on to the banker who was willing to provide 'credit on tap' and thus absorb all shocks of fluctuations in project operations by providing ready funds to meet emergency needs. The position has undergone radical change. The banker can no longer be taken for granted, and in the absence of proper estimation of working capital needs, the project may have to face serious financial problems.

b. Position of Business Cycle

Movements of the business cycle bring about shifts in working capital position. The upward swing is associated with spurt in sales and increase in levels of inventories and book debts. There could be a cash drain and borrowings may become necessary. On the other hand, when there is a downswing, the levels of inventories and book debts may fall, causing a cash flux.

Nature of business

The nature of business has an important bearing on its working capital needs. Some ventures like retail stores, construction companies etc, require an abundance of working capital. In other cases, such as power generation and supply, the current assets play a minor and secondary role.

d. The Manufacturing Cycle

An extended time span, between the raw material purchase and the completion of the manufacturing process yielding the finished product, will obviously mean a larger tie-up of funds in the form of enhanced working capital needs. In such cases, management should endeavour to contain the intervening period and effect economy in working capital needs, through process changes, where possible, or through effective organisation and coordination at all levels of enterprise activity to ensure that the operating cycle time is minimal. Frequent changes in set-ups, waiting for materials, tools or instructions and accumulations of work-in-progress have the inevitable consequence of extending the cycle time, freezing up more funds. Organised negotiations with suppliers for attractive credit terms and retention of their continued confidence by the settlement of bills on agreed dates can help reduce working capital requirements.

e. Credit Terms to Customers

The credit terms to customers influence the working capital level by determining the level of investment in book debts. Management has to decide on suitable credit policy relevant to each customer based on the merits of his case. Unduly liberal credit policies and slack collection procedures or permissive attitude in the matter of collection of outstandings can lock up funds that would otherwise be available for operating needs.

f. Vagaries in Supply of Raw Materials

The sources of certain raw materials are few and irregular and pose problems in the matter of procurement and holding, using up more funds. Material that are available only in certain seasons have to be obtained and stored, in advance, for the lean months. The working capital requirements, in such instances, will show seasonal fluctuations.

g. Shifts in Demand for Products

Some manufactured products are subject to seasonal fluctuations in sales. In the interest of utilisation of capacity, steady production will have to be maintained, independent of shifts in demand for finished products. Finished goods inventories will, therefore, pile up during off-season and will require increased amounts of working capital to be provided. Financial planning will have to incorporate this pattern of funds requirements associated with steady production and seasonal sales.

h. Production Policies

To off-set the problem of having to find funds to support the mounting inventory levels of finished goods until they got off-loaded in the peak seasons, some companies resort to diversification of activities, enabling production of the main product to follow the seasonal pattern of demand.

i. Competitive Conditions

In a competitive market, winning and retaining customer's satisfaction on a continuing basis will involve extra costs and present a variety of working capital problems. To offer the customer the benefit of choice, a variety of products will have to be manufactured and stocked. This would mean higher levels of inventories in all stages and, therefore, additional working capital funds. More generous credit terms may have to be extended and the investments in accounts receivables may have to be higher, requiring additional funds. The degree of competition is thus an important factor influencing working capital requirements.

j. Growth and Expansion Programmes

As business grows, additional working capital has to be found. In fact, the need for increased working capital does not follow the growth in business activity, but precedes it. Advance planning of working capital is thus a continuing necessity for a growing concern. Or else, the company may have substantial earnings but little cash. With fast growth, they may be under constant financial pressure for external funds to reinforce internal generation. Forward planning and continuous review thereof are absolutely necessary for such companies.

k. Profit levels

By the very nature of things, some enterprises generate high margins compared to others. The product category and the firm's position in the market may have conferred this advantage. Others may have to struggle in a highly competitive environment. But, profits cannot be considered as available cash at the end of the period. Even as the company's operations are in progress cash is used up for augmenting stocks, book debts and fixed assets. Elaborate planning and projection of expected activities and cash inflows, at short intervals, assume importance. For the projected surpluses, appropriate effective uses can be planned. The funds application, then, occur by design and not by accident.

1. Taxation

Tax liability is an inescapable element in working capital planning. It is a short

term liability payable in cash. Advance taxes may have to be remitted in instalments, on the basis of estimated profits. Periods of high taxation impose additional strain on working capital. To be able to get the best out of the available tax incentives, the finance manager has to draw up the operating plans of the company in advance and steer the resources towards research and development, exports or other directions which promise tax benefits and promote the company's earnings.

m. Dividend policy

Management has to preserve cash resources, but at the same time, it cannot fail to satisfy investor expectations. Market prestige for the shares of the company has also to be nurtured and maintained in its long-run interests. During periods of low profits, maintenance of steady dividends will involve draining of resources but may be needed to preserve the company's image.

n. Reserves Policy

One of the cherished goal of enterprise management is to build up adequate reserves out of profits. The urge to retain profits may act as a major constraint on the dividend policy, the funds position getting priority of consideration over dividend policy.

o. Depreciation Policy

Depreciation policy centres around the determination of the amount to be provided as depreciation charge to make up the ultimate resource for replacement of worn out or obsolete assets. The depreciation charges do not involve any cash outflow. Enhanced rates of depreciation have the effect of reducing profits correspondingly, which in turn can help in holding back distribution of dividends. By this process, cash is conserved. Depreciation policies, thus, exert influence on the status of working capital in the enterprise from time to time.

p. Price Level Changes

Rapidly rising prices create the need for more funds for maintaining the present volume of activity. For same levels of inventories, higher cash outlays are needed. In an inflationary set up, even operating expenses will grow for given levels of activity. Some companies may be able to compensate parts of these cost increases through increases in prices for their products. The implications of changing price levels on working capital position will vary from company to company depending on the nature of its operations and its standing in the market.

q. Operating Efficiency

There is an obvious relationship between the operating efficiency of a company and its working capital position. Waste elimination, improved coordination to cut delays, higher efficiency in operations and fuller utilisation of resources are among the initiatives taken to avert erosion of profits. They also have the effect of getting more out of a given volume of working capital or obtaining the current levels of output with a reduced volume of working capital. Efficiency of operations accelerates the pace of the cash cycle, and improves the working capital turnover. It releases the pressure on working capital by improving profitability and adding internal generation of funds.

With a multiplicity of factors exerting varied degrees of influence on working capital status, the management has to be alert to the developments, internal, external and environmental, and has to plan and review constantly its working capital needs and strategy.

14.5 WORKING CAPITAL SOURCES - USES LINK UP

The owners or share holders have to provide a share of the total investment in fixed and current assets. This is required from the point of view of risk sharing. Normally financing arrangements are planned for a combination of needs including capital expenditure and working capital investment. The assortment of sources of funds forms a package and rarely will it be possible to connect up a particular source to a specific application or use. Yet, the finance manager has to decide on a proper mix of short and long term funds. He has a range of sources to choose from and each has a given cost. He has to select the most economical combination of sources, generally falling in line with the variations in time scale relevant to the different uses contemplated.

The 'margins' that lenders insist upon in considering the company's assets as security can be regarded as their expectation of the shareholders' interest and risk-sharing in the business. Application of permanent and long term sources to short term uses does not pose any major problem except that it may prove expensive if interest charges have to be paid for extended periods, whether the funds are actively employed or not. But diversion of funds from short term sources to long term applications, such as purchase of plant and equipment, is bound to lead to liquidity problems. The link-up of sources and 'uses' of working capital is indicated below:

Sources	Uses
Net working capital, by way of long term funds:	working Capital represented by current assets:
Equity of shareholders	Cash and Bank balances
Long term borrowings	Marketable securities
	Accounts receivables
Current liabilities:	Raw material stocks,
	Stores, work-in-progress,
	and finished stocks.
Short term borrowing	
Trade creditors	
Other provisions	

The proportion in which current assets are financed by short term obligations as distinct from long term sources varies from company to company and this is an aspect that the finance manager has to determine.

Where the commitments are firm but cash flows are not clearly predictable, it would be wise to cut down drastically the number and extent of short term debts and prefer longer maturity schedules for debts. To the extent that a constant minimum level of investment in current assets is continually to be maintained, funds from long term sources can be employed for this purpose continuously. For seasonal needs, short term sources can be had. Even here, to take care of the vagaries in cash flows, a part of the funds required may be obtained from sources with longer maturity schedule.

Thus, permanent working capital can be financed by long term debt and equity and the fluctuating requirements of variable working capital, caused by seasonal shifts in business operations, can be financed by short term sources.

14.6 THE OPERATING CYCLE

The 'operating cycle' of the company can be said to cover distinct stages, each stage requiring a level of supporting investment. The sum total of these stage-wise investments will be the total amount of working capital required.

The operating cycle has four stage :

- i. The raw materials and stores inventory stage;
- ii. The work-in-progress stage;
- iii. The finished goods inventory stage;
- iv. The book debts stage.

The level of investments in raw materials and stores inventory can be expressed in terms of the number of days' materials and stores consumption, on an average, held in inventory. The work-in-progress can be stated as representing a certain number of days' cost of production. The finished goods inventory can be expressed as equivalent to a given number of days' cost of sales, on an average. The number of days' purchases, on an average, included in the trade creditors can also be calculated from the company's data. The fact that the trade creditors finance a good part of investment in raw materials and stores inventory deserves particular attention.

The framework of operating cycle formula can be :

$$t = (r - c) + w + f + b, \text{ where}$$

't' stands for the total period of the operating cycle, in number of days;

'r' the number of days' raw material and stores consumption requirements held in raw material and stores inventory;

'c' the number of days' purchases, included in trade creditors;

'w' the number of days' cost of production held in work-in-progress;

'f' the number of days' cost sales included in the finished goods inventory; and

'b' the number of days' sales in accounts receivables.

The computations involved are:

$$r = \frac{\text{Average inventory of raw materials and stores}}{\text{Average materials and stores consumption per day}}$$

$$c = \frac{\text{Average trade creditors}}{\text{Average purchase per day}}$$

$$w = \frac{\text{Average work-in-progress}}{\text{Average cost of production per day}}$$

$$f = \frac{\text{Average inventory of finished goods}}{\text{Average cost of sales per day}}$$

$$b = \frac{\text{Average accounts receivable}}{\text{Average sales per day}}$$

The average inventory or accounts receivable level can be arrived at by finding the mean between the opening and closing balances for the year. The average consumption or output or cost of sales or sales per day can be obtained by dividing the respective annual figures by 365.

The total operating cycle time, expressed in number of days, can at best give a very general idea of the time interval for initial cash outlay on purchases to get converted into cash again after passing through production, sales and collection processes. But, the information pertaining to each distinct stage of the operating cycle, stated in number of days relevant activity, has considerable significance, in that it can be used, directly or with modifications, in arriving at the money value of investment required in each of these stages for anticipated levels of activity. The total of these money values will represent the estimated working capital requirements. Such an estimate can only indicate the magnitude of working capital needs, on an average. The short run fluctuations attributable to seasonal and other factors and their impact on funds requirements cannot be spelt out by the above blanket approach to assessment of working capital needs. To get at these specifics, short run forecasts and budgets have to be resorted to, involving more elaborate and searching exercises, on a continuing

basis.

The following simple illustration presents a method of estimating working capital requirements, based on information concerning operating cycle time and product cost data.

The management of Gemini Limited has called for a statement showing, the working capital needed to finance a level of activity of 3,00,000 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 materials	20
Direct labour	5
Overheads	15
Total cost	40
Profit	10
Selling price	50

On an average, 2 months raw materials inventory is to be held. Work-in-progress will approximate to half a month's production. Finished goods remain in warehouse, on an average, for a month. Suppliers of materials extend a month's credit.

2 months' credit is normally allowed to debtors:

A minimum cash balance of Rs. 25,000 is to be maintained.

The production pattern is assumed to be even during the year.

The forecast of working capital requirements is worked out below:

	Period (Months)	Raw mate- rial	Work- in- progress	Fin- shed goods	Debt- ors	Cred- itors	Total Rs. Lakhs
1. Materials :							
In stock	2	10.00					
In work-in- Progress	1/2		2.50				
In finished goods	1			5.00			
In debtors	2				10.00		
	5 1/2						
Supply credit	(1)					(5.00)	
Total	4 1/2						22.50
2. Direct labour :							
In work-in- Progress	1/4		0.31				
In finished goods	1			1.25			
In debtors	2				2.50		

Total	3 1/4					4.06
3. Overheads:						
In work-in-progress	1/4	0.94				
In finished goods	1		3.75			
In debtors	2			7.50		
Total	3 1/4					12.19
4. Profit:						
In debtors	2		5.00	5.00		
		10.00	3.75	10.00	25.00	(5.00)
5. Cash balance to be maintained						43.75
						0.25
Total working capital required						44.00

Based on an average output of 25,000 per month, the relevant cost information has been used in above computations. Labour and overhead expense are treated as incurred each month, without any lag. Labour and overheads in work-in-progress are assumed to accrue evenly during the time manufacture is in progress. process time is half-month but since labour is evenly carried on during production, the effective labour and overhead costs pertain to only half the process time, that is quarter of a month.

Some may argue that the profit element in debtors and the depreciation part in overheads (there is no cash outflow on depreciation) should not be taken in calculating the requirements of funds. These are debatable issues.

14.7 WORKING CAPITAL FINANCE

The sources of finance for working capital can be grouped in four categories:

- Trade dues and other sundry creditors:
- Current provisions and non-bank short term borrowings:
- Short term bank borrowings
- Net working capital from equity and long term borrowings:

Trade dues and other sundry creditors, current provisions and non-bank short term borrowings together constitute the non-bank current liabilities 'Total current assets' minus 'total non-bank current liabilities' represents the 'working capital gap'. The working capital gap is partly met by bank borrowings or cash credit facilities, the balance being supported by equity and/or long term borrowings. The part that is supported by equity and/or long term borrowings representing 'total current assets' minus 'total current liabilities' is referred to as 'net working capital'.

14.7.1 Trade dues and other sundry creditors

Trade creditors represent amount that are payable in cash within a short period of time of a year or less. Until this falls due for payment, it serves as a short term source of finance to support the working capital needs.

Taking advantage of 'cash discounts' for early payments would be worthwhile on two counts :

- a. Where a company is in a liquid position and would like to apply the surplus funds towards reducing its current liabilities;
- b. If the quantum of discount offered is remunerative enough.

14.7.2 Current provisions and non-bank short term borrowings

i. Current provisions:

Current provisions or accruals arise in the normal course of business operations, such as for wages, taxation, dividends etc. and mature for payment within a short period of a few months. For a brief while they serve as a source of working capital funds. Since the accruals expand or contract in tune with changes in the level of business activity, they are regarded as part of 'spontaneous financing'. As no interest is paid on these dues, they are also considered as 'free' sources of financing.

ii. Public deposits

Public deposits have been a popular source of short-to-medium term source of finance for working capital for companies. These are in the nature of unsecured loans from the public.

iii. Inter corporate deposits

This refers to deposit made by one company with another, normally for a period upto 6 months. Such deposits can be :

- a. Call deposit, which is withdrawable by the lender on giving a day's notice. The lender may, in fact, have to wait for three days. These will bear higher rates of interest.
- b. Three months deposits are more popular. When temporary cash crunch arises due to operational problems or external factors, companies resort to this handy source. The interest rates will be higher than that for call deposits.
- c. Six months' deposits : this is time span beyond which companies do not extend deposits to other companies. These will carry even a higher rate of interest than that for three months deposits.

In the absence of legal restrictions on short term intercorporate deposits, these have become a convenient source of funds. These transactions are also kept secret by brokers and do not get publicised.

Short term loans from financial institutions

Firms with good record of performance can obtain short term loans from the Life Insurance Corporation of India, the General Insurance Corporation of India and the Unit Trust of India.

These loans are unsecured and are given on the basis of demand promissory notes. The loan given for a period of one year, can be extended to two consecutive years if the specified criteria continue to be fulfilled.

v. Commercial Paper

Commercial paper represents short-term unsecured promissory notes issued by firms which enjoy a fairly high credit rating. Large firms with considerable financial strength are the ones that can issue commercial paper. The main features of commercial paper are:

- a. The maturity period of commercial paper ranges from 30 to 270 days.
- b. Commercial paper is sold at a discount from its face value and redeemed at its face value. Thus, the implicit interest rate is a function of the size of the discount and the period of maturity.
- c. Commercial paper is either directly placed with investors or sold through dealers.
- d. Commercial paper is usually bought by investors who intend holding it till its maturity. As such, there is no well developed secondary market for commercial paper.

vi. Factoring

A factor is a financial institution which purchases accounts receivable from business. The credit risks associated with such purchase is usually borne by the 'factor'. The factor enters into an agreement with the client whose accounts receivable is being purchased and the factoring agreement normally have the following conditions:

- * The factor will make the choice of those accounts receivables which it is willing to buy;
- * The factor should bear the losses arising from bad debts or non-collectible accounts. The sale of accounts receivables to the factor will thus be on a non-recourse basis.
- * The factor will open an account for his client whose accounts receivables are purchased. Monies will be deposited into this account as payments are received or as due dates arrive and the client can freely withdraw amounts from this account. Surplus balances in the account will earn some interest.
- * The factor has the obligation to pay the amount to the client as and when the accounts receivable is collected or on the last day of the concerned credit period, whichever is earlier.
- * The client may obtain advances from the factor against amounts of accounts receivables sold to factor and pending collection or yet to fall due, at certain rates of interest.

Factoring enables ready funds to be raised against accounts receivable, leading to a defined pattern of cash flows and eliminating the need for a large administrative set up for managing credit and collections. But the cost of funds will be higher than other sources of unsecured borrowing and, in some cases, factoring may be viewed as a sign of financial weakness.

14.7.3 Short term bank borrowing

Time was when the commercial bank was considered the most obliging provider of finance, close at hand and ready to absorb the shocks of fluctuating demands for funds in the client's venture. Where adequate security was provided, finance was readily forthcoming. Assistance through cash credit accounts was extended for the ostensible purpose of acquisition of current assets. These advances were, in principle, repayable on demand and were regarded as short term self-liquidating loans. In practice, however, they behaved as permanent tie-up of funds with the constituents, which tended to grow with the growth in client business.

a. Dehejia Committee, 1968

The Dehejia Study Group which examined the extent to which credit needs of industry and trade are likely to be inflated and how such trends could be checked' noted that bank credit, primarily meant for working capital finance was found to be used for long term purposes and to finance subsidiaries and associated companies. Cheap credit available from banks were also used to accumulate disproportionate stocks of materials to realise trading profits. Bank lending, under the cash credit system, was directly related to security in the form of inventory and receivables, irrespective of borrower's operations. The borrower's limit got increased, whenever inventories and receivables went up, without any question about his business operations. Within the sanctioned maximum limit, the borrower could draw at his will, rendering credit planning by banks very difficult.

b. Tandon Committee, 1974

Although the monetary authorities were aware of the faulty system of bank lending, it was only in 1973, when the demand for bank credit rose sharply in spite of stagnant production and when a number of banks had to freeze credit abruptly that serious consideration was given to the matter. Reserve Bank found it necessary to impose credit restraints. In 1947, when inflation touched the unprecedented level of 31 per cent, a package of measures to curb inflation became inevitable. The Reserve Bank constituted the Tandon Committee to frame guidelines for the follow up of bank credit.

The Tandon Study Group brought to focus the change in the role of banks following their nationalisation, calling for a variation in the pattern of disbursement of credit. Significant sectors of the economy which in the past had little or no access to the bank finance, had now to be taken into the banking fold. Priority sectors such as agricultural and food procurement made massive demands on bank finance. The share of small industry rose sharply. The public sector broke from the convention of looking to Government for working capital assistance and came out in a big way seeking bank credit. Then, there was the added social responsibility of financial assistance to various categories of self-employed groups. Faced with these pressures for large-scale financial assistance and with the constraint on over-all credit availability, the banks had to cut down credit facility to industry and deploy funds to the other sectors.

The wide gap between sanctioned and utilised limits in the case of industry clients was indicative of poor credit planning and supervision on the part of the banks. Though some positive move in the shape of credit appraisal and follow up had been in evidence with the working of the Credit Authorisation Scheme, there was need for greater and more effective attention to credit planning and review at individual customer levels.

As inunciated by the Tandon Study Group, the new system should :

- * Make a customer plan his credit needs in advance and observe a discipline in its use; he should draw operating plans for the ensuing year and supply them to the banker. It will help the banker in evaluating the borrower's credit needs in a realistic manner and in the periodic follow up in the ensuing year.
- * Indicate to the banker the likely demand for credit and thus enable him to plan his own deposit-credit function.
- * Assure finance to industry for its genuine production needs; the borrower should maintain reasonable levels of inventory and receivables, just enough to carry on target production. Efficient management of resources should be ensured to eliminate slow moving and flabby inventories.

- * Having provided the finance, enable the banker to receive from the customer adequate flow of information on the use of credit, but with in-built flexibility to suit changes in circumstances.
- * The working capital needs of the borrower cannot be entirely financed by the banker. The banker will finance only a reasonable part of it; for the remaining the banker should depend on his own funds, generated internally and externally.

The following are the major recommendations of the Tandon Committee :

i. Inventory and receivables norms

Considerable dialogue and prolonged debate followed the fixation of inventory and receivables norms or standards by the Tandon Committee for selected groups of major industries. Other industries and small units should not be exempt from norms, but should be gradually brought into the fold and while dealing with these categories of clients, banks should keep in view the purpose and spirit behind the norms. Identifying the need to 'curb any tendency on the part of borrowers to build up undue inventories or to misdirect credit', the Committee identified the critical types of inventories that need close attention, as has been detailed in the Chapter on Inventory Management. The Study Group examined also investment in receivables, with an eye on scope for discipline and economy. It conceived of a stage where credit planning gets dovetailed with production planning, ensuring good use of bank credit and, at the same time, efficient management of current assets.

Industry representatives had no hesitation in accepting the need and the scope for increased discipline in the management of current assets but questioned the wisdom of 'across-the-board' norms as standard prescription for a wide spectrum of industry. The study group responded partially to this plea for flexibility in norms, by agreeing that they have to be responsive to any major change in environment and within the industry. The Study Group has also clarified that the norms do not suggest entitlement to hold inventories and receivables upto the prescribed level. If a borrower was efficient and could manage with less in the past, he should continue to do so.

The Central Committee of Direction, constituted by the Reserve Bank, was empowered to make the on-going review of the norms and effect revisions or changes. The Study Group appears to have refrained from a close look at stocks of spares and has not included them for norms, on the ground that in financial terms they are not significant in many industries. However, it has cautioned that banks should keep a watchful eye if spares exceed 5 per cent of total inventories.

ii. Lending norms

The banker's new role expects him to supplement the borrower's resources in carrying a reasonable level of current assets in relation to his production requirements. The banker had to understand and interpret some new concepts which included:

- * the extent of working capital gap in the borrowers business at any given time.
- * the appropriate method of arriving at the 'maximum permissible level' of bank credit for the borrower.

Three alternatives, to be considered as three sequential stages, were proposed for deciding on the maximum permissible level of bank credit for any borrower.

Method 1 : Determine the working capital gap, ie. reasonable level of total current assets minus non-bank current liabilities, and reckon 75 per cent of the 'working capital gap' as the permissible level of bank finance. The balance will have to be found by the borrower from his own funds and/or from long term borrowing.

Method 2 : The borrower will have to get his own resources and/or long term funds to finance 25 per cent of the current assets. Whatever is then required to meet the working capital gap will be provided by the banker.

Method 3 : Determined the core current assets. These have to be financed out of own funds and/or long term sources. The reasonable level of total current assets minus the core current assets will represent real current assets. 25 per cent of real current assets will also have to be met from the borrower's own funds and/or long term sources. If the non-bank current liabilities are inadequate to cover the balance 75 per cent of real current assets, the required amount will be obtained by way of bank borrowings.

The first two methods, accepted for implementation by the Reserve Bank, are illustrated below:

	Rs. lakhs	
	Method 1	Method 2
Reasonable level of current assets(as per relevant norms)	100	100
Non-bank current liabilities	20	20
Working capital gap	80	80
Borrower's contribution	20	25
Permissible bank finance	60	55

Note that in Method 1 borrower's contribution is 25 per cent of the working capital gap and in Method 2, 25 per cent of the total current assets.

All with credit limits above Rs. 20 lakhs be covered by the recommendations and Method 1 will be a start for quick progress to Method 2. Those already in Method 2 cannot revert back, and should endeavour to move forward further. As Method 1 cannot be attained overnight, banks may finance the deficiency between permissible bank finance and required assistance by way of 'working capital term loan', which should be repaid over a period of time and is not to be resorted to thereafter.

Activity 3

Illustrate and compare Method 1 and Method 2 proposed by Tandon Committee for determining permissible bank lending to clients.

iii. Style of credit

The Committee recommended the bifurcation of total credit limit into fixed and fluctuating parts. The fixed component was to be treated as a demand loan for the year representing the minimum level of borrowing which the borrower expects to use throughout the year. The fluctuating part will be taken care of by a demand cash credit. The cash credit portion may be partly used by way of bills. The new cash credit limit was to be placed on a quarterly budgeting reporting system. The interest on the demand loan part was to be lower than that for the demand cash credit.

iv Information system

The Committee advocated for a greater flow of information both for operational purposes and for the purposed of supervision and follow up of credit. The propose information and reporting system had the objective of :

- ★ Enabling the borrower to plan his credit needs more systematically;
- ★ Promoting free flow of information between the borrower and the banker facilitating more effective monitoring of credit situation;
- ★ Ensuring that credit is used for intended purposes.

The quarterly budgeting-cum-reporting system was to consist of the Quarterly Profit and Loss Statement and the Quarterly Statement of Current Assets and Current Liabilities. In addition, the half-yearly proforma balance sheet and profit and loss statement, the annual audited accounts and the monthly stock statements were to be provided. To begin with, borrowers with credit limit over Rs. 1 crore were to come under this discipline. The banker, as a stakeholder in the business was to be treated as a partner, by free and frank sharing of information.

The Tandon Committee recommendations succeeded in bringing about a perceptible change in the outlook and attitude of both the bankers and their customers.

c. Chore Committee, 1979

The Reserve Bank constituted the Chore Committee, in 1979, with the purpose of :

- ★ Examining the working of the cash credit system, with particular reference to the gap between sanctioned limits and their utilisation;
- ★ Recommending modifications to the system with an eye on more rational management of funds by commercial banks and suggesting alternative modes of extending credit with greater credit discipline and closer relation to outputs;
- ★ Recommending on other related issues considered germane to the subject.

The Chore Committee made the following recommendations:

1. The combination of cash credit, loan and bill composition in lending is to be continued, emphasising that, wherever possible, loan and bill modes are to be preferred.

2. The bifurcation into demand loan and fluctuating cash credit components has not been accepted by borrowers and banks and the advantages are not large enough to make it compulsory.

3. Borrowers should be made to realise that part of their internal generation of funds should support working capital needs, thereby reducing the over-dependence on bank finance.

4. All borrowers, with aggregate working capital limits of Rs.10 lakhs and over, should be brought into the Second Method of lending advocated by Tandon committee, which would mean a minimum current ration of 1.33 : 1 and excess borrowings over this norm should be treated as working capital term loan at a higher rate of interest, repayable in instalments.

5. While assessing credit requirements of the above category of borrowers, the bank should appraise and fix separate limits for the normal non-peak level as also for the peak level credit requirements, indicating the periods during which the separate limits are to be utilised. One of the important criteria for deciding such limits should be the borrowers' utilisation of credit limits in the past.

6. Where unforeseen contingencies necessitate additional adhoc or temporary finance in excess of sanctioned limit, it could be financed through a separate demand loan account or a separate non-operable cash credit account, at a higher rate of interest.

7. Borrower should be required to indicate his quarterly requirement of funds before the commencement of each quarter on the basis of his budget, the actual requirement being within the sanctioned limit for the particular peak level/non-peak level periods. Drawings of less than or in excess of the operative limit so fixed (with a tolerance of 10 per cent either way) but not exceeding the sanctioned limit would be subject to a penalty to be fixed by the Reserve Bank from time to time.

B. The forms relating to the quarterly information system have been simplified and non-submission of the returns within the prescribed duration will entail a penal interest of 1 per cent, over the normal rate, on the whole outstandings in the account, from the due date of the return to the date of actual submission.

9. Banks should subject to close scrutiny requests for relaxations in inventory norms, limits etc. and should agree only in exceptional cases.

10. Where the borrowers provide timely information as required, banks should extend eligible credit facilities promptly.

11. Stamp duty on usance bills and the difficulties in obtaining the required denomination of stamps are impediments in the growth of the bill system and these issues have to be taken up with the state governments.

12. Bank should curtail financing of book debts through cash credit and insist on conversion of such credit limits into bill limits.

13. At least 50 per cent of lending on the cash credit limits against raw materials to manufacturing units should be by way of drawee bills, for borrowers whose aggregate working capital limits exceed Rs.50 lakhs.

14. Public sector units/large borrowers should be required to provide detailed information in their quarterly statements about dues to small scale units so that banks can take suitable measures to induce these dues to be paid promptly.

15. Autonomous discount houses may be set up in order to encourage the bill system of financing and the call money operations.

d. Maratha Committee, 1982

This Committee had the responsibility of reviewing the working of the Credit Authorisation Scheme (CAS). CAS was introduced by the Reserve Bank of India, for regulating the end use of credit, whereby all scheduled commercial banks were to obtain the prior authorisation of the Reserve Bank of India for sanctioning credit limits (including bill discounting limit but excluding letters of credit and guarantee limits) of Rs.1 crore or more. In stages, the minimum limit got raised to Rs.6 crores. The objectives of CAS got redefined in 1979 as below:

- ★ To ensure that additional bank credit is in conformity with the approved purposes and priorities and that the bigger borrowers do not pre-empt scarce resources.

- ★ To enforce financial discipline on the large borrowers, where necessary, on uniform principles.

- ★ Where a borrower is financed by more than one bank, to ensure that the customer's proposal is assessed in the light of the information available with all the banks.

★ To bring about improvements in the techniques of credit appraisal by banks and their system of follow up.

The marathe Committee made the following suggestions for improving the operational aspects of the CAS:

1. CAS is not to be viewed as a regulatory measure confined to large borrowers.
2. Its purpose is to ensure orderly credit management and improve quality of bank lending, covering large and small borrowing.
3. Though the CAS scrutiny by the Reserve Bank is confined to large borrowers as a matter of administrative convenience, the spirit of CAS and the criteria for lending are to be extended to all borrowers.
4. The borrowers should cooperate by giving required information promptly to facilitate provision of credit without delay.
5. The banks should take organisational measures to reduce lead time for processing applications and the Reserve Bank should also reduce the time taken for scrutiny.

Where the borrowers, in CAS category, provide reliable estimates of their activities and requirements, follow the guidelines for classification of current assets and current liabilities, maintain a current ratio of over 1.33 : 1, are regular in submitting quarterly operating statements and agree to submit annual accounts promptly, the commercial banks are to be given the discretion to deploy credit without prior authorisation by the Reserve Bank.

e. Chakravarty Committee, 1985

The Committee, while reviewing the monetary system in India, made the following suggestions in respect of financing working capital.

- ★ All public sector units, large private sector units and Government departments should be compelled to include in their purchase contracts with suppliers, a penal charge for undue delays, say beyond 4 months, in settling their bills.
- ★ The credit limit to borrower should be in three heads, with varying rates of interest
 - i. Cash credit I to cover supplies to Government.
 - ii. Cash credit II to cover special circumstances or contingencies.
 - iii. Normal working capital to cover the balance of the credit facilities.

14.7.4 Net Working Capital from Equity and Long Term Borrowings

It is essential that industry does everything in its means to activate the capital market and improve on internal generation of surplus so that the strong equity base can gradually be created for sustaining progress and growth. Industry will have to readjust itself to reduced dependence on banking system and find alternative ways of ensuring continuous supply of its own funds requirements. The capital market and accelerated internal generation of funds are the two ultimate sources that have to be effectively tapped.

Rights Debentures for Working Capital: In 1978, the Government announced the guidelines for the issue of right debentures by public limited companies for augmenting their working capital. These included the following:

- i. The guidelines are applicable to issue of secured debentures by public limited

companies in the form of rights issues to their shareholders for augmenting long term resources of the company for working capital requirements.

ii. The amount of debentures issue will not exceed 20 per cent of the gross current assets, loans and advances minus the long term funds presently available for financing working capital, or 20 per cent of the paid up share capital, including preference capital and free reserves, whichever is lower.

iii. The debt-equity ratio, including the proposed debenture issue, should not exceed 1 : 1

iv. The interest rates will be stipulated by the Government.

v. The debentures shall be listed in stock exchanges.

vi. The company must be a listed company and its equity shares must have been quoted in the stock exchange at or above par value in the 6 months prior to the date of application for the issue of debentures.

vii. The company can proceed to allot the debentures only after a minimum subscription of 75 per cent of the amount of debentures issue has been secured.

14.8 SUMMARY

Working capital management is an integral part of overall corporate management. Working capital represents the amount of funds which a company must have to finance its day-to-day operations. The cash-to-cash journey constituting the flow of funds, in stages, through inventories and debtors is also referred to as operating cycle. The volume, the rate and the spread are the three critical elements of working capital flow that deserve close and continuous managerial attention. Management of working capital also calls for the maintenance of an optimal balance between the objectives of profitability and liquidity.

Among the sources of finance that are exclusively for supporting current assets or working capital, which include trade creditors, other current liabilities, bank finance, public deposits, intercorporate deposits, short term loans from financial institutions, rights debentures for working capital, commercial paper and factoring, bank credit is a dominant institutional source.

Bank credit to industry has been for long an area of progressive regulation and control. Various Study groups of the Reserve Bank of India have been reviewing the state-of-the-art of bank finance for working capital and making recommendations. The progressive steps taken for establishing better credit discipline and control have been extensively discussed in this chapter.

14.9 KEY WORDS

Solvency	A continued state of readiness to meet maturing obligations
Gross working capital	Sum total of all current assets
Net working capital	difference between current assets and current liabilities
Permanent working capital	The minimum level of current assets that have an attribute of fixity, which can be called the hard core
Variable working capital	The amount of funds needed over and above the permanent working capital to take care of seasonal shifts in business operations

Commercial paper

Short-term unsecured promissory notes
issued by firms which enjoy a fairly
high credit rating

Factor

A financial institution which purchases
accounts receivable from business

14.10 SELF-ASSESSMENT QUESTIONS

- i. Outline the recommendations of the Tandon Committee on the financing of working capital by banks.
- ii. Enumerate the various sources of finance which more or less exclusively support current assets.
- iii. Evaluate public deposits from the point of view of the depositors and the company.
- iv. What are the important guidelines applicable to rights debentures for working capital ?
- v. Discuss the important recommendations of the Chore Committee.
- vi. What are the recommendations of the Marathe Committee with respect to the Credit Authorisation Scheme ?
- vii. Explain the features of commercial paper.
- viii. Examine the significance of factoring as a source of working capital finance.
- ix. AB Co. has the following selected assets and liabilities:

	Rs.
Cash	45,000
Retained earnings	1,60,000
Equity share capital	1,50,000
Debtors	60,000
Inventory	1,11,000
Debentures	1,00,000
Provision for taxation	57,000
Expenses outstanding	21,000
Land and building	3,00,000
Goodwill	50,000
Furniture	25,000
Creditors	39,000

You are required to determine (i) Gross Working Capital and (ii) Net Working Capital.

- x. Explain the concept of hard core working capital. Suggest how it should be determined and financed.

- xi. From the following Balance Sheet of Super Ltd. determine the maximum permissible bank finance for working capital, under the three methods proposed by Tandon Committee. Assume core current assets of Rs. 40 lakhs for the firm:

Balance Sheet as at 31st December, Current Year

	Rs. Lakhs		Rs. Lakhs
Capital & Liabilities		Assets	
Equity Share Capital	300	Fixed Assets	480
Retained earnings	100	Current Assets	300

13% Debentures	200	
Creditors and other		
Outstanding bills	180	
	780	780

14.10 FURTHER READINGS

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BRAOU

UNIT 15 MANAGEMENT OF CASH AND RECEIVABLES

Objectives

Having gone through this unit, you should be able to understand:

- ★ the importance of management of cash and receivables.
- ★ the implications of costs and benefits relating to the levels of cash and receivables maintained.
- ★ the process of planning and controlling cash and the level of investment in receivables and the relevant tools and techniques.
- ★ the measures for evaluating effectiveness cash and receivables management.

Structure

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SECTION A : MANAGEMENT OF CASH

15.1 INTRODUCTION

One of the main tasks of financial management is to hold and maintain adequate, but not excessive, cash position. Cash is an obvious and inescapable input into company's operations and as such it has to be available in sufficient doses according to needs, on a continuing basis. Cash is also the major and much awaited output or result of the company's operations and there is the need for effective plan to deploy this liquid resource to utmost productive use.

A company that is growing fast and even turning out handsome profits may be

continuously faced with a state of shortage of cash and a threat to uninterrupted flow of production. So finding adequate funds for operating needs is an unending preoccupation for the company's finance manager. Inadequacy of cash, even for short period, is a source of trouble for most enterprises. It is not wise to have a lot of cash, which is idle. Cash is not an earning asset.

15.2 WHY HOLD CASH

Lord Keynes, the noted economist, has attributed three motives for holding cash.

- i. The transactions motive
- ii. The precautionary motive
- iii. The speculative motive

The transactions motive arises from the need for ready funds to make payments falling due in the ordinary course of day-to-day business, such as payment of purchases, payment of wages, payment of operating expenses and payments of taxes and dividends. The operating needs have to be promptly met and any delay will hamper production and profitability. Imagine the plight of the finance manager who has not planned for the necessary funds to pay the annual bonus and suddenly finds himself compelled to raise substantial funds. Payments of taxes and dividends may raise serious problems, in the absence of proper resources planning. Many are those who resort to crisis management and repeatedly plead with creditors to bear with them patiently until they manage to find the resources to meet the liabilities. The aim of cash management is to ensure smooth functioning of day-to-day business, by judicious direction of the flow of cash into and out of the business, so that the operating and contractual payments are promptly made.

The precautionary motive comes from the desire to keep a cash cushion or buffer to meet unexpected contingencies. The degree of precaution will normally bear an inverse relationship to the degree of predictability of cash flows of the business. As a matter of abundant caution, many companies have learnt the art of establishing and maintaining good lasting link with progressive banking institutions. Thus, having a ready borrowing power, the firm can release available cash resources for remunerative applications. Where considered advisable, part of the precautionary balance can also be held in the form of near-money assets, especially marketable securities.

The speculative motive covers instances where the intention is to hold cash to be able to take advantage of shifts in security prices, arising from changes in interest rates and other factors. This is not a common feature of corporate financial management, except in cases of finance and investment companies.

Activity 1

Comment on the following motives for holding cash:

- a. Transactions motive

- b. Precautionary motive

c. Speculative motive

15.3 HOW MUCH TO HOLD

What are the factors that influence the quantum of transaction and precautionary balances to be held:

- i. The expected net cash flows based on the cash forecasts, taking note of the long-range and short-term cash needs of the company.
- ii. Expectations as to the degree of possible deviations from forecasts. To anticipate changes in cash flows under varying circumstances, the probability concept can be applied.
- iii. The maturity schedules or the structure of the different liabilities of the company.
- iv. The facility of readily drawable borrowing power in times of emergency.
- v. Management's views and attitudes in the matter of liquidity risks, varying between caution and adventure.

15.4 CASH PLANNING

The pursuit of everyday transactions of the company generates cash inflows and outflows. Granting that operations are carried out efficiently and successfully, the cash inflows can be expected to be substantially in excess of cash outflows, presenting the long-run pattern of accumulation of cash from current operations. The short-run course, however, will not be smooth and steady and will be marked by a variety of pressures and fluctuations which may be attributed to seasonal factors, unexpected market turns, production problems or financing difficulties. Within the operating year, cash surpluses and cash deficits may appear and reappear, at varying points of time, posing borrowing and investing problems. If the swings are steep and abrupt, financial problems get aggravated. Financial planning can be directed to see that the fluctuations are smooth and gradual, by effective coordination of the inflows and outflows of cash.

If the finance manager finds himself in the unenviable position of having to overcome a sizeable cash shortage, his action has to be instant and, often, expensive. He has no time to consider several alternatives before deciding on an appropriate course of action. On the other hand, he has to rush out and borrow the money, possibly at an enhanced price. But, if the same cash shortage, at that point of time, was anticipated earlier, in the course of scrutiny of cash forecasts, he has some options open before him. He may even decide against borrowing and may find the resources by rearranging some phases of the operating cycle, such as deferring payments of bills, speedier collection of outstandings, postponement of certain discretionary expenses or by a combination of these measures.

The short-run financial management is built around its two prime and inter-related ingredients, profit and cash management. The objective of cash planning is to provide advance signals as to:

- i. What are the amounts of cash that are needed to attain short-run profit objective ?
- ii. How much of these cash requirements can be met out of the cash generated

from current income ?

- iii. What are the magnitudes of the ebbs and flows of cash emanating from operations, and what are the sizes and frequencies of the resulting cash surpluses and deficits ?
- iv. What are the sources of cash (that is, borrowing) and under what conditions or in what context are they available ?

Timely and rewarding short-term outlets will have to be found for the surpluses and appropriate outside financing arrangements will have to be made for meeting the deficits, so that operations continue unhindered and planned profits are realised. The cash planning goals can be communicated to the operating executives and their cooperation enlisted for realising these goals, many times, without resorting to external assistance. The sales division can be requested to make special efforts to push up sales required to generate the necessary cash. Once this sales plan is present and agreed to, the sales personnel can be relied upon to carry it out. The collection schedules can be reviewed and recast to yield the cash resources at the time needed. The purchase division can, given information on the cash plan, rearrange its purchase schedules so as to release cash for other pressing needs at specified points of time. It is thus evident that if the advance signals thrown up by cash planning are acted upon constructively, a major part of the problems of cash surpluses and deficits can be resolved by suitable and marginal readjustments in internal operations, without affecting the short-run profit goals.

Planning of the sources of cash will revolve mainly around sales. If all sales were for cash, the sales estimates themselves serve as estimates of cash inflows. But when cash and credit sales co-exist, projections of cash realisations from sales and debtors assumes complexity. The sales personnel can competently aid in this planning exercise, equipped as they are with a first hand insight into the sales and collection patterns. The finance manager can, however, exhort them to improve over past experience by planning a higher proportion of cash sales to total sales or speedier collection of outstandings or other measures. Cash discounts can be planned as incentives for prompt settlement of bills in period when cash inflows have to be stimulated to forestall impending cash shortage. Odd transactions like sale of disposable assets can be suitably timed to generate cash at a time when it is needed. If the company has an adequate holding of liquid assets, especially short-term securities, planning for cash from operations does not have to be very intense. A credit line with a commercial bank is another major safeguard against temporary cash shortage. But the establishment of such an external facility should not turn out to be a deterrent to cash planning. It is an expensive and not always dependable source, to be drawn upon only in emergencies, and so the cash planning drill has to be directed effectively to generate optimum internal resources from operations.

The uses of cash also need to be carefully planned. Payments to employees, inventory payments and payments for varied services, have to be examined and forecast. Questions such as taking advantage of cash discounts offered by suppliers need close attention to assess and effect the available cash savings. Besides planning the payments of various categories of operating expenses, the payments of taxes and dividends and the timing thereof have to be preplanned. The repayment of loans, in accordance with agreed schedules, has to be provided for.

Planning Cash Balance

It is essential that a minimum cash balance is ever kept ready for emergency use. The quantum to be thus held may vary from company to company, and from time to time.

This reservoir of cash balance acts as a levelling factor. This reservoir cannot be allowed to go dry, as in that event, there can develop a liquidity crisis and a threat of insolvency. Nor can this reservoir be allowed to fill to the brim, because it will be expensive to hold large dose of idle cash and the return on investment will shrink. Thus arises the question: how much is too much? The answer will depend upon individual business situations. The level of production, pattern of demand, credit terms for purchases and sales, sources and prompt availability of credit, pattern of operating expenses etc., are factors that vary from industry to industry and company to company. The levels of adequacy of cash also vary correspondingly.

If excess cash is indicated in the cash plan, decision has to be taken on appropriate utilisation by making short-term investments, allowing some build up in inventories, liberalising credit terms, acquiring some fixed assets or repaying liabilities, even ahead of schedule. If cash shortages are expected, action called for may cover sale of some short-term investments, increasing the proportion of cash sales to total sales, aggressive collection of outstandings, sale of some inventories, sale of disposable fixed assets, and as a final resort, borrowing funds from outside.

15.5 MEASURES OF OPERATING LIQUIDITY

The current ratios and acid test ratios serve as measures or indicators of general short-term liquidity and creditworthiness. There are other methods too, to measure operating liquidity.

One such method, which endeavours to measure the efficiency with which cash is being employed to support the company's operations, is the ratio of 'cash balance' to 'total current assets'

$$\text{Cash in current assets} = \frac{\text{Cash balance}}{\text{Current assets}}$$

The trend of this ratio during previous years can provide some guidance as to the desirable level of the ratio. Inter-firm comparisons and industry averages can also aid in the choice of an acceptable ratio of cash to current assets, for planning the cash balance. A large ratio can be interpreted to mean unduly high liquidity and poor cash management.

Another approach may be to measure the velocity with which cash moves through the company's operations, as reflected in the sales for the period. The aim is to measure the number of times the opening cash balance is turned over in sales during the given period.

$$\text{Cash turnover in sales} = \frac{\text{Sales for the period}}{\text{Opening cash balance}}$$

If the nature of business entails a low rate of turnover of cash in sales, it will follow that the initial and the sustaining cash balance will have to be relatively large. On the other hand, if cash velocity in sales is high, the activities can be sustained by relatively smaller cash balance, making for effective and efficient use of cash and also for improved liquidity.

Yet another approach will be to compare the opening cash balance with the total cash handled during the given period. This will indicate the rate of turnover of cash in relation to the total cash flow that the company has had for the period under consideration.

$$\text{Turnover of cash in total cash handled} = \frac{\text{Total cash handled}}{\text{Opening cash balance}}$$

To determine the amount of total cash handled during any given period, we have to obtain the sum total of the sources and the uses of cash relevant to the period. The

goal will be to maintain as high a turnover as possible and comparative data can be had by way of industry averages and inter-firm particulars.

15.6 PERIODIC REPORTS FOR CONTROL

The preparation of the short-term forecasts or cash budget sets the framework for management of cash flow and cannot be considered as the final act in the cash management process. The operations of the business enterprise may often deviate from the planned courses with instantaneous changes in cash requirements, and such deviations have to be promptly identified and necessary follow up action initiated. Minor shifts can be tackled by marginal operational readjustments such as postponing certain discretionary payments and speedy collection of book debts. These can be viewed as course correction measures but their effectiveness depends upon a good reporting system that highlights such changes without loss of time.

Periodic reports that provide a comparison of actual developments in relation to budgeted figures will help decide whether, when and to what extent financial plans need to be modified in the light of the existing gap between plan and performance.

The Daily Cash Report is the best vehicle for obtaining a running comparison between the forecast cash flows and the actual cash flows. Even though the cash budgets are generally not set up on a daily basis, the daily cash report indicating the opening cash balance of the day and the closing balance for the day is a very useful document. Its scrutiny over a period of consecutive days will confirm whether or not the rate of cash flow is conforming to the expectations. When a close watch is maintained on the direction and movement of the daily closing cash balance, there is an inbuilt warning mechanism facilitating timely bank negotiations when there is urgency to draw on the line of credit with the bank or for repayment of bank borrowings when abundant surplus cash position persists. Table 15.1 is a simple format for the Daily Cash Report.

Table 15.1

Daily Cash Report

January 18,

Opening balance	_____
Receipts:	
Cash sales	_____
Collection from debtors	_____
Others	_____
Total receipts	_____
Payments:	
Operations	_____
Others	_____
Total payments	_____
Excess/(shortfall) of receipts over payments	_____
Closing balance	_____

Another periodic report of considerable importance in comparing and analysing the significant details of actual cash flows, for the month and for the year to date, with the relevant projections in the cash budget, is the 'Monthly Cash Budget Report'. Major variance of actual against projected cash receipts and payments thus get singled out

for special scrutiny and possible corrective action. Table 15.2 gives the format of such a 'monthly cash budget report'.

Table 15.2

Monthly Cash Budget Report

	This month			Year to date		
	Actual Rs.	Budget Rs.	Variance Rs.	Actual Rs.	Budget Rs.	Variance Rs.
Cash receipts:						
Cash sales						
Collections from debtors						
Sale of investments						
Interest income						
Short-term borrowings						
Long-term borrowings						
Others						
Total						
Cash Payments:						
Raw materials						
Wages						
Manufacturing expenses						
Selling expenses						
Administrative expenses						
Income tax						
Interest						
Dividends						
Fixed assets						
Loan repayments						
Short-term investments						
Others						
Total						

A variety of cash reports designed for specific needs of individual companies are in vogue, for checking cash flows and ensuring constant availability of adequate cash. These reports serve as constant reference points for finance managers.

Activity 2

Explain the utility of the following reports

a. Daily cash report

15.7 GETTING MOST MILEAGE OUT OF CASH

How active is the cash flow stream? Does it tend to be tardy, in stages? What, then, are the stages that need to be energised or activated? Cash administration has to raise these questions constantly, spot and halts and delays that hinder profits and hamper liquidity and be ever alive to take immediate and effective remedial actions.

The main stage in the cash flow stream covers the time span between the receipt of the customer's order and the invoicing of the supply to the customer. It will be interesting to examine the time lag between the acceptance of customer's order by the sales department and its inclusion in the production schedule. Most of these confirmed orders are victims of undue delay, even in initial clerical processing. The sales department may take its own time to release the requirements signal to the planning department. The planning department may not be in any particular hurry to speed up action of the materials and process planning preparatory to the inclusion of the item in the production plan. Even after the item manages to stagger along into the production stream, a number of stoppages and hold-ups impede its progress to the finishing stage.

Meantime, the customer might have been treated to a number of postponements in delivery dates. Ultimately the item gets manufactured and duly despatched. Then comes the time lag between shipment and billing. The elaborate documentation and delays in clerical handling swallow up valuable time before the invoices are mailed to the customer for amounts already due for some days. Where high value and large volume transactions are involved, these delays punctuating the flow process between order acceptance and billing can cost a considerable sum by way of locked up funds and interest payments on avoidable borrowings. All along the line, the careful observer can discern administrative delays, which can be eliminated with profitable results. In most cases, the gap between the rational cycle time needed for processing and completing an order and the actual time taken for the order to mature into the final invoice to the customer will be found to be far too wide. This is a potential area for effective control, with profitability and liquidity implications.

The following stage, deserving careful attention, is the time lag between billing and the collection of dues. Credit and collection policies and procedures have to be tuned to the objective of increasing the magnitude and speed of cash inflows. A variety of approaches can be adopted, including offer of cash discounts, for speedy realisation of dues. But, it is not uncommon to find customers habitually delaying payments, aided and assisted by permissive and ineffective collection policies of companies. Such administrative lapses can promote incidence of bad debts.

Yet another stage that offers substantial scope for improvement in the efficiency of cash management concerns the time interval between the receipt of the cheque from the customer and its conversion into spendable cash for the company.

How promptly are the cheques received from the customer deposited into the company's account with the bank? Many companies tend to overlook this aspect, leading to some expensive conventions such as accumulating the cheques received and depositing them

with the bank once in two or three days, where substantial remittances are involved, the casual approach to this clerical function can prove very costly, in terms of lost opportunity to save interest charges, besides the non-availability of funds for immediate operational needs. There are instances where the branch offices of trading companies forward all cheques received, including the local cheques, to the head office. With additional mailing time and further delays in realisation of outstation cheques, the availability of funds for spending gets unnecessarily postponed and meantime, borrowings will have to be resorted to, for urgent operating needs.

While centralised management of cash, operated from head office has the advantage of economy in the matter of minimum cash balance needed to support a given level of operations, this philosophy cannot be carried to the extreme stage where are the branches or area offices merely forward the mails and await instructions. In an organisation with a vast network of branches, the head office can have centralised control of funds deployment and uses, but can operate through a series of area or regional bank accounts, into which the area or regional offices can be asked to deposit the cheques received from customers, without delay. These accounts can function as collection bank accounts, with separate imprest bank accounts for local office expenses. Standing arrangements can be made for automatic or telegraphic transfer or telex transfer of amounts realised by the collection bank accounts to the head office bank account, at headquarters, with the branch of the collection banker or with a correspondent bank. With a very large network of branches established by our major banks, all over the country, there can be no difficulty in establishing strategic collection centres and operating the respective collection bank accounts. If the bank services are requisitioned in an organised manner on a continuing basis it should be possible to have them at attractively concessional rates. The company can thus have speedier use of its own funds.

With a large number of area collection banks in operation, the finance manager is confronted with a new problem. He has hastened the cash flow by shortening the pipelines through which the remittances mature into usable funds. But, if he is operating a large number of regional collection bank accounts, he has to keep track of the 'floats' obtaining at these centres. The deposited cheque remains immobilised as a 'float' until the amount is actually realised and recorded by the bank. In India, these 'floats' can assume sizeable proportions, as cheques normally take a longer time to get realised, than the most countries. He needs day-to-day feed back of the bank balance and the float at each location or collection centre. This information is fundamental to his efforts to employ the funds effectively.

The company's bank can, if it is adequately geared with its information system, provide useful services by keeping the finance manager regularly advised of the company's 'balance' and 'float' position at the various centres served by its branches. By ensuring that the proceeds realised by the regional collection bank is promptly transferred to the bank's office at the company's headquarters, the problem becomes less complex. The regional office will not be authorised to operate the collection bank account, but its operating needs will be met through a separate imprest bank account with the same bank, into which periodic reimbursements will be made by the head office.

How about effective control of disbursements? One of the popularly known ways of maximising funds availability is to combine accelerated collection with slower disbursement of dues. While working with a network of bank accounts at different regions or locations, the deployment of funds become a skilled exercise as some locations will show surplus funds while other will have urgent needs to meet.

Some companies have the courage to resort to the risky game known as 'playing the

float'. In this case, the float represents the cheques issued but yet to be presented and realised. Upcountry cheques issued by the company may take upto a few weeks to be realised. Though, in the company's records, the cheques issued go to reduce the balance with the bank, the bank account records the reduction only at the time of actual payment. The finance manager may feel emboldened to take a calculated risk of allowing the company's to indicate an overdrawn bank account, by issuing a few cheques for amounts within the float, in the hope that by the time the outstation cheques are presented, further deposits into the bank would have materialised and augmented the bank balance adequately. If the calculations prove wrong, the result will be complications and embarassments, but the adventurous among the finance managers proceed to play the game fully aware of the risks.

The designing and implementation of overall cash control systems calls for a variety of planning decisions, covering location of bank facilities, information process, transfer of funds and similar aspects. Any system in use has to be constantly kept under review and modified to meet new and changing situations and needs.

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SECTION B : MANAGEMENT OF RECEIVABLES

15.8 INTRODUCTION

The well known form of trade credit is 'book debt', also referred to as 'debtors', 'outstandings' and 'accounts receivables'. When a seller extends credit to a buyer, mutual trust is implicit in the transaction. The trust has three dimensions. First, it embraces an element of risk which needs to be assessed. Cash transaction, covering immediate payment in exchange for goods and services, is totally riskless. Second, it is based on economic value. The economic value in goods passes to the buyer currently, in return for an equivalent economic value expected from him later. Third, it implies futurity. The payment, for value received, arises at a future date.

From the point view of the seller, accounts receivables or trade credit represents a claim or an asset. In the present day economy, credit stands out as Prominent, pervasive force. Some view it a type of business finance. Others look upon it as an ingredient of marketing, which aids and sustains the movement of goods through the production and distribution channels to ultimate consumption.

Granting credit has the effect of diverting financial resources and this gives rise to the need for supplemental financial assistance from banks or other sources to sustain credit sales. This is the basis for the reference to the investment in 'receivables' or 'debtors'.

Terms of credit, in many cases, tend to be governed by conventions or standards that fail to reckon the variations in creditworthiness as between different clients. This is also often followed by a passive or permissive attitude in the matter of follow up and collection of outstandings. It is essential to recognise the two distinct and critical elements in credit, namely, the time element and the amount element. The risk involved in allowing undue delay in settlement of outstandings is often overlooked. Excessive credit for an unduly long spell can often lead to default in payment of dues on the part of the client for a variety of reasons.

Adequacy of credit implies a degree of calculated moderation, whereby the right amount of credit is available for the right duration. Too little of credit stifles trade and impairs profit. Too much of it creates a false sense of abundance, breeds overtrading and brings the inability to meet the fast mounting obligations and ultimate failure. Effective credit management seeks to steer clear of these two undesirable extremes. A knowledge of credit principles and sound credit practices is the best insurance against abuses of credit.

15.9 OBJECTIVES AND SCOPE OF RECEIVABLES MANAGEMENT

Primarily, receivables management should sustain and promote the twin corporate goals of liquidity and profitability. For this, the credit policies, procedures and practices have to be so tuned as to:

- * Obtain the optimum volume of sales for a given period.
- * Maintain proper control over the quantum of investment in receivables.
- * Exercise control over the cost of credit and collections.

Credit policy has close relevance to pricing strategy as also the volume of business transacted in any given period. Well administered credit can provide a good push to sales and serve as an effective tool for sales promotion. It can win new customers and keep them as profitable credit accounts.

Funds locked up in 'accounts receivables' have opportunity costs. Excessive tie up in outstandings will amount to denial of funds for more remunerative alternative uses. To avert over-investment in 'receivables', the control has to be exercised over the quality as well as the amount of receivables. The level of receivables is influenced by external factors such as industry conventions as to terms of sale, impact of changes in general level of business activity on the volume of credit sales and other seasonal factors. While these external influences may defy control, there are a host of internal, controllable factors that deserve attention. These cover credit policies, norms pertaining to granting of credit, determination of credit limits, and policies and procedures relating to collection of outstandings. Also relevant are issues such as charging interest on overdue accounts, policies on cash discount and the insistence on collateral securities for debts, in appropriate cases.

Extension of credit and the follow up and collection of outstandings entail costs, and these costs have to be kept under close control. The types of expenses are bad debts losses, the emoluments of those engaged in credit and collection activities, the interest charges or opportunity costs of funds locked up in accounts receivables and rent or depreciation relevant to the space and facilities used by the credit and collection establishment. The objective is to keep the expenses to a minimum commensurate with a maximum sales volume. Effective appraisal and periodic review are essential steps to ward off poor risks. Follow up and collection of outstandings and prompt attention to delinquent accounts call for considerable tact and diplomacy.

15.10 CREDIT POLICY

The discharge of the credit function in a company embraces a number of activities for which the policies have to be clearly laid down. Such a step will ensure consistency in credit decisions and actions.

An essential step to make the credit function effective is to give it an adequate status and a complementary role to the sales function.

Some companies have informal and unwritten and yet consistent policy approaches to credit granting and collection. It is desirable to state these policy directions in writing, in clear and precise terms, so that credit thinking and credit decisions have stability and continuity.

Credit policy, once developed and spelt out, should not be regarded as permanent. It has to be periodically reviewed and modified, taking note of significant changes in business environment. The credit policy should fall in line with the marketing policy. Where the marketing policy is directed to gain entry into new market territories and increased the overall market share, the credit policy should enable relaxation of credit terms and even acceptance of substandard risks on a calculated basis.

There may be specific industry characteristics influencing credit policy, governed by tradition, the pattern of demand for the industry's products, the pace of technological change and the other factors pertaining to the industry. In a given industry, credit might be the dominant factor in competition tool. Consideration will also have to be given to the company's strength in matters of finance, marketing organisation and product growth.

If the company is operating to full or near-full capacity of the plant, it might find it justifiable to insist on customers with high credit ratings. On the other hand, if there is idle plant capacity, the desire to relax credit standards might dictate the credit policy. What is normally involved is a trade-off between profit on additional sales that give rise to accounts receivables on the one hand, and the cost of carrying these receivables

balances plus the bad debts losses. Lenient and sloppy credit extension is as much undesirable very stringent credit standards.

Then there are the influences on the credit policy of the two conflicting factors:

- (i) Profitability and
- (ii) Liquidity.

The liquidity factor concerns:

- (a) the prospects of the receivables being realised when they fall due and
- (b) the prospects of reducing the duration of the credit term, without affecting profitability.

To improve profitability, one can resort to easy credit policy as a booster to sales, but the implications are:

- (a) chances of extending credit to those with weak credit standing.
- (b) unduly long credit terms.
- (c) tendency to expand credit to suit customers' needs, and
- (d) lack of attention to overdue accounts.

These might lead to reduced profits on account of higher incidence of bad debts. The question then is: What is the right balance between 'easy' credit to promote sales and profits and 'tight' credit to promote liquidity. A Cost-benefit study of each individual proposition will aid the decision process.

Activity 3

How do the following factors influence credit policy ?

a. Profitability

b. Liquidity

Interpretation of the policy in relation to short-term operations, determination of the levels of authority and delegation of credit decision and actions, and detailing the procedures, controls and the set-up for the periodic review and evaluation are the action measures at the implementation phase. Effective communication of the policy and its essentials to all concerned is the prime step for attaining harmony and a sense of direction in credit administration. This communication is also to be extended to related departments, such as sales. For instance, the salesman has to have an appreciation of what information concerning a new customer he should collect and forward to the credit department for assessment of creditworthiness. The delegation of authority for credit decisions should be clearly spelt out. Higher commitments and longer duration of credit may require approval at higher executive levels.

Procedures should also be established for recording and reporting the pattern of flow of sales orders, the preparation and maintenance of customers' ledgers, analysis and periodic reporting of the outstanding and customer performance, the nature and tone of collection letters, the situations calling for legal action and the approach thereto and other relevant matters.

15.11 CREDIT INFORMATION

While granting credit to a customer, satisfaction on two counts becomes essential.

- i. That the payment will be received in full.
- ii. That the payment will be received on the due date.

There is a cost attached to the granting of credit represented by either the interest charges of the bank borrowings required to finance it or the loss of opportunity to gain from alternative employment of the funds thus tied up. If book debts fall overdue, the damage is even more. In this context, the availability of adequate relevant credit information concerning the customer is the pre-requisite for intelligent credit granting.

Business practice in India has miles to go in the direction of organised assembly and interpretation of credit information by specialised agencies.

Trade References

The prospective customer can be asked to furnish two or three trade references, including some trade creditors with whom there are current dealings, and personal acquaintances. This is a very valuable source that provides speedy and authentic information at a minimum cost. It is advisable to send a brief questionnaire incorporating essential aspects of information required so that the response from the references will be specific and purposeful. It is essential to look into the credentials of the source also. The references have to be established and known business firms or companies.

Bank References

Seeking banker's opinion of the customer is another source of helpful information. The customer can be asked to advise his banker to provide the required credit information, and the bank can then be approached. This source, however, suffers from some limitations. The banker cannot be expected to come out with categorical answers to pointed questions about his customer. Moreover, proper conduct of bank account cannot be taken as evidence of prompt settlement of dues to other suppliers and creditors. Bank reference can, at best, be one of the information inputs for credit investigation. It might be worthwhile to contact the customer's bank, in person, for a closer exploration of the customer's credit and financial condition. Such a personal dialogue can set things in right perspective.

Credit Bureau Reports

Credit bureau organisations, on national and regional scales, provide signal services in advanced countries, enabling creditors to exchange information concerning their common customers. There are a large variety of trade and industry associations and chambers of commerce which are operating in India and these can well be developed into very useful and specialised agencies providing very valuable and authentic credit informations for their members and other business prospects. Ledger experience gathered from members, financial and business sections of local newspapers, other clippings from trade publications, periodicals and journals, are all inputs for the individual master cards or credit records. Thus equipped, these agencies can provide speedy, accurate and complete credit information at reasonable charges.

Ledger Experience

The sales ledger or the debtor's ledger, if promptly maintained, can be a valuable source of essential data for scrutiny and interpretation. The schedule of debtors, with details of the bills and amounts due, can be extracted from the ledger, at regular intervals, providing first hand information for review of each customer's behaviour in the matter of settlement of dues. However, this source of reference will not be available in the case of new customers.

Declining business, incompetence, a shift in character or standard of integrity will eventually be reflected in the customer's payments performance and this trend can certainly be recognised promptly, if only the continuing story of the transactions with the customer, as revealed by his account in the sales ledger, is regularly examined and interpreted. In many instances, what starts as an occasional lapse, can develop into a frequent pattern of delayed payment, mature into a chronic collection problem or sticky account and, if the warning is not taken, may explode into a bad debt.

The ledger account most instantly and faithfully reflects these deteriorating trends, if only one cares to take a look at these signals. The potential of the debtors' ledger as a warning system has not been widely recognised. An attitude of premissiveness is a clear encouragement for the customer to turn bad, if he can.

A sustained record of regular and prompt payments is a positive index of the customer's good credit standing. But there can be odd instances of calculating crooks building up confidence over a stretch of time, gaining quick extensions to credit limits on the basis of good credit performance, and playing an abrupt trick on confidence by backing out of a huge commitment, professing insolvency. Request for large increases in credit limits should be treated with much caution.

Published Financial Statements

Scrutiny of audited and published balance sheets and profit and loss statements of prospective clients can provide insight into their financial position and performance trends. The published financial statements of companies can be obtained without much difficulty, from the companies themselves, direct or from other sources. Difficulties may, however, be experienced in getting them from firms or individuals.

In India, the relevance of published accounts to credit granting is little realised and the problem is one of lack of appreciation rather than that of customer resistance. Very few among trade creditors bother to enquire into mortgages, hypothecations and other charges binding the customer's assets and blocking prospects of fully realising the amounts due in the event of liquidation. A narrow share capital base and reliance on heavy borrowing is a picture of unfair distribution of business risks and closer examination is required to assess the staying power and growth potential of the business.

If the customer's name appears in the shopping list of Government agencies and reputed organisations or in trade association directories or booklets, a degree of trust and confidence is created and reference to such publications can be step in customer evaluation.

Salesmen's Interviews and Reports

First hand information based on personal contact and dialogue has much significance in appraisal of credit risk. Salesmen or representatives may often be reluctant to assume responsibility for credit and collection functions. The message that the sale is not complete until the proceeds are realised has to be conveyed to them emphatically.

They need also to be given training to handle the delicate task of credit reporting and collection. They have frequent contacts with the customers and thus have the closest view of the customer's activities, progress and problems, and are best equipped to provide critical feedback information of relevance to credit decisions.

Once they establish cordial relations and keep the customer happy by ensuring prompt deliveries, they will have no difficulty in exerting mild pressures for prompt settlement of bills. Where enhancement of credit limits are sought, they can obtain from the customer the necessary particulars regarding his business standing, trends and prospects and also copies of the published financial statements pertaining to his business. They can also get clues, concerning his operations and progress, from other customers in the area, by making discreet enquiries. Salesmen can easily assume the role of interviewers and credit reporters, in the course of their routine contacts with the customers.

15.12 CREDIT INVESTIGATION

The process of gathering credit information is itself part of the credit investigation activity. The nature of information obtained may often indicate certain aspects that have to be further investigated. Among the factors that exert influence on the extent of credit investigation in a given situation, are:

- * The type of customers: whether new or one of existing or long-standing customers.
- * The customer's business line and background and the related credit risks.
- * The nature of the product - perishable or seasonal.
- * Size of customer order and expected future volumes of business with him, and
- * Company's credit policies and practices.

Two conflicting factors that pose a dilemma in credit decisions are:

- i. The adequacy of credit information
- ii. The need for speed in decision, particularly in a competitive set up.

Credit decision based on inadequate data may eventually prove faulty. At the same time, obtaining comprehensive credit information from different sources is a time consuming proposition and undue delay in responding to customer's request may result in his being lost to a competitor. Direct approach to customer will, in most cases, be the quick and effective way of obtaining information that is wanting. Generally, a comparative study of the customer's published financial statements for the previous three to five years will be adequate. Where substantial limits are involved, it may be necessary to ask the customer to furnish interim operating statement and balance sheets attested by him.

An organised approach will be to maintain each customer's credit file constantly updated, with the help of periodic field reports from the salesman, prompt scrutiny of the successive published financial statements and lessons drawn from the transactions experience reflected in the customer's account in the ledger. A regular system of annual review of customer file is a normal requirement. In selected cases, the review may have to be even more frequent, particularly in instances where the firm admits a new partner or there is a change in the composition of the management team. A noticed change in the payment habits of the customer, the receipt of a large order from him, a request for a sizeable upward revision in credit limit or for extended credit terms will call for a prompt review of his credit file.

Sound credit management rests on adequate information and the resulting proper credit investigation.

15.13 CREDIT ANALYSIS

Credit analysis, with respect to a prospective client, has two facets: the non-financial and financial. The crucial aspect, from the non-financial angle, is his management calibre. Questions can be posed seeking antecedent information and covering complete business background of the persons managing the business venture. The analyst has to be alert to spot instances of imbalance in the management of customer's business, marked by over-centralisation of responsibilities and authority, over-trading, shrinking margins and growing liabilities. While management failure can be attributed to a large variety of factors, the central factor is management incompetence.

Another aspect of appraisal of credit applicant's condition covers financial analysis. It is essential to gain an appreciation of the conditions and trends of the applicant's business operations, with particular attention to the concern's liquidity and ability to repay its debts. The magnitude of the credit transactions contemplated may have a bearing on the extent and intensity of financial analysis. The analyst who examines the financial affairs of the prospective client has also to equip himself with comparative performance data of the relevant industry. This will enable him to determine whether some of the observed shortcomings are attributable to general economic factors affecting all companies or are due to specific managerial deficiencies of the company under study. The ultimate aim is to obtain an assessment of the client's earning power and ability to meet current obligations.

15.14 CREDIT LIMITS

In considering the question of granting or denial of credit, the approach should be one of furthering profitable sales rather than that of detecting new excuses for credit refusal. Routine credit approval procedures can be set out for prompt processing of clear and normal credit applications. Sometimes it may happen that a customer who is currently enjoying credit facility, becomes slack in settling his dues, and precipitates a situation where further credit has to be refused to him or, may be, supplies to him have to be frozen pending further investigation. In such cases, it is only fair that he is promptly informed of this decision, so that he is not taken unawares.

Decision on the amount of credit will depend upon the magnitude of transactions contemplated and the assessment of the client's ability to settle his debts. To avoid the tedium of elaborate scrutiny, of each order from a customer for credit clearance, the practice of establishing credit lines can be adopted. If it is found from experience that the customer has a record of regular payment of debts, the credit line can be based on his purchasing pattern. For example, if the normal sale to him is expected to be of the order of Rs. 20,000 per month for purchase orders received from him upto this extent each month, credit can be extended automatically without investigation, scrutiny or reference to payment performance. Sometimes, where the payments from a customer are found to be unsteady, the credit line may be with reference to the amount of bills remaining to be settled by the customer. In this case, when the outstandings from the customer exceed a present level, the information will be flashed to the sales and credit functions so that the question of further supplies on credit can be properly reviewed.

While a credit line of or upto a specified amount can be stipulated for any given customer as a guideline, a periodic review based on current credit information regarding the customer is a 'must', so that tendencies towards delinquency can be spotted without delay and suitable downward revision of his credit line effected.

The credit line, expressed in value terms, reflects the operating level of credit extended to the customer. It will also be advisable to determine for each customer, the maximum

amount of credit that the company will be willing to extend to him. This limit, in the nature of a ceiling, is the credit limit. This may correspond to the credit line or may be above it. If the customer's financial capabilities are much above the normal level of transactions with him, the credit limit may be fixed at a higher level than the credit line, providing scope for further increase in volume of business with the customer on credit terms, without the formality of extended investigation.

There may be occasional credit requests from some customers for amounts much in excess of what their financial conditions would warrant. An unexpected and sudden spurt in business or price-induced concentration of purchases may have led to such an abnormal request. If the product involved has a high margin or, if the additional sale will lead to improved utilisation of plant facilities, resulting in reduced costs and higher profits, even an extraordinary risk may find a justification. The added risk of higher incidence of non-recovery or bad debts may be more than covered by the added profits that the extra sales will generate. The implications have to be examined through cost-benefit study.

Relaxation of credit standards may also be sought by some customers by way of extended credit period. The longer the credit period, the greater the degree of risk. Besides the increased risk of non-realisation, extended credit period will also call for additional tie-up of funds by way of investment in accounts receivables for longer duration and this will involve additional costs. Slower turnover of accounts receivables means reduced return on investment. But, if the decision to extend credit is taken with a view to attaining increased sales volume, the need arises to compare the additional revenues from increased sales with the extra costs relevant to the decision.

An increase in sales volume need not necessarily result in improved profits always. The costs associated with credit management are:

- i. 'Accounts receivables' maintenance and servicing costs, that is, administrative and clerical costs for record keeping etc.
- ii. Risk costs or bad debts
- iii. Costs of investment in accounts receivable, which may either be the rate of borrowing from banks or even the opportunity cost represented by loss of earnings potential from alternative investment of funds.

Relaxation of credit standards will have to be, therefore, justified in terms of improved profitability from additional sales generated, more than compensating the above mentioned costs arising from the credit decision.

The shift from ad hoc, subjective judgement to that of a studied reaction based on an analysis of the customer's character, capacity, capital, collaterals and business conditions is a must in these days of growing scarcity of external sources of working capital funds for any company.

15.15 THE COLLECTION PHASE

Collection of accounts receivables is the concluding stage in the fruition of sales transactions. The realised cash has to be speeded back into the purchase-production-sales cycle. Delays or prolonged hold-ups in collections can cause major financial embarrassments, as alternative sources of funds will have to be promptly found for sustaining operations. Slow paying customers have to be needled tactfully to make prompt payments. The collection process is an elaborate one comprising several steps such as letters, telephone calls, visits and, in some cases, legal proceedings. Since it involves bringing pressure, without offending, it calls for good deal of tact.

Aggressive sales, backed up by effective sales projection efforts, may be of little avail, if the follow up and collection mechanism fails by neglect. In the absence of clear cut collection policy and procedures, the accounts receivables will tend to accumulate, fall overdue and even turn sticky, if not bad.

A common debate is as to whether the 'sales' or 'accounts' function is responsible for follow up and collection. Salesmen who are good at clinching sales, often feel shy to ask for timely payment of dues by customer. They may expect the accounts wing to follow up and collect outstandings. In the absence of proper coordination, the officials from accounts department may adopt an ill-advised and nagging attitude in their eagerness to collect dues promptly and, in that process, may create strained relations with customer, adversely affecting future business.

Whether the responsibility for follow up and collection is with the sales or the accounts department or a separately set up credit department, there is the need for close coordination between these functions. For instance, when the accounts department proposes to take a tough line on a customer for non-payment of dues and intends to advise him that further supplies will not be made until the dues are settled, the sales department should be consulted and consent obtained. Similarly, sales department should consult accounts department before granting extended terms of credit.

The collection policy will cover aspects such as terms of sales including the permissible time intervals for settlement of dues, the incentives by way of cash discounts for prompt payment and the rate thereof, and the question of collecting interest charges of overdue accounts. It should also indicate the manner and timings of the follow up steps to be taken for collection of dues, ranging from initial polite reminder to ultimate threat of legal action.

Tailor-made follow up procedures can be designed for each organisation covering the preparation and despatch of statements of accounts and initial, intermediate and final stage collection letters, besides more direct contacts through telephone or through personal visits.

Where it is considered advisable, the trade documents can be arranged to be delivered to the customer through banker, instead of being mailed direct. The banker will present the documents against acceptance or payment as the case may be and promptly advise the company. In some cases, an advance approximating the amount of credit line for the customer, can be received from him as a deposit, with the understanding that he will process the bills for payment in accordance with agreed credit terms, so that this advance serves as an ever-present cushion.

The customer with chronic complaint about quality or quantity deviations in goods supplied could be one who is ever keen on postponing the payment on some pretext or the other. Some have a tendency to take advantage of the offer of cash discount though they have settled the amount well after the period of discount. Such clients have to be identified and their credit terms suitably revised, to include possibly an advance or deposit to be maintained against their purchase orders. Some companies charge higher prices for supplies to such problem clients.

Some clients may have the best intentions but may be financially in a tight corner and hence unable to meet their obligations. Their problems might have arisen from external factors for which they are not responsible. Given the support, they might still be capable of tiding over the difficulties and resume normal payments. Such genuine cases need special consideration, because the aim is to realise the money and also retain the goodwill and continue dealings with the customer. Only when the financial problems seem to be the outcome of the customer's incompetent handling

of his business and the prospects of his recovery seem to be doubtful, does it become necessary to initiate speedy or strong measures to collect the dues.

Offer of cash discount is a practice being increasingly adopted to stimulate quick payment, reduce incidence of bad debts and curtail debt servicing and collection expenses. The cash discount can also be regarded as the price the seller is willing to pay for getting the advantage of faster turnover of his funds. The buyer who has the funds is happy because he is able to purchase his requirement at a lower cost.

The Cost-Benefit Axis

It was noted earlier that credit decisions, particularly those concerning relaxation in existing credit terms, involve a tradeoff between expected profits from additional sales that the extended credit will bring and the extra costs and commitments that will arise in implementing the decision.

Take for instance, a company that is currently extending one month's credit to its selected customers. It sells its product at Rs.100 each and has an annual sale volume of 60,000 units. At current level of production, which mostly matched with sales, the product has a total cost of Rs.90 per unit and a variable cost of Rs.80 per unit. The company is considering a plan to grant more liberal credit terms by extending the duration of credit from one month to two months and expect the sales to go up by 25 per cent. In the background of a normal expectation of a 20 per cent return on investment, will this relaxation in credit standards justify itself? The cost-benefit computation is shown below.

Additional sales in units resulting from
relaxation in credit standards

15,000 units

Rs.

Contribution per unit = units selling price
minus unit variable cost = (100 - 80)

20

Additional profits from additional sales:
i.e. contribution from increased sales:

= 15,000 × 20

3,00,000

Annual sales at present

60,00,000

Annual sales after credit relaxation

75,00,000

Investment in outstanding, now (1 month)

5,00,000

Investment in outstandings expected (2 months)

12,50,000

Additional investment in outstanding, at sale value

7,50,000

Rs.

Units total cost based on increased activity,
(75,000 units):

Total fixed cost (10 × 60,000)

6,00,000

Total variable cost (80 × 75,000)

60,00,000

Total cost for 75,000 units

66,00,000

Cost per unit = 66,00,000/75,000

= 88

Additional investment in outstandings,

at cost: (7,50,000 × 88)/100

= 6,60,000

Expected return on the additional
investment, at 20 per cent

= 1,32,000

Since the additional profits, Rs.3,00,000, well exceed the costs of additional investment in outstandings, Rs.1,32,000, the decision to relax credit terms will prove remunerative.

Assume the decision has been implemented. At this stage, the company plans to offer 2 per cent discount for payment within 10 days and expects that out of the group of select customers, those covering 50 per cent annual sales by value will avail the cash discount facility. Is it advisable to offer this discount ?

	Rs.
The cash discount to be suffered	
= $(75,00,000/2) \times 2$ per cent	= 75,000
The average investment in outstandings:	
2 months for 50% sales = $(37,50,000 \times 2)/12$	= 6,25,000
and 10 days for 50% sales = $(37,50,000 /12) (10/30)$	= 1,04,100
Total	7,29,100
Total investment in outstandings at present (2 months)	12,50,000
Savings in investment, in sale value	5,20,900
Savings in investment, at cost = $(5,20,900 \times 88)/100$	= 4,58,400
savings in cost, at 20 per cent	91,680

The savings in cost, Rs.91,680, exceed the sacrifice by way of cash discount, Rs.75,000 and hence the proposition is welcome.

15.16 EFFECTIVENESS OF CREDIT MANAGEMENT

A clear assignment of responsibilities for the credit function and a statement of related objectives provide the proper setting against which the measurement of the effectiveness of credit operations can be attempted. Generally, the responsibilities and objectives go unstated, and there is no clear basis for appraisal of credit operations. Let us take that the objectives of credit management can be spelt out as:

- Obtain maximum sales.
- Keep bad debts losses to the minimum.
- Minimise the cost of investment in 'accounts receivables'.
- Minimise servicing and clerical costs for 'accounts receivables'.

We find that conflicting objectives have to be resolved. Steps to maximise sales may also increase the incidence of bad debts. Action to keep investment in accounts receivables to the minimum may restrain sales. The obvious aim is to strike the best possible compromise among these competing objectives.

The following measures may serve to assess the effectiveness of the credit granting function:

- Credit Sales Index:** Credit sales expressed as a percentage of total sales in a period may indicate the extent to which the company has to rely on credit based transactions for marketing its products.
- Rejection Index:** The rigidity or laxity in the grant of credit can be known normally from the ratio of applications received from prospective customers seeking credit facilities. This refusal ratio may not reveal the full story because some of the customers, whose applications have not been considered favourably may have agreed to purchase against cash payment or other protected terms. So the refusal of credit need not necessarily always lead to loss of sales opportunity.

iii. **Risk Classification of Customer Accounts:** A periodic review of the number of accounts falling in selected risk classifications can serve to indicate whether the general level of risk is rising or assuming disturbing proportions. The risk categories are: (a) no risk, (b) good, (c) marginal or any other suitable break up. The categories have to be clearly defined for meaningful classification.

iv. **Bad Debts Loss Index:** The amount of loss by way of bad debts, as a percentage of credit sales, shows the extent of loss due to credit risk. The bad debts ratio, however, has one snag that the bad debts, though expressed as a percentage of the credit sales of the current period, may in fact be traceable to credit sales of an earlier period. Yet the bad debts ratio is generally recognised as a measure of the net consequence of credit decisions for the period under consideration.

Another set of measures can be adopted to evaluate the company's performance in the matter of keeping investments in accounts receivables at a minimum level; thereby keeping the related costs low.

a. **Aging Schedule of Accounts Receivables:** The accounts receivables outstanding as at the end of the period may be classified according to the age, as in Table 15.3 below:

Table 15.3
Aging Schedule of Accounts Receivables - I

Period outstanding	Amount	Percentage
	Rs. Lakhs	
Less than 30 days	6	30
30 - 60 days	10	50
60 - 90 days	3	15
Over 90 days	1	5
Total	20	100

Assuming the annual turnover of Rs.80 lakhs, it is found that outstanding accounts stand at a level equivalent to 3 months sales and the distribution of the outstandings by time periods is shown in Table 15.3. The nature and intensity of collection effort called for with reference to each account can now be determined depending upon whether it is current or overdue, as revealed by the aging schedule.

Aging schedule can also serve as a measure of collection performance. Let us consider another situation where the annual sales is of the same order of Rs.80 lakhs and the outstandings also total Rs. 20 lakhs as in Table 15.3. But the age-wise distribution is as shown in Table 15.4.

Table 15.4
Aging Schedule of Accounts Receivables - II

Period outstanding	Amount	Percentage
	Rs. Lakhs	
Less than 30 days	5	25
30 - 60 days	8	40
60 - 90 days	4	20
Over 90 days	3	15
Total	20	100

While the total outstandings in relation to sales remain at the same 25 per cent level, in both the situations (Table 15.3 and Table 15.4), a comparison of the aging schedules throws up some concern about the pattern of accounts in Table 15.4. It is found that the composition of accounts receivables, as shown in Table 15.4 suffers in quality as there is an increasing tendency for larger amounts to persist in outstandings list for longer duration. Aging schedule thus highlights the quality and risk composition of accounts receivables, providing a basis for evaluating the collection effectiveness. Passive attitude to follow up and collection will be reflected in mounting levels of outstandings in the longer duration categories, with higher risks from the point of view of realisability and causing additional servicing costs.

Aging of outstandings, by value, however, may not convey the entire message. Consider a situation where there are a limited number of large accounts covering the bulk of accounts receivables, by value, and a large number of small accounts forming a small proportion of total outstandings, by value. If a few large accounts are collected promptly, a favourable trend will be shown in value terms. The fact will be that a very large number of accounts remain to be settled and in terms of effectiveness of follow up and collection, in terms of the number of parties involved, the performance can be regarded unsatisfactory. To draw attention to this aspect of physical performance, the aging schedule can be designed to indicate the number of accounts involved in each time scale. Table 15.5 illustrates this approach.

Table 15.5
Aging Schedule of Accounts Receivables - III

Period outstanding	No. of Accounts	Percentage
Less than 30 days	30	7.5
30 - 60 days	60	15.0
60 - 90 days	200	50.0
Over 90 days	110	27.5
Total	400	100

b. Delinquency Ratio: The aging schedule depicts varying degrees of delinquency, in three or more classifications on time scale. A simplified approach may be to group accounts receivables into two broad categories, normal and overdue accounts. The overdue debts, for example, can be those that are more than 6 months old. The overdue outstandings can be expressed as a percentage of total outstandings and the trends observed. If the amount of overdue debts keep increasing in relation to total book debts, the collection and follow up efforts may be deemed to be slack. This aspect is shown in the published financial statements of companies wherein information is given about the amount of overdue outstandings.

c. Analysis of Collections: The actual sum of debts collected during the period can also be analysed age-wise, as shown in Table 15.6.

Table 15.6
Age-wise Classification of Debts Collected

	Amount	Percentage
	Rs. Lakhs	
Within the normal credit term	14	56

Overdue by 30 days	4	16
Overdue by 30 - 60 days	3	12
Overdue by 60 - 90 days	3	12
Overdue above 90 days	1	4
Total	25	100

As the overdue debts get collected, the collection efforts merit appreciation, provided further debts are not allowed to enter and enlarge the overdue category.

d. Accounts Receivables Turnover Rate or Number of Days' Sales in Outstandings:

The most popular and generally adopted measure of effectiveness of collection effort is the turnover rate of accounts receivables. The rate is obtained by dividing the credit sales for the year in question by the amount of book debts as at the end of the year. Some prefer to divide credit sales by the average accounts receivables for the year (the average of accounts receivable at the beginning and as at the end of the year) to get a more reliable indicator. The number of times the investment in accounts receivables has been recycled or rolled over in relation to the year's credit sales is reflected in the turnover rate. The higher the turnover, the more effective and more rewarding has been the use of this investment. The turnover rate thus gives an overall measure of efficiency in management of accounts receivables.

Another way to review relationship between accounts receivables and annual credit sales is to express the accounts receivables as a percentage or fraction of credit sales. The lower the percentage of the ratio, the more effective is the credit management. The third approach will be to express the amount of accounts receivables gets divided by the value of average credit sales per day. The number of days' average credit sales which remain outstanding can then be compared with the normal credit term (in days) to determine whether the average collection period is keeping within the norm. If it exceeds the normal credit term, there is need to speed up collection efforts.

In the absence of information in published financial statements, about credit sales as distinct from cash sales, the turnover rate or accounts receivables ratio can be worked out with reference to the value of total annual sales (including cash sales).

15.17 SUMMARY

Cash management constitutes a key area of working capital management. Cash needs to be held in an enterprise for meeting anticipated obligations that may not match with cash receipts. Some reserve has also can be kept to cope with unforeseen fluctuations in cash flows. Cash might also be held with the speculative motive of taking advantage of opportunities that may present themselves. The twin objectives of cash management can be stated as that of being able to meet payment schedules and yet keeping minimum funds as cash balances. Cash budget is a device that helps the firm to plan and control cash. Cash management strategies have to be adopted, in keeping with the firm's activities, to minimise the operating cash balance requirement.

Receivables represent claims arising from credit sales and since the funds get blocked up to the extent of credit provided to customers, it is necessary to keep a close watch on the amount credit provided and the risk involved in extending credit to parties whose creditworthiness have not been assessed. However, credit has the potential to increase the sales and, thus, the profits, and it is necessary to do a proper credit assessment of the parties and also a cost-benefit analysis of the credit policy that is sought to be followed. Care also has to be exercised in promptly following up and collecting the amounts due without delay.

15.18 KEY WORDS

Operating liquid-ity Ability of the firm to meet its short term obligations without delay.

Current ratio Current asstes/current liabilities

Acid test ratio Quick assets/current liabilities: Quick assets are current assets minus investories

Floats The cheques deposited into the bank get collected and credited after an interval though from the firm's point of view the amount has been paid into the bank. Similarly, cheques issued though reckoned as paid through bank take time to be presented and collected by the parties concerned. The amounts thus pending realisation or payment for certain intervals are known as floats.

Credit limits The amount of credit that the customer will be eligible for on considerations of the magnitude of transactions with him and the assessment of his ability to settle his debts.

15.19 SELF-ASSESSMENT QUESTIONS

- i. What are the principal motives for holding cash ?
- ii. What are the cash management strategies that can be adopted to minimise the operating cash balance requirements ?
- iii. Discuss the utility of the cash budget as a tool of management.
- iv. Halts and delays can occur at different stages in the cash flow stream and cash administration is responsible for spotting these halts and delays and taking necessary remedial actions. Explain what these stages are and what the role of cash administration is with reference to them.
- v. What are the costs of maintaining receivables ?
- vi. Discuss the different ways in which credit information can be collected.
- vii. What are the important decision variables of a firm's credit policy ?
- viii. How would you measure the effectiveness of credit management ?
- ix. Eminent Ltd. is a company having an annual credit sales of Rs.30 lakhs. It deals in only one product. Currently it has an average collection period of 30 days. It is anticipated that the liberalisation of credit terms can lead to increased sales as indicated below:

Increase in collection period (days)	Incremental sales Rs. '000
15	200
30	300
45	350
60	375

The unit selling price for the product is Rs.50 and its unit variable cost is Rs.30. At current volume, it has a unit total cost of Rs.35.

It is also noted that the liberalisation of credit will lead to the following incidence of bad debts losses:

Incremental collection period	Bad debts: % on sales
15 days	0.5
30 days	1.0
45 days	1.5
60 days	2.0

Currently the company is free from bad debts losses. What will be the most rewarding credit policy under these circumstances? The company expects an 18 per cent return on investment.

15.20 FURTHER READINGS

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Huston T.G. and Butterworth John, Management of Trade Credit, Gower Press, London.

UNIT 16 MANAGEMENT OF INVENTORY

Objectives

After studying this unit, you should be able to:

- * appreciate the importance of inventory management
- * understand the process of inventory management;
- * learn about the costs relating to ordering and holding inventories
- * knowabout the tools and techniques of inventory management;
- * identify the ways in which effectiveness of inventory management can be measured.

Structure

- 16.1 Introduction
- 16.2 Objectives of inventory management
- 16.3 Inventory risks, policies and essential steps
- 16.4 A comprehensive inventory list
- 16.5 A.B.C. Analysis
- 16.6 Setting stock levels
 - 16.6.1 The Minimum-Maximum system
 - 16.6.2 Inventory decision and relevant costs
 - 16.6.3 Ordering costs
 - 16.6.4 Carrying costs
 - 16.6.5 Stock out costs
 - 16.6.6 How much to buy
 - 16.6.7 When to order
 - 16.6.8 Industry norms for inventories: Tandon Group Report
- 16.7 Perpetual inventory system
- 16.8 How to measure effectiveness of inventory management?
 - 16.8.1 Spare parts inventory
- 16.9 Summary
- 16.10 Key words
- 16.11 Self assessment questions/exercises
- 16.12 Further readings
- 16.13 Answers to activities

16.1 INTRODUCTION

The management of any enterprise is faced with the problem of having to ensure:

- (i) adequate inventories of finished goods to meet the ever- increasing demand for prompt customer services;
- (ii) adequate inventory of materials to maintain smooth flow of production operations; and
- (iii) Keep the money blocked in inventories at a reasonable level.

Sudden changes in production plans often result in changes in the requirements of raw materials whereby some items already procured become surplus and others that are urgently needed are not in stock. Steep price increases in certain items pose the question: Should we buy in bulk and carry stocks or should we buy in smaller lots to meet production requirements from time to time. Selection of the sources of supply, vendor development and connected efforts etc., influence the level of inventories held. Management has to draw the line of distinction between 'stock-outs' and excessive stocks'.

16.2 OBJECTIVES OF INVENTORY MANAGEMENT

Inventories of raw materials and supplies are needed for sustaining production. The process of manufacture will give rise to semi-finished products in the form of work-in-progress, components or sub-assemblies. Finished goods inventories will be necessary to support varying demands of customers. The objective of inventory management in its raw material phase can be said to be that of supporting a given production programme with the right quantity of materials, having the required quality and made available as and when needed, ensuring at the same time that the investment in or the funds tied up in inventory is kept at the minimum possible level and economies of storage and ordering costs are secured. In the work-in-process phase the objective will be to achieve economy of costs by processing economic batch quantities and avoiding undue accumulation of intermediate stocks. The finished goods phase of inventory management is concerned with maintenance of adequate inventories at the required outlets to meet the market needs promptly, and yet avoid build-up of imbalances such as excess stocks in certain outlets and shortages or stock-outs in other areas.

Avoidance of over-investment or under-investment in inventories is the desired management goal and an essential step to improve profitability.

16.3 INVENTORY RISKS, POLICIES AND ESSENTIAL STEPS

Poor inventory management can cause much drain on profits. Funds frozen in excessive stocks are denied for current operations which have to be financed by borrowing at substantial costs. Extra inventories would involve additional storage space and extra costs on insurance, handling and inspection. These categories of costs, known as 'carrying costs', tend to move in proportion to the quantity of inventory holdings and excess inventories will necessarily depress profits. By the same token, inadequate levels of inventories of raw materials, supplies and components can cause stoppages of production affecting sales and profits.

The profitability risks cited above get further compounded by liquidity risks. Where inventories turn redundant and are held for long periods, some of them suffer physical deterioration in quality while in storage and their realisable value may shrink substantially. There is also the risk of some of the items becoming obsolete and some products going out of fashion.

No standard set of rules can be prescribed to determine the right amount of inventory for all firms, in all situations. In a dynamic business setting, every policy decision needs to be constantly reviewed and updated to take note of changing circumstances and this holds good for inventory policies also.

The nature of business activity will have a bearing on inventory policies. For example, manufacturing companies with long production cycles will need heavier investment in inventories, as compared to trading companies or assembly type ventures. The location of the sources for materials and services as also of the sales outlets will influence inventory levels. The reliability of the sources of supply, the speed and efficiency of transport and communication facilities and seasonal aspects relating to purchased items or finished goods, are among the other factors that will influence inventory policies.

All functions in an organisation get involved, at one stage or the other, in activities and decisions affecting inventory. Inventory management cannot be thought of in patches or in isolated segments, but has to emerge as a unified approach with active involvement of all the functional areas of the organisation.

Effective inventory management calls for the following essential steps:

- (i) A comprehensive and well classified list of items in inventories;
- (ii) A.B.C. analysis of inventory items;
- (iii) Setting stock levels for different items;
- (iv) System of 'continuous stock taking' or perpetual inventory;
- (v) Evaluation through selected inventory ratios.

16.4 A COMPREHENSIVE INVENTORY LIST

In big organisations, where numerous categories of items are held in stock, and it is beyond the capacity of human memory to know and remember the vast multitude of inventory items, a well set form of communication is a necessary. A full list of items in stock, duly coded, classified and presented, with indications of the location and, wherever necessary, prices, will save much confusion and prevent duplication of purchases.

The stock lists will have to be updated periodically to reflect the current status of stocks. Material substitutions and operational changes may have eliminated the need for procuring certain items but in the absence of proper communication and coordination, these items may continue to get replenished when they reach their minimum levels. An annual review can help in spotting and remedying these mistakes. Companies that face severe funds crisis often search for surplus or redundant items for disposal. They have found that even items in 'C' class categories which are considered unimportant and have been written off as expenses at the point of purchase but have stagnated at various points, can be salvaged and disposed of for augmenting funds.

Comprehensive lists of work-in-process items, with information on the relevant quantities, prepared monthly, can assist in identifying lognpending jobs in manufacturing lines and facilitating their speedy processing. It is not unusual to find in some organisations where there is no systematic periodic review, rectification jobs and semi-processed items stagnating indefinitely until they are discovered in deteriorated state at the time of annual stock taking.

A list of items and their quantities in finished goods stores as at the end of each month can be a good information basis for marketing division for tracking down instances of slow moving products and taking necessary corrective action.

In any organised effort in tracing idling inventory items, the importance of rationalised codification deserves special recognition. Instances of confusion in identification are not uncommon, particularly in large sized stores.

An electrical firm in the U.K. had 111 different names for a simple item of a rod, three-eighths inch in diameter and six inches long. Twelve of these names are given below:

Plunger	Dowel pin	Motor drive spindle
Roller	Pinion spindle	Oil relief ball stop
Locating peg	Pin mould holding	Armature stud
Drive pin	Sanding valve roller	Trip arm pin

The fact was that several departments were using this item for different purposes and the item was called by the various functions it performed. When a rationalised system of codification was introduced in that firm, 111 bin cards and bins were found unnecessary and only one was retained for this item.

Varied systems and practices of codification have been evolved and the choice of a suitable system with the required degree of sophistication is left to the individual organisation's felt needs.

TABLE-16.1

Proportional Value Analysis

(Rs. Lakhs)

Class	Item			Annual consumption value		3 months' inventory	Inventory as per analysis
	Number	Cumulative	%	Value	Cumulative		
				Rs.	Rs.	Rs.	Rs.
A	100	100	10	42.00	42.00	10.50	1.75
B	200	300	30	12.00	54.00	3.00	2.00
C	700	1000	100	6.00	60.00	1.50	1.50
Total	1000			60.00		15.00	5.25

16.5 A.B.C. ANALYSIS

A.B.C. (Always Better Control) analysis is a selective approach aimed at keeping the investments low and at the same time avoiding stock-outs of critical items. The high value items, in terms of money value consumption, get segregated for pin-point control and extensive paper work is avoided in the case of low value items. Maximum attention thus gets paid to select few items representing a major part of the value of annual usage. This approach is also known as Control by Importance and Exception (C.I.E.) and Proportional value Analysis (P.V.A.)

A.B.C. analysis involves the following steps:

- (i) Make a list of all the items held in inventory and tabulate particulars concerning the annual consumption volume, the unit cost rate and the annual consumption value of each item.
- (ii) Recast the list, ranking the items in the descending order of their individual total value of annual consumption, giving also the running serial number for each item in the list.
- (iii) Record the running cumulative totals of the annual consumption values, starting from the first item downwards, and also indicate the percentage of the cumulative figure against each item to the total grand value of the annual consumption.
- (iv) Express each serial number in the list as a percentage of the total number of items therein.
- (v) A comparative look at the percentages will show that a relatively few represent a bulk of annual consumption value. These constitute the limited family of high value items, which can be ranked 'A' category items. Applying this logic and with the help of either a plotted graph incorporating the tabulated percentage data, or by a visual comparison of the tabulated data, mark off A, B and C groups, at what are regarded as rational break-even points relevant to the company

Table 16.1 gives a tabular presentation of the analysis. Class 'A' items form a mere 10 per cent of the total number of items but account for 70 per cent of the annual consumption value. The next significant active group, comprising of class 'B' items and representing another 20 per cent of the total number of items, account for another 20 per cent of the total annual consumption value. The balance 70 per cent of the items come under class 'C' and they represent the balance 10 per cent of the total value of annual consumption.

The comparison may vary from industry to industry or from company to company, but the basic pattern of a small percentage accounting for the bulk value remains valid.

For class 'A' items, constituting the expensive few, the greatest attention requires to be devoted and the tightest control exercised. For the items of inventories in this group, the stress will be on utmost care in storing. Minimum holding, maximum turnover and utmost speed in processing. Any anticipated change in sales and production plans has to be interpreted quickly in terms of corresponding change in projected usage for these valuable items so that timely action can be taken to prevent investment in unscheduled items. In respect of class 'A' items, the preference will be in favour of frequent ordering and low safety stocks though it will involve enhanced expediting costs. The savings in investment will more than compensate the extra ordering and expediting costs.

The high value nature of class 'A' items should further attract close attention to

all possible avenues of profit improvement through effective price negotiations with vendors, design changes for material saving, and increased material productivity through better equipment, better methods and better tooling. In other words, the company resources get marshalled and directed to the selected areas of maximum potential return.

Extending the principle of selective inventory control further, class 'B' items may not command such extensive and close attention as applied to class 'A' category, but yet have to be managed with some degree of caution. They have to be subjected to a reasonable degree of control and review, with the aim of effecting economies in use and saving in investment.

The class 'C' category constitutes the large family of small value items. There is no need to devote considerable time and expense to design and instal elaborate methods of control and expense review. Simple controls will do. Ordering frequency for these items can be drastically reduced and higher safety stocks maintained. Otherwise, with the very large number of items covered, any adherence to elaborate methods will lead to substantial ordering and expediting costs being incurred, even exceeding the negligible benefits.

Even in regard to class 'A' items, it may often be possible to place bulk order thus gaining on ordering costs, but with instruction to the vendors to arrange for staggered supplies, on monthly or weekly basis, as the situation may need.

Table 16.1 also highlights the effect of the application of A.B.C. analysis. A uniform policy of three months stock holding will involve an investment of Rs. 15 lakhs. Based on A.B.C. analysis, the decision to hold half-a-month stock of 'A' class items, two months' stock of 'B' class items and three months' stock of 'C' class items will introduce considerable economy by bringing down the investment to Rs. 5.25 lakhs.

Variations of A.B.C. analysis can be adopted to suit the needs of individual organisations. For instance, the total number of items can be segregated into :

- (i) High usage items, receiving close direction and strict control, and
- (ii) Low usage items where rough and ready methods of control may prove adequate.

Some may select a classification highlighting the usage and price aspects, as below:

- (i) High usage, low unit price;
- (ii) High usage, high unit price;
- (iii) Low usage, low unit price;
- (iv) Low usage, high unit price.

For each one of these categories, policy directions can be issued on matters of inventory procurement and holding.

Table - 16.2
Guidelines for Selective Inventory Control

		A items	B items	C items
1.	Control	Tight	Moderate	Loose
2.	Requirements	Exact	Exact	Estimated
3.	Postings	Individual	Individual	Group or None
4.	Check	Close	Some	Little
5.	Expediting	Regular	Some	No
6.	Safety stocks	Low	Medium	Large

Source : R.S.Chadda, Inventory Management in India, Allied Publications, Bombay.

Activity 1

1. What are the objectives of inventory management with reference to:

a. Raw materials:

b. Work in process:

c. Finished goods:

16.6 SETTING STOCK LEVELS

A number of factors enter into consideration in the determination of stock levels for individual items for purpose of control and economy. Among them are:

- ★ Rate of consumption
- ★ Lead time for deliveries
- ★ Capital needed
- ★ Keeping qualities, deterioration, evaporation etc.,
- ★ Space availability
- ★ Storage costs
- ★ Price fluctuations
- ★ Obsolescence risks
- ★ Seasonal considerations of price and availability
- ★ Economic ordering quantity
- ★ Insurance costs
- ★ Government restrictions or other statutory restrictions.

Any decision involving procurement, storage and usage of items will have to be based on an overall appreciation of the influence of the above factors and, particularly, the critical ones among them. And these factors are not stable and change from time to time. Therefore, we have to identify the critical areas. Provide for the required degree of safety factor or cushion and administer inventories effectively on selective principles.

16.6.1 The Minimum-Maximum System

This is a simple and widely used system aimed at controlling stock levels of individual items, in high usage and major value categories. A ceiling for a maximum level is fixed for each item, in terms of its number or unit of measurement. This acts as a general safeguard against over-investment in inventory. To avoid stock-out situations and the attendant adverse consequences on production and/or sales, a floor level or a minimum level is also fixed for each of the important inventory items and the aim is to so manage the replenishment that the stock of the individual item does not fall below this level. There are varying practices such as fixing of a 'danger' level, even below the minimum level, to trigger off rush action for replenishment even at extra

costs. The stock level at which the order for replenishment has to be released, called the 're-order point' (ROP), has to take note of the vagaries in consumption rates and possible shifts in procurement lead time, due to delayed despatches by suppliers or transport bottlenecks.

The 'minimum level' is established on the basis of the average consumption rate and the lead time required to procure the item. It can be viewed as the safety or buffer stock to cover any increase in consumption rate or delay in delivery. The intention will be to expect the replenishment to arrive just when the stock is reaching the minimum level. If, for some reason, the stock falls below the minimum level, the purchase department has to initiate urgent action to expedite despatch at supplier's end. The longer the lead time, the higher the minimum stock level. Where there are increased chances of fluctuations in delivery commitments of suppliers, higher minimum stocks are warranted. When the items are locally available, and the stock-out costs are low, the minimum stocks can be nominal. For critical items, however, adequate safety levels of stocks are very essential. For high consumption/value items calling for large investments and bulky items calling for increased storage space, all care has to be taken to keep the minimum stock level as low as possible. The same approach will hold good for items subject to a relatively high risk of obsolescence.

In determining the 'maximum level', considerations of finance, storage space required, import licencing policies and the nature of commodity, assume importance. In prescribing that the stock for an item shall not exceed the given limit, the main goal is to control investment. In broad terms, the maximum level will be equivalent to the minimum level plus the re-ordering quantity.

Altered production methods, diversification, changes in specifications of materials and other similar developments may cause basic changes in the pattern and the rate of requirements of the different items in the inventory. It is, therefore, very essential that the maximum and minimum levels are periodically reviewed and refixed, wherever necessary.

The success of such systems depends to a large extent on prompt and reliable recording of the transactions and timely reporting of events and situations that require attention. Many are the organisations where the systems have been well conceived initially but implemented piecemeal and left to suffer by neglect.

Activity 2

Define the following inventory levels:

a. Maximum level

b. Minimum level

c. Danger level

d. Re-order level

16.6.2 Inventory decisions and relevant costs

Inventory management gives rise to a variety of decision situations. The questions can be:

- * When does an item require to be replenished?
- * When should the order for procurement be released?
- * How much is the quantity to be ordered each time ?
- * What are the alternative sources and prices ?
- * Should we have an additional source or switch over to a new source?
- * How will such a shift or switch over affect the maximum, minimum and re-ordering levels?
- * What types of documentation and procedures are needed for effective inventory control?
- * What are the limitations of storage space and related facilities?
- * In what lot-sizes should the components or products be made?
- * When should action be initiated to produce each lot?

Fundamental to the finding of answers to all these and many more questions on inventory management is the study of the relevant costs and benefits. The most frequent and the basic among inventory decision situations are:

For raw materials and important supplies:

When to order?

How much to buy ?

For manufactured products:

When to make ?

How much to make?

The expectation is that the 'best' decision should be the 'least cost' decision. The types of cost information called for are such as are not readily to be had from the routine accounting and costing system in any organisation. These are termed 'relevant' cost and have to be computed on an ad hoc but rational basis. Questions like : what are our inventory carrying costs ? Or what are our ordering costs ? often fail to get a ready answer because of the inadequacy of the accounting and costing systems in some organisations. Futuristic and notional costs assume relevance in decisions. making. If bulk ordering is being considered, it becomes necessary to know what the likely quantity discounts and cost benefits are, and these values are futuristic and have to be estimated.

Inherent in inventory decisions are three types of cost factors:

- (i) Ordering costs or costs of acquiring inventories;
- (ii) Carrying costs or costs of maintaining inventories; and
- (iii) Stock-out costs.

16.6.3 Ordering costs

In respect of raw materials and supplies, 'ordering costs' will include the costs connected with the order placement and also the subsequent costs arising from and related to such individual supply order. Thus, it will include the cost of purchase order forms, the clerical and order processing costs in purchase department, the postage, the stationery costs of 'receiving notes' and 'inspection notes', the cost of related staff work in receiving

and inspection departments, and the specific costs for recording and processing the concerned supply bills for payment. Most of these costs tend to vary directly or relatively with reference to the number of orders placed.

When manufacture of the products for sale via finished product inventory is involved, we will be concerned with the 'set-up cost'. The set-up cost will cover the cost of preparing the concerned stock orders, the staff costs in finalising drawings and specifications, cost of tooling and set-up of machines and concerned handling costs, learning costs and specific costs such as overtime.

16.6.4 Carrying Costs

Among the cost elements that have to be considered in determining inventory carrying costs are:

- ★ The cost of the storage space, viz. rent or depreciation
- ★ Property taxes on stores buildings
- ★ Property insurance as also insurance on inventoried items
- ★ Cost of deterioration or obsolescence while in storage
- ★ Storage handling costs
- ★ Storage costs including staff services, recording and special facilities such as enclosures etc.,
- ★ Cost of funds, viz. borrowings, to support investment in inventories.

Most of these costs can be determined or estimated with reference to the available data on rent or depreciation on stores building, taxes or rates paid, insurance risks covered and related payments of premia, stores handling expenses, and outlays on stationery, fencing, trays, bins, racks, etc., Losses from evaporation, shrinkage, spoilage, deterioration, obsolescence etc. can also be estimated on the basis of past experience connected with the concerned categories of inventories. Financing costs relevant to inventory levels could either be the interest charges on the amounts borrowed to procure the items in inventory or the opportunity cost of the funds blocked in inventory represented by the earnings that the funds will command if diverted to the best among more rewarding investment opportunities available.

Considerations of 'carrying costs' will include a line of action which is the exact opposite of what considerations of 'ordering costs' will recommend. To keep ordering costs low, we should increase the size of each order and reduce the number of orders. But, to keep the inventory carrying costs low, our aim should be to keep the inventories low and replenish them more often. In deciding on how much to buy and when to order, these conflicting cost currents have to be resolved and balanced, to yield maximum results.

The inventory items can be grouped into major classifications, depending upon their nature, such as raw materials, oil stores, tool stores, spares etc. and inventory carrying cost for each category expressed in relation to the value of the concerned inventories held.

16.6.5 Stock-out cost

If an item of raw material is not in stock and the product line is waiting for material, special efforts to procure the material with utmost speed will entail special costs. Telegrams, trunk calls, air dashing of materials, if of small bulk (sometimes with escort), may be resorted to, at considerable expense, to rush the material to the production line. These are traceable costs. In some cases, desperate efforts are made to spot some source locally, where a small lot of the required material can be bought,

If a customer who fails to get what he had asked for turns to any other competing supplier or dealer, there is a loss of profit to the extent of 'contribution' lost on the missed sale. Repeated failure to afford customer satisfaction can have a telling effect leading to substantial loss of earnings arising from loss of reputation and loss of clientele.

16.6.6 How much to buy ?

What is the optimum size of the purchase order lot ? This is a fundamental inventory decision area. This optimum size is popularly referred to as Economic Order Quantity (EOQ). This order size has to give the minimum annual total costs for ordering and holding, to qualify as the 'best' or 'least cost' quantity level.

The analytical approach to resolving lot-size problem can be illustrated with the help of a simple example. The annual requirement of a particular component is 2,400 pieces. The component will have a steady usage through the year. The ordering cost tends to remain constant regardless of the size of the order and is Rs. 100 per order. The inventory carrying cost is computed as a percentage of the value of average inventory held during the year and is estimated at 20 per cent of the value. On the assumption that the inventory orders are promptly filled, there is no need for safety stocks nor are stock-out situations anticipated. The purchase cost of the component is Rs. 10 each.

A variety of options are open. Buy the entire requirement of 2,400 pieces in one lot, or in 2 lots of 1,200 pieces each and so on. But which is the lot size that will involve minimum total ordering-cum-carrying cost ? Table 16.3 presents the tabulated cost data pertaining to different lot sizes that may be chosen.

Table 16.3
Economic Ordering Quantity

Number of orders per year	Order size	Average inventory ie. 50% of each purchase	Annual carrying cost at 20%	Annual procurement cost at Rs. 100/order	Total cost
	Rs.	Rs.	Rs.	Rs.	Rs.
1	24,000	12,000	2,400	100	2,500
2	12,000	6,000	1,200	200	1,400
3	8,000	4,000	800	300	1,100
4	6,000	3,000	600	400	1,000
5	4,800	2,400	480	500	980
6	4,000	2,000	400	600	1,000
7	3,430	1,715	343	700	1,043
8	3,000	1,500	300	800	1,100
9	2,670	1,335	267	900	1,167
10	2,400	1,200	240	1,000	1,240
11	2,180	1,090	218	1,100	1,318
12	2,000	1,000	200	1,200	1,400

If the intention is to place one order for the total annual requirements, the purchase lot of 2,400 pieces will be the starting inventory at the commencement of the year. The steady usage in the course of the year will reduce progressively the inventory level until it reaches the zero point at the end of the year. In other words, assuming a pattern of constant or steady usage, the average inventory held during the year will be the average of the opening and the closing inventory, that is, 1,200 units, valued at

Rs.12,000.

On the other hand, if the plan is to order on a monthly basis, 12 orders will be released in the course of the year, each for 200 units. Each month will start with an opening inventory of 200 units, and the items having been used up during the month, the inventory will fall to zero the month end. The average level of inventory held will, in this case, work out to 100 units, valued at Rs. 1,000.

If the objective is to reduce the investment in inventory, the choice should fall in favour of ordering on a monthly basis. But whether this will be the most economical proposition needs to be examined by studying the cost implications of not merely carrying lower inventory levels but also of processing larger number of small lot orders.

The inventory carrying cost, in the example, is worked out at 20 per cent of the average inventory level relevant to each situation.

From the Table, it is seen that the single order for annual requirements will involve an average inventory of 1,200 units worth Rs.12,000. The multiple order plan entailing 12 individual orders for the monthly requirements results in an average inventory level of 100 units, worth Rs. 1,000. The investment in the single order plan is Rs. 12,000, whereas in the multiple order plan it will be only Rs. 1,000.

A look at the ordering costs of the two plans shows that against the ordering cost of Rs. 100 for the single annual order plan, the ordering cost for the 12 monthly orders will be Rs. 1,200. From this point of view, the multiple order plan is more expensive.

In terms of total or ordering-cum-carrying cost, the single order plan costs Rs. 2,500, while the multiple order plan costs Rs.1,400, as seen from the Table. Comparatively, the multiple order plan is more economical.

The optimum solution, however, has to be obtained by considering the impact of the other possible intermediate plans detailed in the Table. It is observed that the optimal order size or the economic order quantity (EOQ) is 480 pieces, the number of orders for the year being 5. This option incurs the minimum total ordering-cum-carrying cost of Rs. 980 of the year. The average inventory level, in this case, will be 240 units.

The economic ordering quantity is not a rigid dictum. One can think of operating within an EOQ range, with considerable flexibility in the matter of deciding on the order size. For example, if a variation of 12 per cent from the minimum total ordering-cum-carrying cost of Rs. 980 is acceptable, the order size can be anywhere between 300 units and 800 units. If a 2 per cent variation, in relation to the total minimum cost of Rs. 980 is what is acceptable, the order size can vary between 400 and 600 units. These are undoubtedly wide ranges, providing considerable flexibility to adjust the order size to the changing needs of the situation.

Besides the tabular solution presented above, the problem can also be solved by the equation:

$$x = \sqrt{2AS/i}$$

where,

x = the size of the individual purchase

A = ordering cost, Rs. 100 per order

S = annual usage, 2400 pieces, and

i = inventory carrying cost, at Rs. 2 per piece, per annum, for the average inventory held.

Substituting the known values for A, S and i, in our example.

$$x = \sqrt{(2 * 100 * 2400)/2} = \sqrt{2,40,000} = 490 \text{ pieces.}$$

The annual requirements will thus have to be obtained in 5 lots and this can be in even lots of 480 each.

The EOQ approach has particular relevance and usefulness in instances of high usage, low value items.

16.6.7 When to order ?

When should we order stock replenishment ? Given steady usage or consumption and a stable and reliable lead time for procurement of the stock item, deciding on the right time for re-ordering is a simple proposition. A straight forward approach to this situation is the two-bin system. The total inventory of a given item can be split into two groups, one small and the other large. The small group, placed in the small bin, will contain enough numbers of the item to meet the consumption needs during the lead time for procurement, i.e., regular consumption rate $\times$ lead time. The balance will be placed in the large bin for issue to production. At that point of time, when the large bin gets exhausted, the order for replenishment will be released and further issues to production will be made from the small bin. Just before the small bin gets empty, the replenishment is expected to arrive, enabling the two bins to be filled.

An alternative approach is the periodic-inspection system which schedules verification of inventories at regular intervals. Wherever the stock levels are found to fall short of the consumption needs till the next inspection, plus the procurement lead time, replenishment order will be released.

Both the above approaches assume smooth functioning based on even rate of consumption and prompt receipt of the item within the prescribed lead time. Such a near ideal situation is uncommon. Some safety factor can be built into the systems so as to keep to the minimum the event of a stock-out situation during the reorder period. In deciding on adequate safety stock levels, the aim will be to attain a balance between the costs of carrying additional inventory and stock-out costs. What is sought is an optimum or least cost solution.

A retailer has a sale of the order of 250 units per week. He works on an Economic Order Quantity of 1,000 units. The lead time required for the supply is constant at 2 weeks. If he wants to avoid a stock-out situation, he will place an order when stock on hand shows 500 units. Just when the inventory is reaching the zero level, the replenishment will arrive.

If on the other hand, he is prepared to tolerate a stock-out situation, he will release the replenishment order when the inventory reaches 250 units. These 250 units will be sold in a week's time and he will have to wait for another week before stocks arrive, during which period back orders pending clearance will accumulate to 250 units.

Which option is to be preferred ? Assume the cost of carrying inventory at 20 per cent of the cost of average inventory held. The item costs Rs.100 each. The stock-out cost will include the cost of clearing the back order and also cost in terms of customer dissatisfaction. It is difficult to assess the short run cost of customer dissatisfaction. The estimated stock-out cost is given as Rs. 1 per week per item, out of stock.

In the first instance, there is no stock-out cost and only inventory carrying cost is involved. The average inventory held is 500 units (1000 units at the start of month

reducing to zero by end of the month) valued at Rs. 50,000 and the inventory carrying cost works out to Rs. 10,000. In the second situation, where replenishment order is placed at the end of the third week when the inventory level is 250 units, the stocks will arrive only by the end of the first week of the following month. Immediately on their arrival, 250 units of back order will have to be cleared. The second week will then start with an inventory of 750 units to be cleared evenly during the remaining three weeks. After the initial week of no stock, the average inventory for the next three weeks of the month will be 375 units. The average inventory level for the month will then be $\frac{3}{4}$ of 375 units. The value of average inventory will work out to Rs. $37,500 \times \frac{3}{4} =$ Rs. 28,125. The inventory carrying cost, at 20 per cent is Rs. 5,625. The stock-out position occurs every fourth week and for thirteen weeks in the year. The stock-out quantity is 250 units each time. At Re. 1 per unit per week, the total stock-out cost will work out to Rs. $25 \times 13 = 3,250$

Thus, situation I has inventory carrying cost of Rs. 10,000 and no stock-out cost, total cost being Rs. 10,000. Situation 2 has a total cost of Rs. 8,875, comprising inventory carrying cost of Rs. 5,625 and stock-out cost of Rs. 3,250, and emerges as the less expensive and more favoured option.

16.6.8 Industry norms for inventories : Tandon Group Report

The Tandon Committee, while framing 'guidelines for follow up of bank credit', identified the need to curb any tendency on the part of the borrowers to build up undue inventories and grouped inventories in following categories.

- * Flabby inventory, attributable to unsound working capital management and inefficient distribution.
- * Profit making inventory, where the stocks of raw materials or finished goods are looked upon as sources of stock profits, via induced scarcity.
- * Safety inventory, by way a rather liberal insurance against failures in supplies or abrupt spurts in demand.
- * Normal inventory, as related to the production plan, procurement lead time, rate of consumption, economic ordering levels and similar factors of effective inventory management.
- * Excessive inventory, induced by reasons beyond control such as strategic imports etc.

Flabby inventory and profit making inventory have been duly graded as selfish, inequitable and inefficient use of resources, deserving to be discouraged. Safety inventory, with a liberal factor of safety built into it is also frowned upon as avoidable luxury, with scope for trimming.

While fixing norms for inventory and receivables for selected industries on a one-flat-norms-for-each-industry basis, which were to be regarded as maximum permissible levels for holding inventory and receivables in each industry, the Committee visualised deviations from norms under following situations:

- * Bunched receipt of raw materials including imports.
- * Power cuts, strike and other unavoidable interruptions in the process of production.
- * Transport delays and bottlenecks.
- * Accumulation of finished goods due to non-availability of shipping space for exports or other disruptions in sales but not under such circumstances where a sales stimulation is needed through reduction in prices.
- * Build up of stocks of finished goods such as machinery due to failure on the part of the purchasers, for whom they were specially manufactured, to take delivery.

- * Need to cover full or substantial requirement of raw materials for specific export contract of short duration.

16.7 PERPETUAL INVENTORY SYSTEM

In addition to the fixation of stock and re-order levels for individual items in inventory, especially the important ones, a system of perpetual inventory or continuous stock taking can cover almost all items. The stock verification is undertaken throughout the year, taking care to see that each item gets checked at least once a year, or more often where necessary. The important items may be subjected to more frequent and larger number of verifications during the year. Unlike annual stock taking, there is no need to close down operations for verification of stocks. Items for stock verification can be selected at random, seeing that as far as possible the items chosen for surprise checks are fairly close to minimum levels, as per stock records or bin cards. In annual Inventories, huge inventories of certain items pose problems of counting or weighing, which can be avoided by above process of choice. It will thus be easy to spot shortages, and take necessary follow up actions.

Perpetual inventory system compels prompt updating of stock records on a continuous basis. The personnel who are assigned the task of physical verification of stocks under perpetual inventory system are experienced and are familiar with the items and can identify them properly. In annual stock taking, many employees who are unfamiliar with the items may be engaged to verify the inventories and the possibilities of wrong identification and counting are higher. Perpetual inventory helps prompt detection of discrepancies, facilitating speedy investigation. Annual stock taking highlights discrepancies long after the occurrence, in most cases, and is less effective.

16.8 HOW TO MEASURE EFFECTIVENESS OF INVENTORY MANAGEMENT ?

While a variety of tools and techniques aid in planning of investment in inventories, there is a simultaneous need for constant feedback on the liquidity and profitability conditions of existing inventories. A package of measuring tools or indices of inventory efficiency can be employed for this purpose comprising of inventory turnover ratios.

As a measure of effectiveness of the overall inventory management, either of the two following turnover rates can be computed, based on annual figures.

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average total inventories at cost}}$$

$$\text{Inventory turnover} = \frac{\text{Net sales}}{\text{Average total inventories at cost}}$$

All categories of inventories get aggregated and related to the cost of goods or the net sales, as the case may be, and the turnover rate thus computed, can be compared with the corresponding rates for the previous years or the rates of competing units in the industry.

The rates can also be computed individually, for the major inventory categories, as shown below:

$$\text{Raw materials inventory turnover} = \frac{\text{Cost of raw materials consumed}}{\text{Average raw materials inventory at cost}}$$

$$\text{Work-in-process inventory turnover} = \frac{\text{Cost of manufacture}}{\text{Average work-in-process inventory at cost}}$$

$$\text{Finished goods inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average finished goods inventory at cost}}$$

Variations of the formula can be applied to suit individual preferences. For example, the raw material inventory turnover rate can have the following counterparts:

$$\text{Raw material turnover percentage} = \frac{\text{Average raw materials inventory at cost} \times 100}{\text{Cost of materials consumed}}$$

$$\text{Raw materials turnover ratio} = \frac{\text{Average raw materials inventory at cost}}{\text{Cost of raw materials consumed}}$$

$$\text{period taken to turnover raw materials} = \frac{\text{Average raw materials inventory at cost}}{\text{Average daily consumption of raw materials at cost}}$$

The message regarding the status of the level of investment in the different categories of inventories and their efficiency of usage in relation to activity can thus be obtained by different computational methods.

If information is confined to published financial statements, the average inventories will have to be determined as the average of the opening and closing inventories for the particular year. This can often give misleading signals, especially where the size of the inventories fluctuate substantially during the course of the year. A company might have been compelled, by circumstances, to make major additions to its raw materials inventory, just a few days prior to the close of the accounting year. An allotment of a quota, or an arrival of an imported consignment, may have to be promptly cleared or a bulk offer of an important item at a concessional price may have to be clinched, causing unavoidable additions to the inventory just before the close of the year. In such a situation, the average between the opening and the closing inventory cannot be considered representative. To overcome this handicap and to obtain more meaningful measures of performance, the right approach will be to compute the average of the monthly inventories. If the operations of the company are reasonably well organised, it should be possible to obtain monthly particulars of inventories of raw materials, work-in-progress and finished goods, for working out the relevant rates or ratios.

The inventory turnover rates or ratios are not to be taken as conclusive evidence of the wisdom or otherwise of inventory management policies. They provide certain broad indications and can only be regarded as a sufficient basis for a more elaborate and thorough investigation of the causes of the seemingly apparent deficiencies, if any, in inventory management.

The aggregate inventory turnover ratio may fail to bring out the behavioural pattern of the items in the group, some of which may have a very rapid turnover while others are sluggish. While this limitation has to be recognised, this cannot provide an argument to disclaim the usefulness of the ratio. If, over a period of time, the aggregate turnover ratio is declining, it will be a valid clue that the inventory management is gradually tending to become less effective. The initial impression will set in motion more detailed investigation, itemwise, to identify and plug loopholes.

Comprehensive analysis might take the form of determining turnover ratios for individual items, by establishing the relationship between quantities consumed and quantities in inventory. This approach eliminates distortions due to variations in costing and pricing practices.

The odd characters among inventory items take varied forms such as obsolete inventory, excess inventory and slow moving inventory. In a setting of slack inventory control, these grow like weeds in an unattended garden. Organised inventory management

ensures that any design change, material substitution or product extinction is firmly and promptly traced to the relevant materials in stock for quick segregation and conversion into cash by early disposal. Constant vigil and concerted efforts are needed to sort items that tend to stagnate and to divert them for productive use or quick disposal.

15.8.1 Spare parts inventory

Spare parts inventory constitutes a mystery zone in enterprise management. Where the equipment and process technologies are changing fast, larger spares inventories have to be provisioned in advance as the required spares may go out of production and the concerned overseas sources may dry up. In the name of insurance spares, many expensive components enter the stores and outlive the concerned main equipment and eventually age into the obsolete category. Besides freezing up substantial funds for long periods, a good part of these inventories turn into slow moving, obsolete or surplus stocks and lose value ultimately.

There is undoubted scope for organised efforts to contain spare parts inventory. Multi-unit and multi-division organisations can effect considerable savings by avoiding duplicated efforts at procurement and storage. They can plan, establish and operate centralised stores or spares banks to meet common needs. Cataloguing, codification and standardisation of spares are essential primary steps.

The compilation of data on equipment failures, downtime etc. through well documented equipment history cards will provide a good reference point for procurement action. Rational plans for preventive maintenance and reconditioning will lend stability to the pattern of usage of a good part of the spares items bringing them within the discipline of routine inventory control. Concerted action to hasten the pace of import substitution, indigenisation and vendor development can go a long way in scaling down redundant spares inventories.

Activity 3

For an item, the lead time for supply is expected to vary between 100 days and 150 days, with an average value of 120 days. The usage rate is found to vary between 75 and 125 units per day, with an average value of 90 units per day. What should be the safety stock ?

16.9 SUMMARY

For a large majority of undertakings, inventory management policies and practices concern a crucial area of asset management, inadequate attention to which will adversely affect profits and pose numerous problems.

In short, inventory management has to find the right balance between inadequacy and surfeit or establish the right compromise between over-investment and under-investment in inventories, as the basic step towards improving profitability.

16.10 KEY WORDS

Stock-out	A situation where materials or goods demanded are not available in stock
Economic batch quantity	The quantity recommended for batch production so that the cost per unit produced is minimum
Maximum inventory level	A ceiling level to act as a safeguard against over-investment in inventory
Minimum inventory level	A floor level to avoid stock-out situations
Ordering costs	Costs pertaining to procurement of inventories
Carrying costs	Costs pertaining to maintenance of inventories and the relevant stores services
Economic ordering quantity	Optimal size of the purchase order lot or the number of units to be ordered each time
Perpetual inventory system	Continuous verification of stocks throughout the year

16.11 SELF ASSESSMENT QUESTIONS/EXERCISES

- What are the objectives of effective inventory management?
- Examine the motives behind holding inventories.
- What are the essential steps in effective inventory management?
- What are the factors that influence decisions on stock levels of individual items?
- Examine the relevance and process of A.B.C. analysis in inventory management.

EXERCISES

- A certain manufactured product has annual offtake of 60,000 units, spread evenly through the year, and is produced at a cost of Rs.10, each. If the entire capacity is to be used for manufacture of this product alone, the annual production will be 240,000 units. The set-up cost per production run works out to Rs. 2,000. The inventory carrying cost is estimated at 20 per cent of the value of average inventory carried. What will be the economic lot size for each production run. (Answer 12,000 units)
- The annual requirements of a particular component is 2,400 pieces. The component will have a steady usage throughout the year. The ordering cost tends to remain constant regardless of the size of the order and is Rs. 100 per order. The inventory carrying cost is computed as a percentage of the value of the average inventory held during the year and is estimated at 20 per cent of the value. On the assumption that inventory orders are promptly filled, there is no need for safety stocks nor are stock out situations anticipated. The purchase cost of the component is Rs.10 each. But the supplier offers a bulk or a quantity discount for large sized orders, by way of sharing economy in packing, delivery and administration expenses. He offers a 2 per cent discount on orders for 800 units or more at a time. What will be the Economic Ordering quantity ? (Answer 800 units).
- If the corporate goal in inventory management is to be set as minimum inventory and maximum turnover, it can be categorised as blind approach that can harm the company's interests. At its extremity, the aim will be infinite turnover and no inventories. Examine the statements critically and restate and substantiate what you would consider to be the proper corporate goal in inventory management.

16.10 KEY WORDS

16.12 FURTHER READINGS

Buchan, Joseph and Koenigsberg, Ernest, Scientific Inventory Management, Prentice-Hall India Private Ltd, New Delhi.

R.S.Chadda, Inventory Management in India, Allied Publishers, Bombay.

P. Gopalakrishnan and M.Sundaresan, Materials Management-An Intergrated Approach, Prentice Hall of India (P) Ltd.

Starr, Martin K and David W.Miller, Inventory Control: Theory and Practice, Englewood Cliffs, J.J.Prentice-Hall.

16.13 ANSWERS TO ACTIVITIES

Activity 3

(Maximum daily usage rate x maximum lead time) - (Average daily usage rate x average lead time)

$$= (125 \times 150) - (90 \times 120) = 18,750 - 10,800 = 7,950$$

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