Integrated Professional
Competence Course - Group I

# Cost Accounting and
# Financial Management
## Part 2 : Financial Management

**Board of Studies**
**The Institute of Chartered Accountants of India**
*(Set up by an Act of Parliament)*

# PAPER 3

# COST ACCOUNTING AND FINANCIAL MANAGEMENT

## Part – 2 : Financial Management

BOARD OF STUDIES
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA

This study material has been prepared by the faculty of the Board of Studies. The objective of the study material is to provide teaching material to the students to enable them to obtain knowledge and skills in the subject. Students should also supplement their study by reference to the recommended text books. In case students need any clarifications or have any suggestions to make for further improvement of the material contained herein, they may write to the Director of Studies.

All care has been taken to provide interpretations and discussions in a manner useful for the students. However, the study material has not been specifically discussed by the Council of the Institute or any of its Committees and the views expressed herein may not be taken to necessarily represent the views of the Council or any of its Committees.

Permission of the Institute is essential for reproduction of any portion of this material.

### THE INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA

# SYLLABUS

## PAPER – 3 : COST ACCOUNTING AND FINANCIAL MANAGEMENT

*(One paper ─ Three hours – 100 Marks)*

**Level of Knowledge:** Working knowledge

## PART – I : COST ACCOUNTING (50 MARKS)

**Objectives:**

(a)  To understand the basic concepts and processes used to determine product costs,

(b)  To be able to interpret cost accounting statements,

(c)  To be able to analyse and evaluate information for cost ascertainment, planning, control and decision making, and

(d)  To be able to solve simple cases.

**Contents**

1.  **Introduction to Cost Accounting**

    (a)  Objectives and scope of Cost Accounting

    (b)  Cost centres and Cost units

    (c)  Cost classification for stock valuation, Profit measurement, Decision making and control

    (d)  Coding systems

    (e)  Elements of Cost

    (f)  Cost behaviour pattern, Separating the components of semi-variable costs

    (g)  Installation of a Costing system

    (h)  Relationship of Cost Accounting, Financial Accounting, Management Accounting and Financial Management.

2.  **Cost  Ascertainment**

    (a)  **Material Cost**

       (i)   Procurement procedures— Store procedures and documentation in respect of receipts and issue of stock, Stock verification

       (ii)  Inventory control —Techniques of fixing of minimum, maximum and reorder

levels, Economic Order Quantity, ABC classification; Stocktaking and perpetual inventory

(iii) Inventory accounting

(iv) Consumption — Identification with products of cost centres, Basis for consumption entries in financial accounts, Monitoring consumption.

**(b) Employee Cost**

(i) Attendance and payroll procedures, Overview of statutory requirements, Overtime, Idle time and Incentives

(ii) Labour turnover

(iii) Utilisation of labour, Direct and indirect labour, Charging of labour cost, Identifying labour hours with work orders or batches or capital jobs

(iv) Efficiency rating procedures

(v) Remuneration systems and incentive schemes.

**(c) Direct Expenses**

Sub-contracting — Control on material movements, Identification with the main product or service.

**(d) Overheads**

(i) Functional analysis — Factory, Administration, Selling, Distribution, Research and Development

Behavioural analysis — Fixed, Variable, Semi variable and Step cost

(ii) Factory Overheads — Primary distribution and secondary distribution, Criteria for choosing suitable basis for allotment, Capacity cost adjustments, Fixed absorption rates for absorbing overheads to products or services

(iii) Administration overheads — Method of allocation to cost centres or products

(iv) Selling and distribution overheads — Analysis and absorption of the expenses in products/customers, impact of marketing strategies, Cost effectiveness of various methods of sales promotion.

3. **Cost Book-keeping**

Cost Ledgers—Non-integrated accounts, Integrated accounts, Reconciliation of cost and financial accounts.

4. **Costing Systems**

**(a) Job Costing**

Job cost cards and databases, Collecting direct costs of each job, Attributing overhead costs to jobs, Applications of job costing.

**(b) Batch Costing**

**(c) Contract Costing**

Progress payments, Retention money, Escalation clause, Contract accounts, Accounting for material, Accounting for plant used in a contract, Contract profit and Balance sheet entries.

**(d) Process Costing**

Double entry book keeping, Process loss, Abnormal gains and losses, Equivalent units, Inter-process profit, Joint products and by products.

**(e) Operating Costing System**

5. **Introduction to Marginal Costing**

Marginal costing compared with absorption costing, Contribution, Breakeven analysis and profit volume graph.

6. **Introduction to Standard Costing**

Various types of standards, Setting of standards, Basic concepts of material and Labour standards and variance analysis.

7. **Budget and Budgetary Control**

The budget manual, preparation and monitoring procedures, budget variances, flexible budget, preparation of functional budget for operating and non operating functions, cash budget, master budget, principal budget factors.

## PART – II : FINANCIAL MANAGEMENT (50 MARKS)

**Objectives:**

(a) To develop ability to analyse and interpret various tools of financial analysis and planning,

(b) To gain knowledge of management and financing of working capital,

(c) To understand concepts relating to financing and investment decisions, and

(d) To be able to solve simple cases.

**Contents**

1. **Scope and Objectives of Financial Management**

    (a) Meaning, Importance and Objectives

    (b) Conflicts in profit versus value maximisation principle

    (c) Role of Chief Financial Officer.

2. **Time Value of Money**

    Compounding and Discounting techniques— Concepts of Annuity and Perpetuity.

3. **Financial Analysis and Planning**

   (a) Ratio Analysis for performance evaluation and financial health

   (b) Application of Ratio Analysis in decision making

   (c) Analysis of Cash Flow Statement.

4. **Financing Decisions**

   (a) Cost of Capital — Weighted average cost of capital and Marginal cost of capital

   (b) Capital Structure decisions — Capital structure patterns, Designing optimum capital structure, Constraints, Various capital structure theories

   (c) Business Risk and Financial Risk — Operating and financial leverage, Trading on Equity.

5. **Types of Financing**

   (a) Different sources of finance

   (b) Project financing — Intermediate and long term financing

   (c) Negotiating term loans with banks and financial institutions and appraisal thereof

   (d) Introduction to lease financing

   (e) Venture capital finance.

6. **Investment Decisions**

   (a) Purpose, Objective, Process

   (b) Understanding different types of projects

   (c) Techniques of Decision making: Non-discounted and Discounted Cash flow Approaches — Payback Period method, Accounting Rate of Return, Net Present Value, Internal Rate of Return, Modified Internal Rate of Return, Discounted Payback Period and Profitability Index

   (d) Ranking of competing projects, Ranking of projects with unequal lives.

7. **Management of Working Capital**

   (a) Working capital policies

   (b) Funds flow analysis

   (c) Inventory management

   (d) Receivables management

   (e) Payables management

   (f) Management of cash and marketable securities

   (g) Financing of working capital.

# CONTENTS

## FINANCIAL MANAGEMENT

**CHAPTER 3 – FINANCIAL ANALYSIS AND PLANNING**

**UNIT I : APPLICATION OF RATIO ANALYSIS FOR PERFORMANCE EVALUATION, FINANCIAL HEALTH AND DECISION MAKING**

**UNIT II : CASH FLOW AND FUNDS FLOW ANALYSIS**

**CHAPTER 4 – FINANCING DECISIONS**

**UNIT I : COST OF CAPITAL**

**UNIT II : CAPITAL STRUCTURE DECISIONS**

**UNIT III : BUSINESS RISK AND FINANCIAL RISK**

**CHAPTER 5 – TYPES OF FINANCING**

**CHAPTER 6 – INVESTMENT DECISIONS**

## CHAPTER 7 – MANAGEMENT OF WORKING CAPITAL

### UNIT I : MEANING, CONCEPT AND POLICIES OF WORKING CAPITAL

### UNIT II : TREASURY AND CASH MANAGEMENT

### UNIT III : MANAGEMENT OF INVENTORY

### UNIT IV : MANAGEMENT OF RECEIVABLES

# CHAPTER 1

## SCOPE AND OBJECTIVES OF FINANCIAL MANAGEMENT

**Learning Objectives**

After studying this chapter, you will be able to understand

♦ What is financial management and how it evolved?

♦ The objectives of financial management,

♦ Role of a chief financial officer in an organization, and

♦ The relationship of financial management with accounting and other related fields.

### 1. INTRODUCTION

Imagine a scenario where you and your friends decide to set up and manage a small company by the name of Calcutronics Ventures to manufacture and manage your new brand of calculators. Being not only the managers of your company, you are also the owners of the company i.e. the major shareholders. Before you start with business you will have to make certain financial decisions. You will have to decide which assets to buy like premises and machinery. These assets will cost money and the total cost of acquiring them would be your initial investment in the business. Now, a very vital question which arises to your mind is how this investment is to be financed i.e. where do you get the money from to invest in your business? Other questions which need to be answered would be do you have to put your own money only or there are other means of raising money? What is the best way to finance the investment? Who will provide the finance? And how much will it cost to raise the finance?

Besides needing the capital to acquire fixed assets like premises and machinery, the business will need capital to run it on day to day basis as well. This capital is known as the working capital, which is needed to purchase the raw materials, pay suppliers, wages, expenses, etc. this leads to another concern regarding how best to finance its day to day operations? The objective will be to ensure that there is always enough cash available to meet company's operating expenses and that business activities do not suffer due to shortage of cash. Here the focus is on making investment and financing decisions that affect the company in the short term.

You will not make any of these decisions without any direction; you would have a goal in mind

i.e. to make a return on the investment. As shareholders of the company you would want to be better off financially by undertaking the investment than not. If the business proves successful, it will increase the wealth of the shareholders i.e. yours and your friends and enhance the value of the business.

No matter what type of business you choose, you will have to address the questions raised in the above described scenario to understand what financial management is. Thus, financial management is concerned with efficient acquisition and allocation of funds. In operational terms, it is concerned with management of flow of funds and involves decisions relating to procurement of funds, investment of funds in long term and short term assets and distribution of earnings to owners. In other words, focus of financial management is to address three major financial decision areas namely, investment, financing and dividend decisions.

## 2.    MEANING OF FINANCIAL MANAGEMENT

Financial management is that managerial activity which is concerned with the planning and controlling of the firm's financial resources. It is an integrated decision making process concerned with acquiring, financing and managing assets to accomplish the overall goal of a business organisation. It can also be stated as the process of planning decisions in order to maximise the shareholder's wealth. Financial managers have a major role in cash management, acquisition of funds and in all aspects of raising and allocating capital. As far as business organisations are concerned, the objective of financial management is to maximise the value of business.

"Financial management comprises the forecasting, planning, organising, directing, co-ordinating and controlling of all activities relating to acquisition and application of the financial resources of an undertaking in keeping with its financial objective." This definition of financial management by Raymond Chambers aptly sums up the vital role played by it in any organisation.

Another very elaborate definition given by Phillippatus is "Financial Management is concerned with the managerial decisions that result in the acquisition and financing of short term and long term credits for the firm." As such it deals with the situations that require selection of specific assets (or combination of assets), the selection of specific problem of size and growth of an enterprise. The analysis of these decisions is based on the expected inflows and outflows of funds and their effect on managerial objectives.

One more definition of financial management is that "Financial management deals with procurement of funds and their effective utilisation in the business."

Financial management can also be stated as "The management of all the processes associated with the efficient acquisition and deployment of both short and long term financial resources."

There are, thus, two basic aspects of financial management viz., procurement of funds and an effective use of these funds to achieve business objectives.

## 2.1    PROCUREMENT OF FUNDS

Since funds can be obtained from different sources therefore their procurement is always considered as a complex problem by business concerns. Funds procured from different sources have different characteristics in terms of risk, cost and control.

The funds raised by the issue of equity shares are the best from the risk point of view for the firm, since there is no question of repayment of equity capital except when the firm is under liquidation. From the cost point of view, however, equity capital is usually the most expensive source of funds. This is because the dividend expectations of shareholders are normally higher than prevalent interest rate and also because dividends are an appropriation of profit, not allowed as an expense under the Income Tax Act. Also the issue of new shares to public may dilute the control of the existing shareholders.

Debentures as a source of funds are comparatively cheaper than the shares because of their tax advantage. The interest the company pays on a debenture is free of tax, unlike a dividend payment which is made from the taxed profits. However, even when times are hard, interest on debenture loans must be paid whereas dividends need not be. However, debentures entail a high degree of risk since they have to be repaid as per the terms of agreement; also, the interest payment has to be made whether or not the company makes profits.

There are thus risk, cost and control considerations which a finance manager must consider while procuring funds. The cost of funds should be at the minimum level for that a proper balancing of risk and control factors must be carried out.

Funds can also be procured from banks and financial institutions; they generally provide funds subject to certain restrictive covenants. These covenants restrict the freedom of the borrower to raise loans from other sources. The reform process is also moving in the direction of a closer monitoring of 'end use' of resources mobilised through capital markets. Such restrictions are essential for the safety of funds provided by institutions and investors. Besides above there are several other financial instruments used today for raising long term, medium term and short term funds e.g., commercial paper, deep discount bonds etc. The finance manager has to balance the availability of funds and the restrictive provisions tied with such funds resulting in lack of flexibility.

In the globalised competitive scenario it is not enough to depend on the available ways of raising finance but resource mobilisation has to be undertaken through innovative ways or financial products which may meet the needs of investors. Multiple option convertible bonds can be sighted as an example. Funds can be raised indigenously as well as from abroad. Foreign Direct Investment (FDI) and Foreign Institutional Investors (FII) are two major routes

for raising funds from foreign sources besides ADR's (American depository receipts) and GDR's (Global depository receipts). Obviously, the mechanism of procurement of funds has to be modified in the light of the requirements of foreign investors. Procurement of funds inter alia includes identification of sources of finance, determination of finance mix, raising of funds and division of profits between dividends and retention of profits i.e. internal fund generation.

## 2.2 EFFECTIVE UTILISATION OF FUNDS

The finance manager is also responsible for effective utilisation of funds. He has to point out situations where the funds are being kept idle or where proper use of funds is not being made. All the funds are procured at a certain cost and after entailing a certain amount of risk. If these funds are not utilised in the manner so that they generate an income higher than the cost of procuring them, there is no point in running the business. This is also an important consideration in dividend decision. Hence, it is crucial to employ the funds properly and profitably. The funds are to be invested in the manner so that the company can produce at its optimum level without endangering its financial solvency. Thus, financial implications of each decision to invest in fixed assets are to be properly analysed. For this, the finance manager would be required to possess sound knowledge of techniques of capital budgeting.  He must also keep in view the need of adequate working capital and ensure that while the firms enjoy an optimum level of working capital they do not keep too much funds blocked in inventories, book debts and cash, etc.

## 3. EVOLUTION OF FINANCIAL MANAGEMENT

Financial management evolved gradually over the past 50 years. The evolution of financial management is divided into three phases. Financial Management evolved as a separate field of study at the beginning of the century. The three stages of its evolution are:

*The Traditional Phase*: During this phase, financial management was considered necessary only during occasional events such as takeovers, mergers, expansion, liquidation, etc. Also, when taking financial decisions in the organisation, the needs of outsiders (investment bankers, people who lend money to the business and other such people) to the business was kept in mind.

*The Transitional Phase*: During this phase, the day-to-day problems that financial managers faced were given importance. The general problems related to funds analysis, planning and control were given more attention in this phase.

*The Modern Phase*: Modern phase is still going on. The scope of financial management has greatly increased now. It is important to carry out financial analysis for a company. This analysis helps in decision making.  During this phase, many theories have been developed regarding efficient markets, capital budgeting, option pricing, valuation models and also in several other important fields in financial management.

## 4. IMPORTANCE OF FINANCIAL MANAGEMENT

Financial management is all about managing expenditure within a limited budget. It is about allocating money to the necessary items first. If after that, you have some money left, it must be used to pay off the debts. If there is still some money left you can use it as you like. Financial management means management of all matters related to an organisation's finances. This principle is the same whether it is an organisation, a family, or even a country's economy. We must balance expenditure and income.

Let us understand this better by taking an example of a company, Cotton Textiles Limited. The company earns money by selling textiles. Let us assume that it earns Rs. 10 lakhs every month. This is known as revenue. A company has many expenses. Some of the major expenses of the company can be listed as wages to workers, raw materials for making the textile, electricity and water bills and purchase and repair of machines that are used to manufacture the textile.

All these expenses are paid out of the revenues. If the revenues are more than the expenses, then the company will make profits. But, if the expenses are more than revenues, then it will face losses. If it continues like that, eventually, it will lose all its assets. In other words it will lose its property and all that it owns. In that case, even the workers may be asked to leave the company. To avoid this situation, the company has to manage the cash inflows (cash coming into the company) and outflows (various expenses that the company has to meet).

## 5. SCOPE OF FINANCIAL MANAGEMENT

As an integral part of the overall management, financial management is mainly concerned with acquisition and use of funds by an organization. Based on financial management guru Ezra Solomon's concept of financial management, following aspects are taken up in detail under the study of financial management:

(a) Determination of size of the enterprise and determination of rate of growth.

(b) Determining the composition of assets of the enterprise.

(c) Determining the mix of enterprise's financing i.e. consideration of level of debt to equity, etc.

(d) Analyse planning and control of financial affairs of the enterprise.

The scope of financial management has undergone changes over the years. Until the middle of this century, its scope was limited to procurement of funds under major events in the life of the enterprise such as promotion, expansion, merger, etc. In the modern times, the financial management includes besides procurement of funds, the three different kinds of decisions as well namely, investment, financing and dividend. All the three types of decisions would be dealt in detail during the course of this chapter.

The given figure depicts the overview of the scope and functions of financial management. It also gives the interrelation between the market value, financial decisions and risk return trade off. The financial manager, in a bid to maximize shareholders' wealth, should strive to maximize returns in relation to the given risk; he should seek courses of actions that avoid unnecessary risks. To ensure maximum return, funds flowing in and out of the firm should be constantly monitored to assure that they are safeguarded and properly utilized.
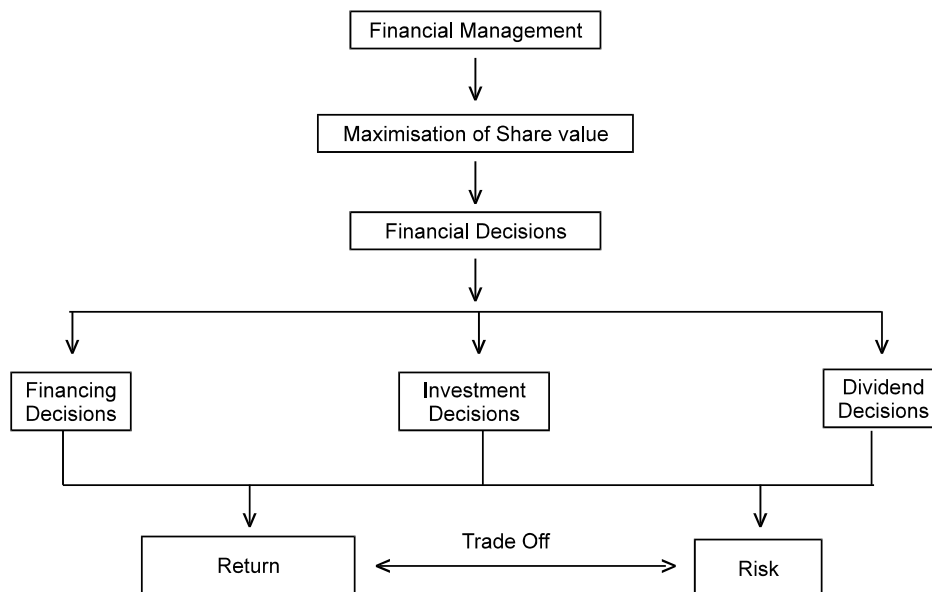


**An Overview of Financial Management**

## 6. OBJECTIVES OF FINANCIAL MANAGEMENT

Efficient financial management requires the existence of some objectives or goals because judgement as to whether or not a financial decision is efficient must be made in the light of some objective. Although various objectives are possible but we assume two objectives of financial management for elaborate discussion. These are:

### 6.1 PROFIT MAXIMISATION

It has traditionally been argued that the objective of a company is to earn profit, hence the objective of financial management is also profit maximisation. This implies that the finance manager has to make his decisions in a manner so that the profits of the concern are maximised. Each alternative, therefore, is to be seen as to whether or not it gives maximum profit.

However, profit maximisation cannot be the sole objective of a company. It is at best a limited

objective. If profit is given undue importance, a number of problems can arise. Some of these have been discussed below:

(i)     The term profit is vague. It does not clarify what exactly it means. It conveys a different meaning to different people. For example, profit may be in short term or long term period; it may be total profit or rate of profit etc.

(ii)     Profit maximisation has to be attempted with a realisation of risks involved. There is a direct relationship between risk and profit. Many risky propositions yield high profit. Higher the risk, higher is the possibility of profits. If profit maximisation is the only goal, then risk factor is altogether ignored. This implies that finance manager will accept highly risky proposals also, if they give high profits. In practice, however, risk is very important consideration and has to be balanced with the profit objective.

(iii)     Profit maximisation as an objective does not take into account the time pattern of returns. Proposal A may give a higher amount of profits as compared to proposal B, yet if the returns begin to flow say 10 years later, proposal B may be preferred which may have lower overall profit but the returns flow is more early and quick.

(iv)   Profit maximisation as an objective is too narrow. It fails to take into account the social considerations as also the obligations to various interests of workers, consumers, society, as well as ethical trade practices.  If these factors are ignored, a company cannot survive for long. Profit maximisation at the cost of social and moral obligations is a short sighted policy.

## 6.2    WEALTH / VALUE MAXIMISATION

You must be aware that many companies sell their shares in the stock market. People buy the shares as an investment. It means that they expect these shares to give them some returns. It is the duty of the finance manager to see that the shareholders get good returns on the shares. Hence, the value of the share should increase in the share market. The share value is affected by many things. If a company is able to make good sales and build a good name for itself, in the industry, the company's share value goes up. If the company makes a risky investment, people may lose confidence in the company and the share value will come down. So, this means that the finance manager has the power to influence decisions regarding finances of the company. The decisions should be such that the share value does not decrease. Thus, wealth or value maximisation is the most important goal of financial management.

How do we measure the value/wealth of a firm? According to Van Horne, "Value of a firm is represented by the market price of the company's common stock. The market price of a firm's stock represents the focal judgement of all market participants as to what the value of the particular firm is.  It takes into account present and prospective future earnings per share, the timing and risk of these earnings, the dividend policy of the firm and many other factors that

bear upon the market price of the stock. The market price serves as a performance index or report card of the firm's progress. It indicates how well management is doing on behalf of stockholders."

Stockholders hire managers to run their firms for them.......

↓    *Because stockholders have absolute power to hire and fire managers ...*

Managers set aside their interest and maximise stock prices ...

↓    *Because markets are efficient ...*

Stockholders wealth is maximised ...

↓    *Because lenders are fully protected from shareholders actions ...*

Firm value is maximised ...

↓    *Because there are no costs created for society ...*

Societal wealth is maximised ...

### Why Wealth Maximisation Works?

Of course, there are other goals too like:

♦ Achieving a higher growth rate

♦ Attaining a larger market share

♦ Gaining leadership in the market in terms of products and technology

♦ Promoting employee welfare

♦ Increasing customer satisfaction

Many companies have several other goals for the welfare of the society, like improving community life, supporting education and research, solving societal problems, etc. But wealth maximisation means that the company is using its resources in a good manner. If the share value is to stay high, the company has to reduce its costs and use the resources properly. If the company follows the goal of wealth maximisation, it means that the company will promote only those policies that will lead to an efficient allocation of resources.

To achieve wealth maximization, the finance manager has to take careful decision in respect of:

1. **Investment decisions**: These decisions determine how scarce resources in terms of funds available are committed to projects which can range from acquiring a piece of plant to the acquisition of another company. Funds procured from different sources have to be invested in various kinds of assets. Long term funds are used in a project for various fixed assets and also for current assets. The investment of funds in a project has to be made after careful assessment of the various projects through capital budgeting. A part of long term funds is also to be kept for financing the working capital requirements. Asset management policies are to be laid down regarding various items of current assets. The inventory policy would be determined by the production manager and the finance manager keeping in view the requirement of production and the future price estimates of raw materials and the availability of funds.

2. **Financing decisions:** These decisions relate to acquiring the optimum finance to meet financial objectives and seeing that fixed and working capital are effectively managed. The financial manager needs to possess a good knowledge of the sources of available funds and their respective costs, and needs to ensure that the company has a sound capital structure, i.e. a proper balance between equity capital and debt. Such managers also need to have a very clear understanding as to the difference between profit and cash flow, bearing in mind that profit is of little avail unless the organisation is adequately supported by cash to pay for assets and sustain the working capital cycle. Financing decisions also call for a good knowledge of evaluation of risk, e.g. excessive debt carried high risk for an organisation's equity because of the priority rights of the lenders. A major area for risk-related decisions is in overseas trading, where an organisation is vulnerable to currency fluctuations, and the manager must be well aware of the various protective procedures such as hedging (it is a strategy designed to minimise, reduce or cancel out the risk in another investment) available to him. For example, someone who has a shop, takes care of the risk of the goods being destroyed by fire by hedging it via a fire insurance contract.

3. **Dividend decisions:** These decisions relate to the determination as to how much and how frequently cash can be paid out of the profits of an organisation as income for its owners/shareholders. The owner of any profit-making organization looks for reward for his investment in two ways, the growth of the capital invested and the cash paid out as income; for a sole trader this income would be termed as drawings and for a limited liability company the term is *dividends*.

The dividend decisions thus has two elements – the amount to be paid out and the amount to be retained to support the growth of the organisation, the latter being also a financing decision; the level and regular growth of dividends represent a significant factor in determining a profit-making company's market value, i.e. the value placed on its shares by the stock market.

All three types of decisions are interrelated, the first two pertaining to any kind of organisation while the third relates only to profit-making organisations, thus it can be seen that financial management is of vital importance at every level of business activity, from a sole trader to the largest multinational corporation. It is instructive to think this point through by taking the case of the sole trader; thus he has to invest capital in a shop, fittings and equipment and in the purchase of stock and sustaining debtors (working capital), he has to have sources of capital to finance his investment such as his own capital and bank borrowings, and he has to make dividend decisions to determine how much can be reasonably withdrawn from the business to ensure that it will remain sufficiently liquid and, if desired, capable of growth.

## 7. CONFLICTS IN PROFIT VERSUS VALUE MAXIMISATION PRINCIPLE

In any company, the management is the decision taking authority. Since the company is a complex organisation comprising of different interested parties, therefore management has a difficult role of reconciling objectives of these parties. In doing so, the management may not always act in the best interest of the shareholders and may pursue its own personal goals. But the management may not be able to exclusively pursue its personal goals due to the constant supervision of the various stakeholders of the company-employees, creditors, customers, government, etc. Since the management would like to survive over the long-run, therefore overall management objective should be directed towards this goal. Every entity associated with the company will evaluate the performance of the management from the fulfilment of its own objective. The survival of the management will be threatened if the objective of any of the entities remains unfulfilled. The wealth maximisation objective is generally in accord with the interests of the various groups such as owners, employees, creditors and society, and thus, it may be consistent with the management objective of survival.

However, there may arise a situation where a conflict may arise between the shareholders' and management's goals. For example, management may create satisfactory wealth for shareholders than the maximum. Such satisfying behaviour of the management will frustrate the objective of shareholders wealth maximisation as a normative guide to management.

| Goal | Objective | Advantages | Disadvantages |
|---|---|---|---|
| Profit maximisation | Large amount of profits | (i) Easy to calculate profits <br> (ii) Easy to determine the link between financial decisions and profits. | (i) Emphasizes the short term <br> (ii) Ignores risk or uncertainty <br> (iii) Ignores the timing of returns <br> (iv) Requires immediate resources. |

| Shareholders Wealth Maximisation | Highest market value of shares. | (i) Emphasizes the long term <br> (ii) Recognises risk or uncertainty <br> (iii) Recognises the timing of returns <br> (iv) Considers shareholders' return. | (i) Offers no clear relationship between financial decisions and share price. <br> (ii) Can lead to management anxiety and frustration. |
|---|---|---|---|

**Illustration 1:** Profit maximization can be achieved in the short term at the expense of the long term goal, that is, wealth maximisation. For example, a costly investment may experience losses in the short term but yield substantial profits in the long term. Also, a firm that wants to show a short term profit may, for example, postpone major repairs or replacement, although such postponement is likely to hurt its long term profitability.

Another example can be taken to understand why wealth maximisation is a preferred objective than profit maximisation.

**Illustration 2:** Profit maximisation does not consider risk or uncertainty, whereas wealth maximisation considers both risk and uncertainty. Suppose there are two products, X and Y, and their projected earnings over the next 5 years are as shown below:

| Year | Product X | Product Y |
|---|---|---|
|  | Rs. | Rs. |
| 1. | 10,000 | 11,000 |
| 2. | 10,000 | 11,000 |
| 3. | 10,000 | 11,000 |
| 4. | 10,000 | 11,000 |
| 5. | 10,000 | 11,000 |
|  | 50,000 | 55,000 |

A profit maximization approach would favour product Y over product X. However, if product Y is more risky than product X, then the decision is not as straightforward as the figures seem to indicate. It is important to realize that a trade-off exists between risk and return. Stockholders expect greater returns from investments of higher risk and vice-versa. To choose product Y, stockholders would demand a sufficiently large return to compensate for the comparatively greater level of risk.

## 8.    ROLE OF CHIEF FINANCIAL OFFICER (CFO)

Modern financial management has come a long way from the traditional corporate finance.  As the economy is opening up and global resources are being tapped, the opportunities available to finance managers virtually have no limits.

Due to the changes in the global environment the chief financial officer needs to have a broader and far-sighted outlook, and must realize that his actions would have far reaching consequences for the firm because they influence the size, profitability, growth, risk and survival of the firm, and as a consequence, affect the overall value of the firm. He must have the flexibility to adapt to the external factors such as economic uncertainty, global competition, technological change, volatility of interest and exchange rates, changes in laws and regulations and ethical concerns. Therefore, in today's changing environment, the chief financial officer plays a pivotal leadership role in a company's overall efforts to achieve its goals.

He is one of the dynamic members of corporate managerial team. His role, day-by-day, is becoming more and more pervasive and significant in solving the complex managerial problems. The traditional role of the chief financial officer was confined just to raising of funds from a number of sources, but the recent development in the socio-economic and political scenario throughout the world has placed him in a central position in the business organisation. He is now responsible for shaping the fortunes of the enterprise, and is involved in the most vital decision of allocation of capital like mergers, acquisition etc. He like other members of corporate team cannot be averse to the fast developments around him. He has to take note of these changes in order to be relevant and dynamic according to the fast changing circumstances.

Therefore a new era has ushered during the recent years in financial management, especially with the development of new financial system, emergence of financial services industry, recent innovations and development of financial tools, techniques, instruments, and products and emphasis on public sector undertakings to be self-supporting and their dependence on capital market for fund requirements, have all changed the role of the chief financial officer. His role, especially, assumes significance in the present day context of liberalization, deregulation and globalisation.

To sum it up, the chief financial officer of an organisation plays an important role in the company's goals, policies, and financial success. His responsibilities include:

(a) *Financial analysis and planning:* Determining the proper amount of funds to employ in the firm, i.e. designating the size of the firm and its rate of growth.

(b) *Investment decisions:* The efficient allocation of funds to specific assets.

(c) *Financing and capital structure decisions:* Raising funds on favourable terms as possible,

i.e., determining the composition of liabilities.

(d) Management of financial resources (such as working capital).

(e) *Risk management*: Protecting assets.

The figure below shows how the finance function in a large organization may be organized. Typically, the chief financial officer, who may be designated as Vice President (Finance) or Director (Finance), supervises the work of the treasurer and the controller. In turn, these officers are assisted by several specialist managers working under them.
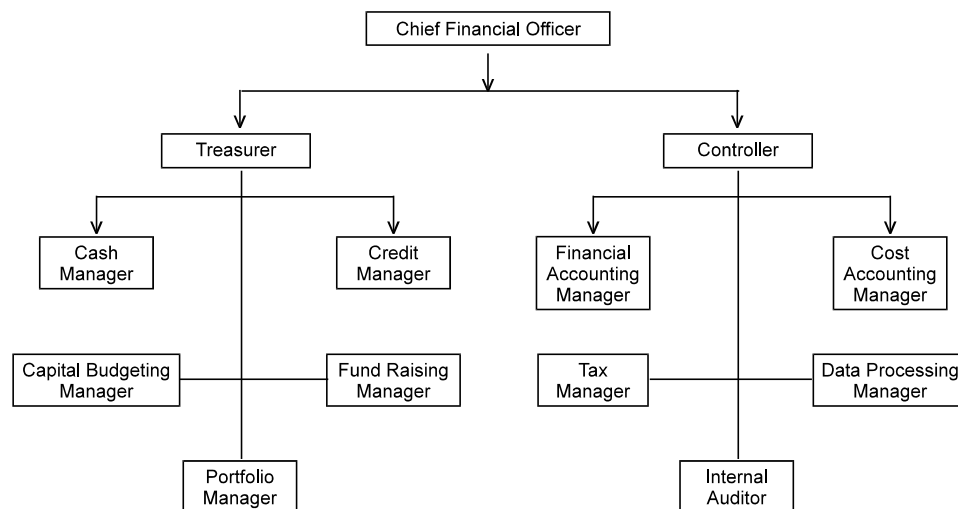


**Organisation of Finance Function**

### Role of CFO in today's World

Today, the role of chief financial officer, or CFO, is no longer confined to accounting, financial reporting and risk management. It's about being a strategic business partner of the chief executive officer, or CEO.

Frequently, in fact, it is the CFO more than the CEO whose insights on business performance are sought by shareholders as well as the board of directors, say experts. Many CFOs have assumed the role of innovative and independent change agents, using intensified scrutiny by shareholders and new regulatory systems to strengthen internal reporting systems and align them with company strategy.

The basic change seen with the CFO job across Asia in recent years has been a shift from being essentially the chief accountant of a company to the executive in charge of all financial matters, both routine (cash management, bank loans) and strategic (capital raising and resource allocation).CFOs have a valuable view of operations and cash flow across the organization, and many are becoming more involved in corporate strategy decisions.

As a result, we increasingly see finance executives serving essentially as the No. 2 executive in many large companies.

| What a CFO used to do | What a CFO now does |
|---|---|
| Budgeting | Budgeting |
| Forecasting | Forecasting |
| Accounting | Managing M&As |
| Treasury (cash management) | Profitability analysis (for example, by customer or product) |
| Preparing internal financial reports for management | Pricing analysis |
| Preparing quarterly, annual filings for investors | Decisions about outsourcing |
| Tax filing | Overseeing the IT function |
| Tracking accounts payable and accounts receivable | Overseeing the HR function |
| Travel and entertainment expense management | Strategic planning (sometimes overseeing this function) |
|  | Regulatory compliance |
|  | Risk management |

## 9. RELATIONSHIP OF FINANCIAL MANAGEMENT WITH RELATED DISCIPLINES

As an integral part of the overall management, financial management is not a totally independent area. It draws heavily on related disciplines and areas of study namely economics, accounting, production, marketing and quantitative methods. Even though these disciplines are inter-related, there are key differences among them. Some of the relationships are being discussed below:

## 9.1    FINANCIAL MANAGEMENT AND ACCOUNTING

The relationship between financial management and accounting are closely related to the extent that accounting is an important input in financial decision making. In other words, accounting is a necessary input into the financial management function. Financial accounting generates information relating to operations of the organisation. The outcome of accounting is the financial statements such as balance sheet, income statement, and the statement of changes in financial position. The information contained in these statements and reports helps the financial managers in gauging the past performance and future directions of the organisation. Though financial management and accounting are closely related, still they differ in the treatment of funds and also with regards to decision making.

*Treatment of Funds:* In accounting, the measurement of funds is based on the accrual principle i.e. revenue is recognised at the point of sale and not when collected and expenses are recognised when they are incurred rather than when actually paid. The accrual based accounting data do not reflect fully the financial conditions of the organisation. An organisation which has earned profit (sales less expenses) may said to be profitable in the accounting sense but it may not be able to meet its current obligations due to shortage of liquidity as a result of say, uncollectible receivables. Such an organisation will not survive regardless of its levels of profits. Whereas, the treatment of funds, in financial management is based on cash flows. The revenues are recognised only when cash is actually received (i.e. cash inflow) and expenses are recognised on actual payment (i.e. cash outflow). This is so because the finance manager is concerned with maintaining solvency of the organisation by providing the cash flows necessary to satisfy its obligations and acquiring and financing the assets needed to achieve the goals of the organisation. Thus, cash flow based returns help financial managers to avoid insolvency and achieve desired financial goals.

*Decision making:* The purpose of accounting is to collect and present financial data on the past, present and future operations of the organisation. The financial manager uses these data for financial decision making. It is not that the financial managers cannot collect data or accountants cannot make decisions. But the chief focus of an accountant is to collect data and present the data while the financial manager's primary responsibility relates to financial planning, controlling and decision making. Thus, in a way it can be stated that financial management begins where accounting ends.

## 9.2    FINANCIAL MANAGEMENT AND OTHER RELATED DISCIPLINES

For its day to day decision making process, financial management also draws on other related disciplines such as marketing, production and quantitative methods apart from accounting. For instance, financial managers should consider the impact of new product development and promotion plans made in marketing area since their plans will require capital outlays and have an impact on the projected cash flows. Likewise, changes in the production process may

require capital expenditures which the financial managers must evaluate and finance. Finally, the tools and techniques of analysis developed in the quantitative methods discipline are helpful in analyzing complex financial management problems.

```
┌─────────────────────────────┐
│   Financial Decision Areas  │
└─────────────────────────────┘

┌─────────────────────────────┐                      ┌──────────────────────────┐
│ 1. Investment analysis      │        Support       │ Primary Discipline       │
│ 2. Working capital          │   ◄──────────────    │ 1. Accounting            │
│    management               │                      └──────────────────────────┘
│ 3. Sources and cost of      │
│    funds                    │
│ 4. Determination of capital │        Support       ┌──────────────────────────┐
│    structure                │   ◄──────────────    │ Other Related Disciplines│
│ 5. Dividend policy          │                      │ 1. Marketing             │
│ 6. Analysis of risks and    │                      │ 2. Production            │
│    returns                  │                      │ 3. Quantitative methods  │
└─────────────────────────────┘                      └──────────────────────────┘
            │
       Resulting in
            │
            ▼
┌─────────────────────────────┐
│ Shareholder's wealth        │
│ maximisation                │
└─────────────────────────────┘
```

**Impact of Other Disciplines on Financial Management**

The above figure depicts the relationship between financial management and supportive disciplines. The marketing, production and quantitative methods are, thus, only indirectly related to day to day decision making by financial managers and are supportive in nature while accounting is the primary discipline on which the financial manager draws considerably. Even economics can also be considered as one of the major disciplines which help the financial manager to gain knowledge of what goes on in the world outside the business.

### Self Examination Questions

### A. Objective Type Questions

1. If income is more than expenditure, a company will be able to show profits.

    (a) True

    (b) False.

2. Management of all matters related to an organisation's finances is called:

    (a) Cash inflows and outflows

    (b) Allocation of resources

    (c) Financial management

    (d) Finance.

3.  Allocation of resources means paying all expenses on time to avoid interest expenditure.

    (a)  True

    (b)  False.

4.  Which of the following is not an element of financial management?

    (a)  Allocation of resources

    (b)  Financial Planning

    (c)  Financial Decision-making

    (d)  Financial control.

5.  Financial management is concerned with the actual cash flows of the organisation, while financial accounting is concerned with recording the flow of cash.

    (a)  True

    (b)  False.

6.  The most important goal of financial management is:

    (a)  Profit maximisation

    (b)  Matching income and expenditure

    (c)  Using business assets effectively

    (d)  Wealth maximisation.

7.  In the traditional phase, the importance of financial management was limited to major events such as mergers and takeovers.

    (a)  True

    (b)  False.

8.  To achieve wealth maximization, the finance manager has to take careful decision in respect of:

    (a)  Investment

    (b)  Financing

    (c)  Dividend

    (d)  All the above.

9.  Early in the history of finance, an important issue was:

    (a)  Liquidity

    (b)  Technology

(c) Capital structure

(d) Financing options.

10. Which of the following are microeconomic variables that help define and explain the discipline of finance?

(a) Risk and return

(b) Capital structure

(c) Inflation

(d) All of the above.

**Answers to Objective Type Questions**

**1.** (a); **2.** (c); **3.** (b); **4.** (d); **5.** (a); **6.** (d); **7.** (a); **8.** (d); **9.** (a); **10.** (d)

**B. Short Answer Type Questions**

1. Differentiate between the following:

(a) Procurement of funds and Utilization of funds

(b) Traditional phase and Modern phase

(c) Profit maximization and Value maximization

(d) Investment decisions and Dividend decisions

(e) Financial management and Financial accounting.

2. Write short notes on the following:

(a) Scope of financial management

(b) Importance of financial management

(c) Financing decisions.

**C. Long Answer Type Questions**

1. What are the two main aspects of the finance function?

2. What are three main considerations in procuring funds?

3. Explain "Wealth maximisation" and "Profit maximisation" objectives of financial management.

4. Discuss the role of a chief financial officer.

5. In recent years, there have been a number of environmental, pollution and other regulations imposed on businesses. In view of these changes, is maximisation of shareholder wealth still a realistic objective?

# CHAPTER 2

## TIME VALUE OF MONEY

### Learning Objectives

After studying this chapter, you will be able to understand

♦ The concept of time value of money;

♦ Techniques of Discounting and Compounding;

♦ Identify the equation for calculating the present value of an annuity and calculation of the present value of an annuity; and

♦ Identify the equation for calculating the future value of an annuity and calculation of the future value of an annuity.

## 1. CONCEPT OF TIME VALUE OF MONEY

Most financial transactions involve a series of cash flows - regular or irregular - over a period of time. When evaluating these cash flows the basic concept used is the time value of money. If you are offered the choice between having Rs. 100 today and having Rs. 100 at a future date, you will usually prefer to have Rs. 100 now. If the choice is between paying Rs. 100 now or paying the same Rs. 100 at a future date, you will usually prefer to pay Rs. 100 later. But why is this? Rs. 100 has the same value one year from now also. Actually, although the value is the same, you can do much more with the money if you have it now; over the time you can earn some interest on your money.

The time value of money (TVM) is one of the basic concepts of finance. We know that if we deposit money in a bank account we will receive interest. Because of this, we prefer to receive money today rather than the same amount in the future. Money we receive today is more valuable to us than money received in the future by the amount of interest we can earn with the money. This is referred to as the time value of money.

The term time value of money can be defined as "The value derived from the use of money over time as a result of investment and reinvestment. This term may refer to either present value or future value calculations. The present value is the value today of an amount that would exist in the future with a stated investment rate called the discount rate." For example, with a 10% annual discount rate, the present value today of Rs. 110 one year from now is Rs. 100.

Considering time value of money is important in decision making, for the purpose of financial decision making expected cash flows are evaluated from the time frame of present time, $t_0$. In finance, we often have a decision making situation wherein cash investment today is evaluated with reference to expected cash flows in future. Say, a firm wants to invest Rs. 1,000 today at $t_0$, its expected cash flows in future are as follows:

$t_1$      Rs. 5,000
$t_2$      Rs. 5,000
$t_3$      Rs. 8,000

Should we accept this investment proposal?

This needs appreciation that cash flows are at different time frame. These are to be converted into unique time frame, say, with reference to $t_0$. Then we shall have to consider present value of future cash flow:

$t_0$          -1,000

$t_1$      Rs. 5,000

$t_2$      Rs. 5,000          Convert into present value of money in terms of $t_0$

$t_3$      Rs. 8,000
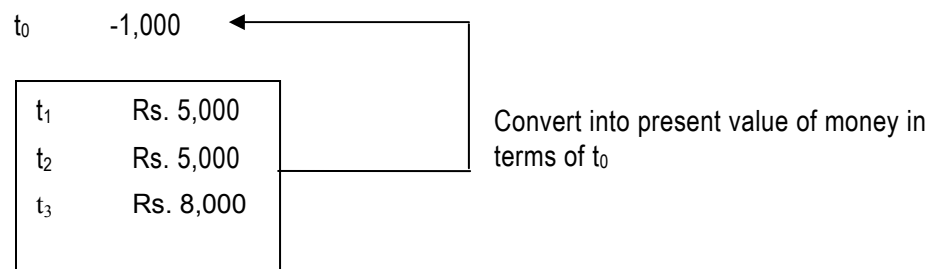
We will discuss the technique of computation of time value of money later in this chapter.

The reason why there is time value of money is as follows:

*Opportunity Cost:* There are alternative productive uses of money. The cost of any decision includes the cost of the next best opportunity forgone. You can save and invest, get interest and spend.

*Inflation:* It erodes the value of money.

*Risk:* There are always financial and non-financial risks involved.

The trade-off between money now and money later depends on, among other things, the rate of interest you can earn by investing. It impacts business finance, consumer finance and government finance. Time value of money results from the concept of interest.

Interest rate is the cost of borrowing money as a yearly percentage. For investors, interest rate is the rate earned on an investment as a yearly percentage.

## 2.     SIMPLE INTEREST

It may be defined as "Interest calculated as a simple percentage of the original principal amount". The simple interest 'I' on a principal 'P' borrowed at the rate of 'i' per annum for a

period of 't' years is given by:

$$I = Pit$$

It must be noted that i is represented in decimals and is part of one unit. If the rate of interest is in percent, i can be calculated by dividing it by 100.

If we add principal to the interest, we will get the total amount (A).

$$A = P + I$$

**Illustration1:** If you invest Rs 10,000 in a bank at simple interest of 9% per annum, what will be the amount at the end of three years?

**Solution**

Amount, $A = P + I = P + Pit = 10,000 + 10,000 \times \dfrac{7}{100} \times 3 = 12,100$

**Illustration 2**: Rs. 2,000 is deposited in a bank for two years at simple interest of 6%. How much will be the balance at the end of 2 years?

**Solution**

Required balance is given by

$$A = P (1 + it) = 2,000 (1 + 0.06 \times 2) = 2,000 \times 1.12 = Rs. 2,240.$$

**Illustration 3:** Find the rate of interest if the amount owed after 6 months is Rs.1,050, borrowed amount being Rs. 1,000.

**Solution**

We know $\qquad A = P + Pit$

$$i.e., 1,050 = 1,000 + 1,000 \times i \times \dfrac{1}{2}$$

$$or, 50 = 500i$$

$$i.e., i = \dfrac{50}{500} = \dfrac{1}{10} = 10\%$$

## 3.    COMPOUND INTEREST

Compound interest is the interest that accrues on a deposit or investment that uses compounding which basically means that interest is paid both on previously earned interest and as well as on the principal. In other words, interest due at the end of unit payment period

is added to the principal and interest on the next payment period is computed on the new principal. Naturally, the amount calculated on the basis of compound interest rate is higher than when calculated with the simple rate. The time interval between successive additions of interests is known as conversion (or payment) period. Typical conversion periods are given below:

| Conversion Period | Description |
|---|---|
| 1 day | Compounded daily |
| 1 month | Compounded monthly |
| 3 months | Compounded quarterly |
| 6 months | Compounded semiannually |
| 12 months | Compounded annually |

at the end of first payment period,

$A_1 = P + P_i = P(1 + i)$;

at the end of second payment period,

$A_2 = A_1 + A_1 i = A_1(1 + i) = P (1 + i)^2$;

at the end of second payment period,

$A_2 = A_1 + A_1 i = A_1(1 + i) = P (1 + i)^2$;

at the end of third payment period,

$A_3 = A_2 + A_2 i = A_2(1 + i) = P (1 + i)^3$;

$A_n = A_{n-1} + A_{n-1} i = A_{n-1} (1 + i) = P (1 + i)^n$;

Thus, the accrued amount $A_n$ on a principal P after n payment periods at i (in decimal) rate of interest per payment period is given by:

$$A_n = P (1 + i)^n,$$

$$\text{where } i = \frac{\text{Annual rate of interest}}{\text{Number of payment periods per year}} = \frac{r}{k}.$$

$$= P \left( 1 + \frac{r}{k} \right)^n, \text{when compounding is done k times a year at an annual interest rate r.}$$

Computation of $A_n$ shall be quite simple with a calculator. However, compound interest tables as well as tables for $(1+i)^n$ at various rates per annum with (a) annual compounding; (b) monthly compounded and (c) daily compounding are available.

It should be remembered that i and n are with respect to per period, which can be different than a year. For example, annual interest can be payable, on monthly, quarterly or half-yearly basis. This will be clear from the illustrations given.
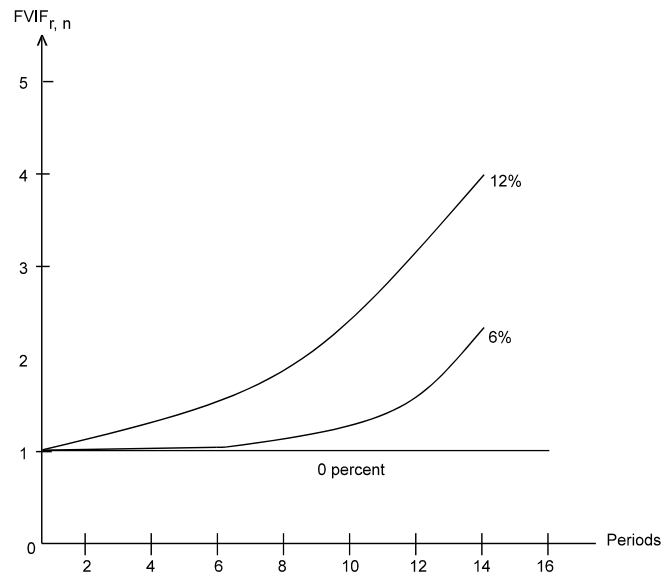


**Graphic View of Compounding**

**Illustration 4:** Determine the compound interest for an investment of Rs 7,500 at 6 % compounded half-yearly. Given that $(1+i)^n$ for i = 0.03 and n = 12 is 1.42576.

**Solution**

$$i = \frac{6}{2 \times 100} = 0.03, \qquad n = 6 \times 2 = 12, \quad P = 1,000$$

Compound Amount = $7,500(1+0.03)^{12}$ = 7,500 $\times$ 1.42576 = 10,693.20

Compound Interest = 10,693.20 – 7,500 = 3,193.20

**Illustration 5:** Rs. 2,000 is invested at annual rate of interest of 10%. What is the amount after 2 years if the compounding is done:

(a) Annually?     (b) Semi annually?     (c) Monthly?     (d) Daily?

**Solution**

(a)  The annual compounding is given by:

$$A_2 = P(1+i)^n, n \text{ being } 2, i \text{ being } \frac{10}{100} = 0.1 \text{ and } P \text{ being } 2,000$$

$$= 2,000 (1.1)^2 = 2,000 \times 1.21 = \text{Rs. } 2,420$$

(b) For Semiannual compounding, n = 2 × 2 = 4, I = 0.1/2 = 0.05

$$A_4 = 2,000 (1 + 0.05)^4 = 2,000 \times 1.2155 = \text{Rs. } 2,431$$

(c) For monthly compounding, n = 12 × 2 = 24, i = 0.1/12 = 0.00833

$$A_{24} = 2,000 (1.00833)^{24} = 2,000 \times 1.22029 = \text{Rs. } 2440.58$$

(d) For daily compounding, n = 365 × 2 = 730, i = 0.1/(365) = 0.00027

$$A_{730} = 2,000 (1.00027)^{730} = 2,000 \times 1.22135 = \text{Rs. } 2,442.70$$

**Illustration 6:**   Determine the compound amount and compound interest on Rs. 1,000 at 6% compounded semiannually for 6 years.  Given that $(1+i)^n = 1.42576$ for i = 3% and n = 12.

**Solution**

i = (6/2) = 3%, n = 6 × 2 = 12, P = 1,000

Compound amount = $P(1 + i)^n$ = 1,000 (1 + 3%)^12

$$= 1,000 \times 1.42576 = \text{Rs. } 1,425.76$$

Compound interest = 1,425.76 – 1,000 = Rs. 425.76

**Illustration 7:**   What annual rate of interest compounded annually doubles an investment in 7 years?  Given that $2^{1/7} = 1.104090$.

**Solution**

If the principal be P, $A_n = 2P$

Since, $A_n = P(1 + i)^n$,

$$2P = P(1 + i)^7,$$

Or,      $2 = (1 + i)^7$

Or,      $2^{1/7} = 1 + i$

Or,      1.104090 = 1 + I          i.e., I = 0.10409

Required rate of interest = 10.41%

**Illustration 8:**   A person opened an account on April, 2005 with a deposit of Rs. 800.  The account paid 6% interest compounded quarterly. On October 1, 2005, he closed the account

and added enough additional money to invest in a 6-month Time Deposit for Rs. 1,000 earning 6% compounded monthly.

(a)   How much additional amount did the person invest on October 1?

(b)   What was the maturity value of his Time Deposit on April 1, 2006?

(c)   How much total interest was earned?

Given that $(1 + i)^n$ is 1.03022500 for $i = 1\frac{1}{2}\%$, $n = 2$ and is 1.03037751 for $i = \frac{1}{2}\%$ and $n = 6$.

**Solution**

(a)   The initial investment earned interests for April – June and July – September quarter, i.e. for 2 quarters.

   In this case, $i = \frac{6}{4} = 1\frac{1}{2}\%, n = 2$ and the compounded amount $= 800\left(1 + 1\frac{1}{2}\%\right)^2$

   $= 800 \times 1.03022500 = $ Rs. 824.18

   The additional amount = Rs. (1,000 – 824.18) = Rs. 175.82

(b)   In this case, the Time Deposit earned interest compounded monthly for 2 quarters.

   Here, $i = \frac{6}{12} = \frac{1}{2}\%, n = 6, P = 1,000$

   Required maturity value $1,000\left(1 + \frac{1}{2}\%\right)^6 = 1,000 \times 1.03037751 = $ Rs. 1,030.38

(c)   Total interest earned = (24.18 + 30.38) = Rs. 54.56

## 3.1   COMPOUND INTEREST VERSUS SIMPLE INTEREST

The given figure shows graphically the differentiation between compound interest and simple interest. The top two ascending lines show the growth of Rs. 100 invested at simple and compound interest. The longer the funds are invested, the greater the advantage with compound interest. The bottom line shows that Rs. 38.55 must be invested now to obtain Rs. 100 after 10 periods. Conversely, the present value of Rs. 100 to be received after 10 years is Rs. 38.55.
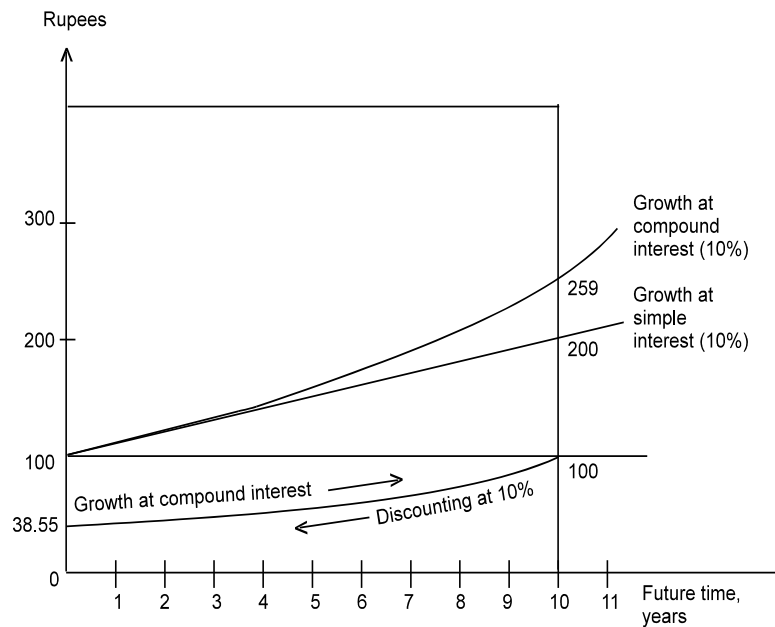
**Compound Interest versus Simple Interest**

## 4.   EFFECTIVE RATE OF INTEREST

It is the actual equivalent annual rate of interest at which an investment grows in value when interest is credited more often than once a year. If interest is paid *m* times in a year it can be found by calculating:

$$E_i = \left(1 + \frac{i}{m}\right)^m - 1$$

**Illustration 9:** If the interest is 10% payable quarterly, find the effective rate of interest.

**Solution**

$$E = \left(1 + \frac{0.1}{4}\right)^4 - 1 = 0.1038 \text{ or } 10.38\%$$

## 5.   PRESENT VALUE

The present value, P, is the amount of money that represents the sum of principal and interest if P is required to be invested now at a certain rate compounded over a number of time periods at a specified rate for each time period.

The present value, P, of the amount $A_n$ due at the end of n interest period at the rate of i per interest period may be obtained by solving for P, the equation is:

$$A_n = P(1 + i)^n \qquad \text{i.e. } P = A_n (1 + i)^{-n}$$

As mentioned earlier, computation of P may be simple if we make use of either the calculator or the Present Value table showing values of $(1+i)^{-n}$ for various time periods/per annum interest rates. For positive i, the factor $(1 + i)^{-n}$ is always less than 1, indicating thereby, future amount has smaller present value.

**Illustration 10:** What is the present value of Re. 1 to be received after 2 years compounded annually at 10%?

**Solution**

Here $A_n = 1$, $i = 0.1$

Required Present Value = $A_n (1+i)^{-n}$

$$= \frac{A_n}{(1+i)^n} = \frac{1}{(1.1)^2} = \frac{1}{1.21} = 0.8264 = \text{Re.} 0.83$$

Thus, Re. 0.83 shall grow to Re. 1 after 2 years at 10% compounded annually.

**Illustration 11:** Find the present value of Rs. 10,000 to be required after 5 years if the interest rate be 9 per cent. Given that $(1.09)^5 = 1.5386$

**Solution**

Here, $i = 0.09$, $\qquad$ n = 5, $\qquad$ $A_n = 10,000$

Required Present value $= A_n (1 + i)^{-n}$

$\qquad\qquad\qquad\qquad = 10,000 (1.09)^{-5} = 10,000 \times 0.65 = \text{Rs. } 6,500.$

$$\left[ (1.09)^{-5} = \frac{1}{(1.09)^5} = 0.65 \right]$$

**Illustration 12:** What is the present value of Rs. 50,000 to be received after 10 years at 10 per cent compounded annually?

**Solution**

$\qquad$ Here n = 10, i = 0.1

$\qquad$ $P = A_n (1 + i)^{-n}$

$\qquad\quad = 50,000 (1.1)^{-10}$

= 50,000 × 0.385543 = Rs. 19,277.15

**Illustration 13:** Mr. X has made real estate investment for Rs. 12,000 which he expects will have a maturity value equivalent to interest at 12% compounded monthly for 5 years. If most savings institutions currently pay 8% compounded quarterly on a 5 year term, what is the least amount for which Mr. X should sell his property? Given that $(1 + i)^n = 1.81669670$ for $i = 1\%$ and $n = 60$ and that $(1 + i)^{-n} = 0.67297133$ for $i = 2\%$ and $n = 20$.

**Solution**

It is a two-part problem. First being determination of maturity value of the investment of Rs. 12,000 and then finding of present value of the obtained maturity value.

Maturity value of the investment may be found from $A_n = P(1+i)^n$,

where P = 12,000, $i = \dfrac{12}{12} = 1\%, n = 5 \times 12 = 60$.

Now, $A_n = 12,000 (1+1\%)^{60} = 12,000 \times 1.81669670$

$= 21,800.36040000 =$ Rs. 21,800.36

Thus, maturity value of the investment in real estate = Rs. 21,800.36

The present value, P of the amount $A_n$ due at the end of n interest periods at the rate of i% interest per period is given by $P = A_n (1 + i)^{-n}$

We have in the present case, $A_n =$ Rs. 21,800.36, $i = \dfrac{8}{4} = 2\%, n = 5 \times 4 = 20$.

Thus, $P = 21,800.36 (1 + 2\%)^{-20}$

$= 21,800.36 \times 0.67297133 =$ Rs. 14,671.02

Mr. X should not sell the property for less than Rs. 14,671.02

## 6. ANNUITY

An annuity is a stream of regular periodic payment made or received for a specified period of time. A recurring deposit with the bank is typical example of an annuity.

The amount of an annuity, A is the algebraic sum of the payments and the accumulated interest.

Thus, if Re. 1 be the periodic payment for an annuity at the interest rate of i per cent per payment period made over n payment periods, the first payment shall accumulate $A_1$ compounded over $n-1$ time period, the second $A_2$ over $n-2$ time period, and so on.

$\therefore A_1 = 1. (1 + i)^{n-1}, A_2 = 1. (1 + i)^{n-2}, \ldots\ldots, A_{n\_1} = 1. (1 + i)^{n-n+1} = 1. (1 + i)^1, A_n = 1.(1 + i)^0 = 1$

The total amount of an annuity after n payment periods, denoted by A(n,i) is therefore given by:

$$A(n, i) = A_n + A_{n\_1} + \ldots\ldots\ldots + A_2 + A_1$$

$$= 1 + (1 + i)^1 + \ldots\ldots\ldots + (1+i)^{n-2} + (1+i)^{n-1}$$

{a geometric series with first term 1 and common ratio (1+i)}

$$= \frac{1.\{1-(1+i)^n\}}{1-(1+i)} = \frac{1-(1+i)^n}{-1} = \frac{(1+i)^n - 1}{i}$$

If P be the periodic payments, the amount A of the annuity is given by:

$$A = P.\,A(n, i)$$

Or, Amount $= P\dfrac{(1+i)^n - 1}{i}$

Table for A (n, i) at different rates of interest may be used conveniently, if available, to workout problems. The value of expression $\dfrac{(1+i)^n - 1}{i}$ can easily be found through financial tables.

**Illustration 14:** Find the amount of an annuity if payment of Rs. 500 is made annually for 7 years at interest rate of 14% compounded annually.

**Solution**

Here P = 500, n = 7, i = 0.14

A = Rs. 500 × A (7, 0.14) = 500 × 10.7304915 = Rs. 5,365.25

**Illustration 15:** Rs. 200 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the amount of this annuity after 10th payment? Given that $(1.005)^{10} = 1.0511$

**Solution**

We have $A(n,i) = \dfrac{(1+i)^{n-1}}{i}$, i being the interest rate (in decimal) per payment period over n payment period.

Here, i = .06/12 = .005, n = 10.

Required amount is given by A = P.A (10, .005)

= 200 × 10.22 = Rs. 2,044.

## 7. PERPETUITY

Perpetuity is a stream of payments or a type of annuity that starts payments on a fixed date and such payments continue forever, or perpetually. Often preferred stock which pays a dividend is considered as a form of perpetuity. However, one must assume that the firm does not go bankrupt or is otherwise impeded for making timely payments. The formula for evaluating perpetuity is relatively straight forward. It is simply the expected income stream divided by a discount factor or market rate of interest. It reflects the expected present value of all payments. It is comparable to a perpetual bond. If a preferred issue pays a Rs. 2.00 quarterly dividend and the annual interest rate is 5 percent then one would expect to be willing to pay 2.50/.0125, or Rs. 200 per share. Here, the 5 percent interest rate was adjusted for a simple quarterly disbursement (.05/4 = .0125).

Perpetuity is an annuity in which the periodic payments begin on a fixed date and continue indefinitely. Fixed coupon payments on permanently invested (irredeemable) sums of money are prime examples of perpetuities. Scholarships paid perpetually from an endowment fit the definition of perpetuity.

The value of the perpetuity is finite because receipts that are anticipated far in the future have extremely low present value (today's value of the future cash flows). Additionally, because the principal is never repaid, there is no present value for the principal. The price of perpetuity is simply the coupon amount over the appropriate discount rate or yield.

Perpetuity is an annuity that provides payments indefinitely. A constant stream of identical cash flows with no end. Since this type of annuity is unending, its sum or future value cannot be calculated.

Examples of perpetuity can be local governments set aside funds so that it will be available on a regular basis for cultural activities or a children's charity organisation set up a fund designed to provide a flow of regular payments indefinitely to needy children.

Therefore, what happens in perpetuity is that once the initial fund has been established the payments will flow from the fund indefinitely which implies that these payments are nothing more than annual interest payments.

### 7.1 CALCULATION OF MULTI PERIOD PERPETUITY

With perpetuities it is necessary to find a present value based on a series of payments that go on forever.

The formula for determining the present value of multi-period perpetuity is as follows:

$$PV = \frac{C}{(1+r)^1} + \frac{C}{(1+r)^2} + \frac{C}{(1+r)^3} + \dots\dots + \frac{C}{(1+r)^\infty} = \sum_{n=1}^{\infty} \frac{C}{(1+r)^n} = \frac{C}{r}$$

Where:

C = the interest payment each period

r = the interest rate per payment period

**Illustration 16:** Ramesh wants to retire and receive Rs. 3,000 a month. He wants to pass this monthly payment to future generations after his death. He can earn an interest of 8% compounded annually. How much will he need to set aside to achieve his perpetuity goal?

**Solution**       C = Rs. 3,000

r = 0.08/12 or 0.00667

Substituting these values in the above formula, we get

$$PV = \frac{Rs.3,000}{0.00667}$$

= Rs. 4,49,775

If he wanted the payments to start today, we must increase the size of the funds to handle the first payment. This is achieved by depositing Rs. 4,52,775 which provides the immediate payment of Rs. 3,000 and leaves Rs. 4,49,775 in the fund to provide the future Rs. 3,000 payments.

## 7.2   CALCULATION OF GROWING PERPETUITY

A stream of cash flows that grows at a constant rate forever is known as growing perpetuity.

The formula for determining the present value of growing perpetuity is as follows:

$$PV = \frac{C}{(1+r)^1} + \frac{C(1+g)}{(1+r)^2} + \frac{C(1+g)^2}{(1+r)^3} + \dots\dots + \frac{C(1+g)^\infty}{(1+r)^\infty} = \sum_{n=1}^{\infty} \frac{C(1+g)^{n-1}}{(1+r)^n} = \frac{C}{r-g}$$

**Illustration 17**: Assuming that the discount rate is 7% per annum, how much would you pay to receive Rs. 50, growing at 5%, annually, forever?

**Solution**

$$PV = \frac{C}{r-g}$$

$$= \frac{50}{0.07 - 0.05} = 2,500$$

## 8. SINKING FUND

It is the fund created for a specified purpose by way of sequence of periodic payments over a time period at a specified interest rate.

Size of the sinking fund deposit is computed from A=P.A (n,i), where A is the amount to be saved, P, the periodic payment, n, the payment period.

**Illustration 18:** How much amount is required to be invested every year so as to accumulate Rs. 3,00,000 at the end of 10 years if the interest is compounded annually at 10%?

**Solution**

Here,  A= 3,00,000    n = 10    i = 0.1

Since,  A=P.A (n,i)

3,00,000=P.A(10, 0.1)

    = P*15.9374248

Therefore, $P = \dfrac{3,00,000}{15.9374248} = 18,823.62$

    P = Rs. 18,823.62

## 9. TECHNIQUES OF DISCOUNTING

The present value of a sum of money to be received at a future date is determined by discounting the future value at the interest rate that the money could earn over the period. This process is known as Discounting. The figure below shows graphically how the present value interest factor varies in response to changes in interest rate and time. The present value interest factor declines as the interest rate rises and as the length of time increases.
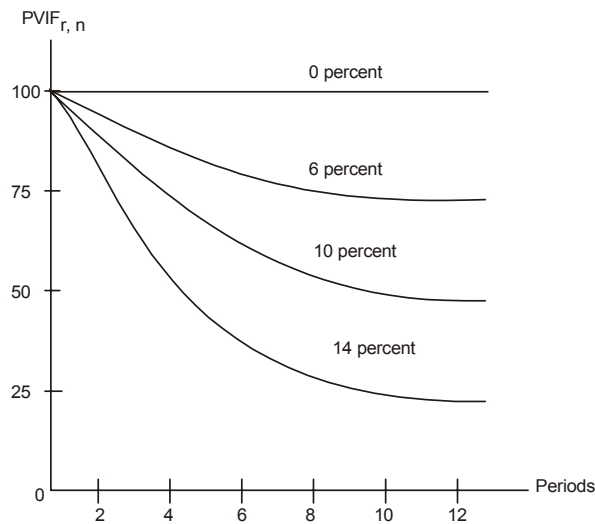
**Graphic View of Discounting**

## 9.1    PRESENT VALUE OF A SINGLE CASH FLOW

The present value of a single cash flow is given as:

$$PV = FV_n \left( \frac{1}{1+i} \right)^n$$

Where,  $FV_n$  =  Future value n years hence

r  =  Rate of interest per annum

n  =  Number of years for which discounting is done.

It can be seen from the above formula that present value of a future money depends upon the three variables i.e. FV, the rate of interest and time period. The published tables for various combination of $\left( \frac{1}{1+i} \right)^n$ are available.

**Illustration 19:** Find out the present value of Rs. 2,000 received after in 10 years hence, if discount rate is 8%.

**Solution**

Present value of an amount = $FV_n \left( \frac{1}{1+i} \right)^n$

Now, I = 8%

n = 10 years

Present value of an amount = Rs. 2,000 $\left(\dfrac{1}{1+0.08}\right)^{10}$

= Rs. 2,000 (0.463)

= Rs. 926

## 9.2 PRESENT VALUE OF AN ANNUITY

Sometimes instead of a single cash flow the cash flows of the same amount is received for a number of years. The present value of an annuity may be expressed as follows :

$$PVA_n = \frac{A}{(1+i)^1} + \frac{A}{(1+i)^2} + ... \frac{A}{(1+i)^{n-1}} + \frac{A}{(1+i)^n}$$

$$= A\left(\frac{1}{(1+i)^1} + \frac{1}{(1+i)^2} + ... \frac{1}{(1+i)^{n-1}} + \frac{1}{(1+i)^n}\right)$$

$$= A\left(\frac{(1+i)^n - 1}{i(1+i)^n}\right)$$

Where,

$PVA_n$ = Present value of annuity which has duration of n years

A = Constant periodic flow

i = Discount rate.

**Illustration 20:** Find out the present value of a 4 year annuity of Rs. 20,000 discounted at 10 per cent.

**Solution**      PV       =  Amount of annuity × Present value (r, n)

Now, i       = 10%

n       =  4 years

PV       = Rs. 20,000 $\left[\dfrac{(1+0.1)^4 - 1}{0.1(1+0.1)^4}\right]$ = Rs. 20,000 × 0.683

= Rs. 13,660

**Illustration 21:** Rs. 5,000 is paid every year for 10 years to pay off a loan. What is the loan amount if interest rate be 14% per annum compounded annually?

**Solution**

$$V = A, P(n, i)$$

$$= 5,000 \times P(10, 0.14)$$

$$= 5,000 \times 5.21611 = \text{Rs. } 26,080.55$$

*Note:* The students may, as an exercise, workout the interest amount.

**Illustration 22:** Y bought a TV costing Rs. 13,000 by making a down payment of Rs. 3,000 and agreeing to make equal annual payment for 4 years. How much would be each payment if the interest on unpaid amount be 14% compounded annually?

**Solution**

In the present case, present value of the unpaid amount was (13,000 – 3,000) = Rs. 10,000. The periodic payment, A may be found from

$$A = \frac{V}{P(n,i)} = \frac{10,000}{P(4,0.14)} = 10,000 \times 0.343205 = \text{Rs. } 3,432.05$$

**Illustration 23:** Z plans to receive an annuity of Rs. 5,000 semi-annually for 10 years after he retires in 18 years. Money is worth 9% compounded semi-annually.

(a)     How much amount is required to finance the annuity?

(b)     What amount of single deposit made now would provide the funds for the annuity?

(c)     How much will Mr. Z receive from the annuity?

**Solution**

(a)   Let us first find the required present value for the 10 years annuity by using

$$V = A. P(n, i)$$

$$= 5,000 \ P(20, 4.5\%)$$

$$= 5,000 \times 13.00793654 = \text{Rs. } 65,039.68$$

Since, $P(20, 4.5\%) = \dfrac{(1 + 4.5\%)^{20} - 1}{.045(1 + 4.5\%)^{20}}$

$$= \frac{2.41171402 - 1}{0.10852713} = 13.00793654$$

(b) We require the amount of single deposit that matures to Rs. 65,039.68 in 18 years at 9% compounded semi-annually. We use

$$A_n = P(1+i)^n, A_n = 65,039.68, n = 18 \times 2 = 36, i = \frac{9}{2} = 4\frac{1}{2}\%, P = ?$$

Thus, $P = A_n (1+i)^{-n}$

$$= 65,039.68 \left(1 + 4\frac{1}{2}\%\right)^{-36}$$

= 65,039.68 × 0.20502817 = Rs. 13,334.97

(c) Required amount = Rs. 5,000 $\times$ 20 = Rs. 1,00,000.

## 10. TECHNIQUES OF COMPOUNDING

The "time value of money" describes the effects of compounding. An amount invested today has more value than the same amount invested at a later date because it can utilize the power of compounding. Compounding is the process by which interest is earned on interest. When a principal amount is invested, interest is earned on the principal during the first period or year. In the second period or year, interest is earned on the original principal plus the interest earned in the first period. Over time, this reinvestment process can help an account grow significantly.

### 10.1 FUTURE VALUE (FV) OF A SINGLE CASH FLOW

The future value of a single cash flow is defined as :

|  | FV | = PV $(1+i)^2$ |
|---|---|---|
| Where, | FV | = Future value n years hence |
|  | PV | = Present value of cash flow today (given) |
|  | I | = Rate of interest per annum |
|  | n | = Number of year for which compounding is done. |

If any of the variable i.e. PV, I and n varies, the FV also varies. It is very tedious to calculate the value of $(1+I)^n$. The pre-calculated values of $(1+I)^n$ for different combinations are published in the form of tables. One may refer to such tables for computation. Otherwise one should use the knowledge of logarithams.

**Illustration 24:** A makes a deposit of Rs. 5,000 in a bank which pays 10% interest compounded annually for 6 years. You are required to find out the amount to be received after 5 years.

**Solution**

$$FV = PV(1+i)^n$$

Now, $\quad PV = $ Rs. 5,000, i = 10% and n = 6 years

$\therefore \quad FV = $ Rs. 5,000 $(1 + 10\%)^6$

$\quad = $ Rs. 5,000 $\times$ 7.716*

$\quad = $ Rs. 38,580

* From table of compounded value of an annuity.

## 10.2 FUTURE VALUE OF AN ANNUITY

An annuity is a series of periodic cash flows (payments or receipts) of equal amount. The premium payments of a life insurance policy, for example, are an annuity.

In general terms the future value of an annuity is given as :

$$FVA_n = A\left[\frac{(1+i)^n - 1}{i}\right]$$

Where, $\quad FVA_n = $ Future value of an annuity which has duration of n years

$\quad A = $ Constant periodic flow

$\quad i = $ Interest rate per period

$\quad n = $ Duration of the annuity.

From the above equation it is clear that the future value of annuity is dependent on three variables i.e. the annual amount, the rate of interest and the time period. If any of these variable changes it will change the future value of the annuity. A published table is available for various combinations of the rate of interest r and the time period n.

**Illustration 25 :** A person is required to pay four equal annual payments of Rs. 5,000 each in his deposit account that pays 8% interest per year. Find out the future value of annuity at the end of 4 years.

**Solution**

$$FVA = A\left(\frac{(1+i)^n - 1}{i}\right)$$

$\quad = $ Rs. 5,000 (4.507)

$\quad = $ Rs. 22,535

**Self Examination Questions**

**A. Objective Type Questions**

1. Both the future and present value of a sum of money are based on:

    (a) Interest rate

    (b) Number of time periods

    (c) Both a and b

    (d) None of the above.

2. An annuity is _____.

    (a) More than one payment

    (b) A series of unequal but consecutive payments

    (c) A series of equal and consecutive payments

    (d) A series of equal and non-consecutive payments.

3. Time value of money is an important finance concept because:

    (a) It takes risk into account

    (b) It takes time into account

    (c) It takes compound interest into account

    (d) All of the above.

4. The concepts of present value and future value are:

    (a) Directly related to each other

    (b) Not related to each other

    (c) Proportionately related to each other

    (d) Inversely related to each other.

5. If you have Rs.1000 and you plan to save it for 4 years with an interest rate of 10%, what is the future value of your savings?

    (a) Rs.1464.00

(b) Rs.1000.00

(c) Rs.1331.00

(d) Cannot be determined.

6. To increase a given present value, the discount rate should be adjusted:

(a) Upward

(b) Downward

(c) True

(d) False.

7. In three years you are to receive Rs. 5,000. If the interest rate were to suddenly increase, the present value of that future amount to you would:

(a) Fall

(b) Rise

(c) Remain unchanged

(d) Cannot be determined without more information.

**Answers to Objective Type Questions**

**1.** (c); **2.** (c); **3.** (d); **4.** (d); **5.** (a); **6.** (b); **7.** (a)

**B. Short Answer Type Questions**

1. Define the following terms:

(a) Annuity

(b) Perpetuity

(c) Sinking Fund

(d) Simple Interest

(e) Compound Interest.

2. Write short notes on the following:

(a) Time Value of Money

    (b)   Effective Rate of Interest

    (c)   Discounting Techniques

    (d)   Compounding Techniques.

## C. Long Answer Type Questions

1.    What is relevance of time value of money in financial decision making?

2.    Explain the discounting and compounding techniques of time value of money.

## D. Practical Problems

1.    A makes a deposit of Rs. 10,000 in a bank which pays 10% interest compounded annually for 6 years. You are required to find out the amount to be received after 5 years.

2.    A person is required to pay four equal annual payments of Rs. 10,000 each in his deposit account that pays 8% interest per year. Find out the future value of annuity at the end of 4 years.

3.    Find out the present value of Rs. 4,000 received after in 10 years hence, if discount rate is 8%.

4.    Find out the present value of a 4 year annuity of Rs. 10,000 discounted at 10 per cent.

5.    If Ramesh wishes to withdraw Rs. 8,000 seven years from now and the interest rate is 12% compounded annually, then how much amount he must deposit today?

6.    If a person makes a series of Rs. 5,000 deposits at the end of each of the next 5 years and the interest rate is 12% compounded annually, what will be the future value of these deposits.

7.    A company anticipates capital expenditure of Rs. 50,000 for new equipment in 10 years. How much should be deposited annually in a sinking fund earning 10% per year compounded annually to provide for the purchase?

8.    A man, aged 35 years intends to invest now at 7% per year compounded semiannually to receive Rs.50,000 at the age of 65 years. How much should be his present investment?

    Given that $(1 + 0.35/2)^{-60} = .126934$.

9.    An investment is made for 4 years at 7% compounded quarterly so as to have a maturity value of Rs.6,000. What is the amount of investment? What is the amount of interest?

# CHAPTER 3

## FINANCIAL ANALYSIS AND PLANNING

**UNIT – I : APPLICATION OF RATIO ANALYSIS FOR PERFORMANCE EVALUATION, FINANCIAL HEALTH AND DECISION MAKING**

### Learning Objectives

After studying this chapter, you will be able to understand

♦ What is financial analysis and how it helps in decision making?

♦ Learn about the important tools and techniques of financial analysis like ratio analysis.

### 1.1 INTRODUCTION

The basis for financial analysis, planning and decision making is financial information. A business firm prepares its final accounts viz., Balance Sheet and Profit and Loss Account which provide useful financial information for the purpose of decision making. Financial information is needed to predict, compare and evaluate the firm's earning ability. The former statement viz profit & loss account shows the operating activities of the concern and the latter balance sheet depicts the balance value of the acquired assets and of liabilities at a particular point of time. However, these statements do not disclose all of the necessary and relevant information. For the purpose of obtaining the material and relevant information necessary for ascertaining the financial strengths and weaknesses of an enterprise, it is necessary to analyse the data depicted in the financial statement. The financial manager has certain analytical tools which help in financial analysis and planning. For instance, a cash flow statement is a valuable aid to a financial manager in evaluating the inflows and outflows of cash i.e. sources and applications of cash during particular period. In addition, ratio helps the manager to analyse the past performance of the firm and to make future projections.

### 1.2 RATIO ANALYSIS

Ratio Analysis is a widely used tool of financial analysis. The term ratio in it refers to the relationship expressed in mathematical terms between two individual figures or group of figures connected with each other in some logical manner and are selected from financial statements of the concern. The ratio analysis is based on the fact that a single accounting figure by itself may not communicate any meaningful information but when expressed as a

relative to some other figure, it may definitely provide some significant information. The relationship between two or more accounting figures/groups is called a financial ratio. A financial ratio helps to express the relationship between two accounting figures in such a way that users can draw conclusions about the performance, strengths and weaknesses of a firm.

Ratio analysis is not just comparing different numbers from the balance sheet, income statement, and cash flow statement. It is comparing the number against previous years, other companies, the industry, or even the economy in general. Ratios look at the relationships between individual values and relate them to how a company has performed in the past, and might perform in the future.

All stakeholders within the company need to be able to appreciate how the company is performing. Their understanding of how the firm is performing is enhanced through ratio analysis.

## 1.3 TYPES OF RATIOS

Broadly speaking, the operations and financial position of a firm can be described by studying its short term and long term liquidity position, profitability and its operational activities. Therefore, ratios can be classified into following four broad categories:

(i)   Liquidity Ratios

(ii)  Capital Structure/Leverage Ratios

(iii) Activity Ratios

(iv)  Profitability Ratios

### 1.3.1 LIQUIDITY RATIOS

The terms 'liquidity' and 'short-term solvency' are used synonymously. Liquidity or short-term solvency means ability of the business to pay its short-term liabilities. Inability to pay-off short-term liabilities affects its credibility as well as its credit rating. Continuous default on the part of the business leads to commercial bankruptcy. Eventually such commercial bankruptcy may lead to its sickness and dissolution. Short-term lenders and creditors of a business are very much interested to know its state of liquidity because of their financial stake.

Traditionally, two ratios are used to highlight the business 'liquidity'. These are current ratio and quick ratio. Other ratios include cash ratio, interval measure ratio and net working capital ratio.

**1.3.1.1  Current Ratios**: The Current Ratio is one of the best known measures of financial strength.

Current Ratio = Current Assets / Current Liabilities

Where,

> Current Assets = Inventories + Sundry Debtors + Cash and Bank Balances + Receivables/ Accruals + Loans and Advances + Disposable Investments

> Current Liabilities = Creditors for goods and services + Short-term Loans + Bank Overdraft + Cash Credit + Outstanding Expenses + Provision for Taxation + Proposed Dividend + Unclaimed Dividend

The main question this ratio addresses is: "Does your business have enough current assets to meet the payment schedule of its current debts with a margin of safety for possible losses in current assets?" A generally acceptable current ratio is 2 to 1. But whether or not a specific ratio is satisfactory depends on the nature of the business and the characteristics of its current assets and liabilities.

**1.3.1.2 Quick Ratios:** The Quick Ratio is sometimes called the "acid-test" ratio and is one of the best measures of liquidity.

> Quick Ratio or Acid Test Ratio = Quick Assets/ Quick Liabilities

Where,

> Quick Assets = Current Assets –Inventories

> Quick Liabilities = Current Liabilities – Bank Overdraft – Cash Credit

The Quick Ratio is a much more exacting measure than the Current Ratio. By excluding inventories, it concentrates on the really liquid assets, with value that is fairly certain. It helps answer the question: "If all sales revenues should disappear, could my business meet its current obligations with the readily convertible `quick' funds on hand?"

Quick Assets consist of only cash and near cash assets. Inventories are deducted from current assets on the belief that these are not 'near cash assets'. But in a seller's market inventories are also near cash assets. Moreover, just like lag in collection of debtors, there is a lag in conversion of inventories into finished goods and sundry debtors. Obviously slow moving inventories are not near cash assets. However, while calculating the quick ratio we have followed the conservatism convention. Quick liabilities are that portion of current liabilities which fall due immediately. Since bank overdraft and cash credit can be used as a source of finance as and when required, it is not included in the calculation of quick liabilities.

An acid-test of 1:1 is considered satisfactory unless the majority of "quick assets" are in accounts receivable, and the pattern of accounts receivable collection lags behind the schedule for paying current liabilities.

**1.3.1.3  Cash Ratio/ Absolute Liquidity Ratio**: The cash ratio measures the absolute liquidity of the business. This ratio considers only the absolute liquidity available with the firm. This ratio is calculated as:

$$\frac{Cash + Marketable\ Securities}{Current\ Liabilities} = Cash\ Ratio$$

A subsequent innovation in ratio analysis, the Absolute Liquidity Ratio eliminates any unknowns surrounding receivables.

The Absolute Liquidity Ratio only tests short-term liquidity in terms of cash and marketable securities.

**1.3.1.4 Basic Defense Interval**

$$Basic\ Defense\ Interval = \frac{(Cash + Receivables + Marketable\ Securities)}{(Operating\ Expenses + Interest + Income\ Taxes)/365}$$

If for some reason all the company's revenues were to suddenly cease, the Basic Defense Interval would help determine the number of days the company can cover its cash expenses without the aid of additional financing.

**1.3.1.5  Net Working Capital Ratio**: Net working capital is more a measure of cash flow than a ratio. The result of this calculation must be a positive number. It is calculated as shown below:

Net Working Capital Ratio = Current Assets - Current Liabilities (excluding short-term bank borrowing)

Bankers look at Net Working Capital over time to determine a company's ability to weather financial crises. Loans are often tied to minimum working capital requirements.

**1.3.2  CAPITAL STRUCTURE/LEVERAGE RATIOS**

The capital structure/leverage ratios may be defined as those financial ratios which measure the long term stability and structure of the firm. These ratios indicate the mix of funds provided by owners and lenders and assure the lenders of the long term funds with regard to:

(i)     Periodic payment of interest during the period of the loan and

(ii)    Repayment of principal amount on maturity.

Therefore leverage ratios are of two types :

(a)    Capital structure ratios and

(b)    Coverage ratios.

**1.3.2.1 Capital Structure Ratios:** These ratios provide an insight into the financing techniques used by a business and focus, as a consequence, on the long-term solvency position. From the balance sheet one can get only the absolute fund employed and its sources, but only capital structure ratios show the relative weight of different sources. In the balance sheet the student may find shareholders' fund, loan fund and current liabilities and provisions. These are very often classified as owners' equities and external equities. *"Owners' Equity"* means share capital, both equity share capital and preference share capital and reserves and surplus.

*'External Equity'* means all outside liabilities (inclusive of current liabilities and provisions). Also these are sometimes classified as equity and debt. *'Equity'* means shareholders fund and *'Debt'* means long term borrowed fund (so short-term loans, current liabilities and provisions are excluded). As per guidelines for issue of 'Debentures by Public Limited Company' debt means term loans, debentures and bonds with an initial maturity period of five years or more, including interest accrued thereon. It also includes all deferred payment liabilities but it does not include short term bank borrowing and advances, unsecured deposits or loans from the public, shareholders and employees, and unsecured loans and deposits from others. It should also include proposed debenture issue. Equity means paid up share capital including preference share capital and reserves.

Three popularly used capital structure ratios are:

**(a) Equity Ratio**

$$\text{Equity Ratio} = \frac{\text{Shareholders' Equity}}{\text{Total Capital Employed}}$$

This ratio indicates proportion of owners' fund to total fund invested in the business. Traditionally, it is believed that higher the proportion of owners' fund lower is the degree of risk.

**(b) Debt Ratio**

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Capital Employed}}$$

Total debt includes short and long term borrowings from financial institutions, debentures/bonds, deferred payment arrangements for buying capital equipments, bank borrowings, public deposits and any other interest bearing loan. Capital employed includes total debt and net worth. This ratio is used to analyse the long-term solvency of a firm.

**(c) Debt to Equity Ratio**

$$\text{Debt to Equity Ratio} = \frac{\text{Debt + Preferred Long Term}}{\text{Shareholders' Equity}}$$

A high ratio here means less protection for creditors. A low ratio, on the other hand, indicates a wider safety cushion (i.e., creditors feel the owner's funds can help absorb possible losses of income and capital).

This ratio indicates the proportion of debt fund in relation to equity. This ratio is very often referred in capital structure decision as well as in the legislation dealing with the capital structure decisions (i.e. issue of shares and debentures). Lenders are also very keen to know this ratio since it shows relative weights of debt and equity.

Debt equity ratio is the indicator of leverage. According to the traditional school, cost of capital firstly decreases due to the higher dose of leverage, reaches minimum and thereafter increases. So infinite increase in leverage (i.e. debt-equity ratio) is not possible. But according to Modigliani-Miller theory, cost of capital and leverage are independent of each other. But Modigliani-Miller theory is based on certain restrictive assumptions, namely, perfect capital market, homogeneous expectations by the present and prospective investors, presence of homogeneous risk class firms, 100% dividend pay-out, no tax situation, etc. And most of these assumptions are viewed as unrealistic. It is believed that leverage and cost of capital are not unrelated.

Presently, there is no norm for maximum debt-equity ratio. Lending institutions generally set their own norms considering the capital intensity and other factors.

**1.3.2.2   Coverage Ratios:** The coverage ratios measure the firm's ability to service the fixed liabilities. These ratios establish the relationship between fixed claims and what is normally available out of which these claims are to be paid. The fixed claims consist of:

(i)     Interest on loans

(ii)    Preference dividend

(iii)   Amortisation of principal or repayment of the instalment of loans or redemption of preference capital on maturity.

The following are important coverage ratios :

**(a)   Debt Service Coverage Ratio**:  Lenders are interested in debt service coverage to judge the firm's ability to pay off current interest and instalments.

$$\text{Debt  Service Coverage Ratio} = \frac{\text{Earnings available for debt service}}{\text{Interest} + \text{Installments}}$$

Earning for debt service =     Net profit + Non-cash operating expenses like depreciation and other amortizations + Non-operating adjustments like loss on sale of + Fixed assets + Interest on Debt Fund.

**(b) Interest Coverage Ratio :** This ratio also known as "times interest earned ratio" indicates the firm's ability to meet interest (and other fixed-charges) obligations. This ratio is computed as :

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest}}$$

Earnings before interest and taxes are used in the numerator of this ratio because the ability to pay interest is not affected by tax burden as interest on debt funds is deductible expense. This ratio indicates the extent to which earnings may fall without causing any embarrassment to the firm regarding the payment of interest charges. A high interest coverage ratio means that an enterprise can easily meet its interest obligations even if earnings before interest and taxes suffer a considerable decline. A lower ratio indicates excessive use of debt or inefficient operations.

**(c) Preference Dividend Coverage Ratio**: This ratio measures the ability of a firm to pay dividend on preference shares which carry a stated rate of return. This ratio is computed as:

$$\text{Preference Dividend Coverage Ratio} = \frac{\text{EAT}}{\text{Preference dividend liability}}$$

Earnings after tax is considered because unlike debt on which interest is charged on the profit of the firm, the preference dividend is treated as appropriation of profit. This ratio indicates margin of safety available to the preference shareholders. A higher ratio is desirable from preference shareholders point of view.

**(d) Capital Gearing Ratio**: In addition to debt-equity ratio, sometimes capital gearing ratio is also calculated to show the proportion of fixed interest (dividend) bearing capital to funds belonging to equity shareholders.

$$\text{Capital Gearing Ratio} = \frac{(\text{Preference Share Capital} + \text{Debentures} + \text{Long Term Loan})}{(\text{Equity Share Capital} + \text{Reserves \& Surplus} - \text{Losses})}$$

For judging long term solvency position, in addition to debt-equity ratio and capital gearing ratio, the following ratios are also used:

**(i)** $\dfrac{\text{Fixed Assets}}{\text{Long Term Fund}}$

It is expected that fixed assets and core working capital are to be covered by long term fund.

In various industries the proportion of fixed assets and current assets are different. So there is no uniform standard of this ratio too. But it should be less than one. If it is more than one, it

means short-term fund has been used to finance fixed assets. Very often many companies resort to such practice during expansion. This may be a temporary arrangement but not a long term remedy.

**(ii)** Proprietary Ratio $= \dfrac{\text{Proprietary Fund}}{\text{Total Assets}}$

Proprietary fund includes Equity Share Capital + Preference Share Capital + Reserve & Surplus – Fictitious Assets. Total assets exclude fictitious assets and losses. If one follows standard current ratio 2 : 1 and standard debt-equity ratio 2 : 1, what should be the standard proprietary ratio ? Let Rs. 100 be the total assets of which Rs. 20 be the current assets. Then following standard current ratio Rs. 10 is financed by current liabilities, remaining Rs. 90 is financed by debt and equity. Since following standard debt-equity ratio equity component is 1/3, it is expected that out of Rs. 90, Rs. 30 should come from proprietary fund. If the current assets component increases equity commitment will be reduced and vice- versa.

### 1.3.3  ACTIVITY RATIO

The activity ratios are also called the Turnover ratios or Performance ratios. These ratios are employed to evaluate the efficiency with which the firm manages and utilises its assets. These ratios usually indicate the frequency of sales with respect to its assets. These assets may be capital assets or working capital or average inventory. These ratios are usually calculated with reference to sales/cost of goods sold and are expressed in terms of rate or times. Some of the important activity ratios are as follows:

**(a)  Capital Turnover Ratio**

$$\text{Capital Turnover Ratio} = \dfrac{\text{Sales}}{\text{Capital  Employed}}$$

This ratio indicates the firm's ability of generating sales per rupee of long term investment. The higher the ratio, the more efficient the utilisation of owner's and long-term creditors' funds.

**(b)  Fixed Assets Turnover Ratio**

$$\text{Fixed Assets Turnover Ratio} = \dfrac{\text{Sales}}{\text{Capital  Assets}}$$

A high fixed assets turnover ratio indicates efficient utilisation of fixed assets in generating sales. A firm whose plant and machinery are old may show a higher fixed assets turnover ratio than the firm which has purchased them recently.

**(c) Working Capital Turnover**

$$\text{Working Capital Turnover} = \frac{\text{Sales}}{\text{Working Capital}}$$

Working Capital Turnover is further segregated into Inventory Turnover, Debtors Turnover, Creditors Turnover.

**(i)  Inventory Turnover Ratio:** This ratio also known as stock turnover ratio establishes the relationship between the cost of goods sold during the year and average inventory held during the year. It is calculated as follows:

$$\text{Inventory Turnover Ratio} = \frac{\text{Sales}}{\text{Average Inventory *}}$$

$$\text{* Average Inventory} = \frac{\text{Opening Stock + Closing Stock}}{2}$$

Very often inventory turnover is calculated with reference to cost of sales instead of sales. In that case inventory turnover will be calculated as :

$$\frac{\text{Cost of Sales}}{\text{Average Stock}}$$

**Note :** Students are advised to follow this formula for calculating inventory turnover ratio. In the case of inventory of raw material the inventory turnover ratio is calculated using the following formula :

$$\frac{\text{Raw Material Consumed}}{\text{Average Raw Material Stock}}$$

This ratio indicates that how fast inventory is used/sold. A high ratio is good from the view point of liquidity and vice versa. A low ratio would indicate that inventory is not used/ sold/ lost and stays in a shelf or in the warehouse for a long time.

**(ii)  Debtors' Turnover Ratio:** In case firm sells goods on credit, the realization of sales revenue is delayed and the receivables are created. The cash is realised from these receivables later on. The speed with which these receivables are collected affects the liquidity position of the firm. The debtors turnover ratio throws light on the collection and credit policies of the firm. It is calculated as follows:

$$\frac{\text{Sales}}{\text{Average Accounts Receivable}}$$

As account receivables pertains only to credit sales, it is often recommended to compute the debtor's turnover with reference to credit sales instead of total sales. Then the debtor's turnover would be

$$\frac{\text{Credit Sales}}{\text{Average Accounts Receivable}}$$

**Note :** Students are advised to follow this formula for calculating debtors' turnover ratio.

**(iii)** *Creditors' Turnover Ratio:* This ratio is calculated on the same lines as receivable turnover ratio is calculated. This ratio shows the velocity of debt payment by the firm. It is calculated as follows:

$$\text{Creditors Turnover Ratio} = \frac{\text{Annual Net Credit Purchases}}{\text{Average Accounts Payable}}$$

A low creditor's turnover ratio reflects liberal credit terms granted by supplies. While a high ratio shows that accounts are settled rapidly.

$$\frac{\text{Credit Purchases}}{\text{Average Accounts Payable}}$$

Debtors' turnover ratio indicates the average collection period. However, the average collection period can be directly calculated as follows:

$$\frac{\text{Average Accounts Receivables}}{\text{Average Daily Credit Sales}}$$

$$\text{Average Daily Credit Sales} = \frac{\text{Credit Sales}}{365}$$

Similarly, average payment period can be calculated using :

$$\frac{\text{Average Accounts Payable}}{\text{Average Daily Credit Purchases}}$$

In determining the credit policy, debtor's turnover and average collection period provide a unique guideline. The firm can compare what credit period it receives from the suppliers and what it offers to the customers. Also it can compare the average credit period offered to the customers in the industry to which it belongs.

### 1.3.4 PROFITABILITY RATIO

The profitability ratios measure the profitability or the operational efficiency of the firm. These ratios reflect the final results of business operations. The results of the firm can be evaluated in

terms of its earnings with reference to a given level of assets or sales or owner's interest etc. Therefore, the profitability ratios are broadly classified in four categories:

(i) Profitability ratios required for analysis from owners' point of view

(ii) Profitability ratios based on assets/investments

(iii) Profitability ratios based on sales of the firm

(iv) Profitability ratios based on capital market information.

### 1.3.4.1 Profitability Ratios Required for Analysis from Owner's Point of View

**(a) Return on Equity (ROE) :** Return on Equity measures the profitability of equity funds invested in the firm. This ratio reveals how profitability of the owners' funds have been utilised by the firm. This ratio is computed as:

$$ROE = \frac{Profit\ after\ taxes}{Net\ worth}$$

Return on equity is one of the most important indicators of a firm's profitability and potential growth. Companies that boast a high return on equity with little or no debt are able to grow without large capital expenditures, allowing the owners of the business to withdraw cash and reinvest it elsewhere. Many investors fail to realize, however, that two companies can have the same return on equity, yet one can be a much better business.

For that reason, a finance executive at E.I. Du Pont de Nemours and Co., of Wilmington, Delaware, created the DuPont system of financial analysis in 1919. That system is used around the world today and serves as the basis of components that make up return on equity.

*Composition of Return on Equity using the DuPont Model*

There are three components in the calculation of return on equity using the traditional DuPont model- the net profit margin, asset turnover, and the equity multiplier. By examining each input individually, the sources of a company's return on equity can be discovered and compared to its competitors.

*(i) Net Profit Margin:* The net profit margin is simply the after-tax profit a company generates for each rupee of revenue. Net profit margins vary across industries, making it important to compare a potential investment against its competitors. Although the general rule-of-thumb is that a higher net profit margin is preferable, it is not uncommon for management to purposely lower the net profit margin in a bid to attract higher sales.

Net profit margin = Net Income ÷ Revenue

Net profit margin is a safety cushion; the lower the margin, the less room for error. A business with 1% margins has no room for flawed execution. Small miscalculations on management's part could lead to tremendous losses with little or no warning.

*(ii) Asset Turnover:* The asset turnover ratio is a measure of how effectively a company converts its assets into sales. It is calculated as follows:

Asset Turnover = Revenue ÷ Assets

The asset turnover ratio tends to be inversely related to the net profit margin; i.e., the higher the net profit margin, the lower the asset turnover. The result is that the investor can compare companies using different models (low-profit, high-volume vs. high-profit, low-volume) and determine which one is the more attractive business.

*(iii) Equity Multiplier:* It is possible for a company with terrible sales and margins to take on excessive debt and artificially increase its return on equity. The equity multiplier, a measure of financial leverage, allows the investor to see what portion of the return on equity is the result of debt. The equity multiplier is calculated as follows:

Equity Multiplier = Assets ÷ Shareholders' Equity.

**Calculation of Return on Equity**

To calculate the return on equity using the DuPont model, simply multiply the three components (net profit margin, asset turnover, and equity multiplier.)

Return on Equity = (Net Profit Margin) (Asset Turnover) (Equity Multiplier)
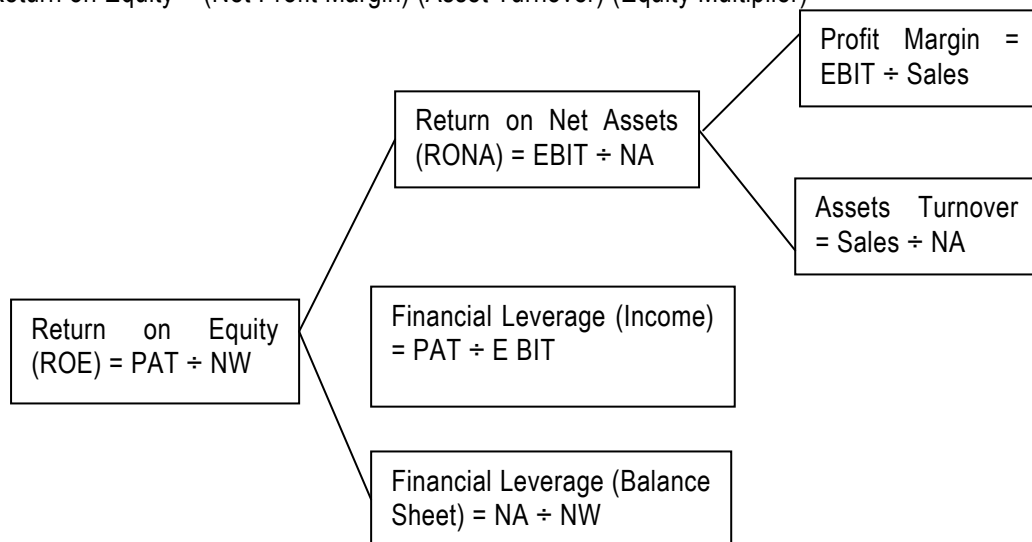


**Du Pont Chart**

**Illustration 1**

XYZ Company's details are as under:

Revenue: Rs. 29,261; Net Income: Rs. 4,212 ; Assets: Rs. 27,987; Shareholders' Equity: Rs. 13,572. Calculate return on equity.

**Solution**

Net Profit Margin = Net Income (Rs. 4,212) ÷ Revenue (Rs. 29,261) = 0.1439, or 14.39% Asset Turnover = Revenue (Rs. 29,261) ÷ Assets (Rs. 27,987) = 1.0455 Equity Multiplier = Assets (Rs. 27,987) ÷ Shareholders' Equity (Rs. 13,572) = 2.0621

Finally, we multiply the three components together to calculate the return on equity:

Return on Equity= (0.1439) x (1.0455) x (2.0621) = 0.3102, or 31.02%

*Analysis:* A 31.02% return on equity is good in any industry. Yet, if you were to leave out the equity multiplier to see how much company would earn if it were completely debt-free, you will see that the ROE drops to 15.04%. In other words, for fiscal year 2004, 15.04% of the return on equity was due to profit margins and sales, while 15.96% was due to returns earned on the debt at work in the business. If you found a company at a comparable valuation with the same return on equity yet a higher percentage arose from internally-generated sales, it would be more attractive.

**(b)  Earnings per Share:** The profitability of a firm from the point of view of ordinary shareholders can be measured in terms of number of equity shares. This is known as Earnings per share.  It is calculated as follows:

$$\text{Earnings per share (EPS)} = \frac{\text{Net profit available to equity holders}}{\text{Number of ordinary shares outstanding}}$$

**(c)  Dividend per Share:** Earnings per share as stated above reflects the profitability of a firm per share; it does not reflect how much profit is paid as dividend and how much is retained by the business. Dividend per share ratio indicates the amount of profit distributed to shareholders per share. It is calculated as:

$$\text{Dividend per share} = \frac{\text{Total profits distributed to equity share holders}}{\text{Number of equity shares}}$$

**(d)  Price Earning Ratio:** The price earning ratio indicates the expectation of equity investors about the earnings of the firm. It relates earnings to market price and is generally taken as a summary measure of growth potential of an investment, risk characteristics, shareholders orientation, corporate image and degree of liquidity. It is calculated as:

$$PE\ Ratio = \frac{Market\ price\ per\ share}{Earnings\ per\ share}$$

### 1.3.4.2 Profitability Ratios based on Assets/Investments :

**(a) Return on Capital Employed/Return on Investment:** ROI is the most important ratio of all. It is the percentage of return on funds invested in the business by its owners. In short, this ratio tells the owner whether or not all the effort put into the business has been worthwhile. The ROI is calculated as follows:

$$Return\ on\ Capital\ Employed = \frac{Return}{Capital\ Employed} \times 100$$

Where,

> Return = Net Profit
>
> ± Non-trading adjustments (but not accrual adjustments for amortization of preliminary expenses, goodwill, etc.)
>
> + Interest on long term debts + Provision for tax
>
> – Interest/Dividend from non-trade investments
>
> Capital Employed = Equity Share Capital
>
> + Reserve and Surplus
>
> + Pref. Share Capital
>
> + Debentures and other long term loan
>
> – Misc. expenditure and losses
>
> – Non-trade Investments.

Intangible assets (assets which have no physical existence like goodwill, patents and trade marks) should be included in the capital employed. But no fictitious asset should be included within capital employed.

### (b) Return on Investment

$$ROI = \frac{Return}{Capital\ Employed} \times 100$$

$$= \frac{Return}{Sales} \times \frac{Sales}{Capital\ Employed} \times 100$$

$$\frac{\text{Return}}{\text{Sales}} \times 100 = \text{Pr ofitability Ratio}$$

$$\frac{\text{Sales}}{\text{Capital Employed}} = \text{Capital Turnover Ratio}$$

So, ROI = Profitability Ratio $\times$ Capital Turnover Ratio

ROI can be improved either by improving operating profit ratio or capital turnover or by both.

**(c)  Return on Assets (ROA):** The profitability ratio is measured in terms of relationship between net profits and assets employed to earn that profit. This ratio measures the profitability of the firm in terms of assets employed in the firm. The ROA may be measured as follows:

$$\text{ROA} = \frac{\text{Net profit after taxes}}{\text{Average total assets}} \quad \text{or}$$

$$= \frac{\text{Net profit after taxes}}{\text{Average tangible assets}} \quad \text{or}$$

$$= \frac{\text{Net profit after taxes}}{\text{Average fixed assets}} \quad \text{or}$$

### 1.3.4.3  Profitability Ratios based on Sales of Firm

**(a)  Gross Profit Ratio**

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

This ratio is used to compare departmental profitability or product profitability. If costs are classified suitably into fixed and variable elements, then instead of Gross Profit Ratio one can also find out P/V ratio.

$$\text{P/V Ratio} = \frac{\text{Sales - Variable Cost}}{\text{Sales}} \times 100$$

Fixed cost remaining same, higher P/V Ratio lowers the break even point.

Operating profit ratio is also calculated to evaluate operating performance of business.

**(b)  Operating Profit Ratio**

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Sales}} \times 100$$

Where,

Operating Profit = Sales – Cost of Sales.

**(c) Net Profit Ratio**

It measures overall profitability of the business

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Sales}} \times 100$$

**1.3.4.4 Profitability Ratios based on Capital Market Information**

Frequently share prices data are punched with the accounting data to generate new set of information. These are (a) Price- Earning Ratio, (b) Yield, (c) Market Value/Book Value per share.

**(a) Price- Earning Ratio**

$$\text{Price} - \text{Earnings Ratio (P/E Ratio)} = \frac{\text{Average Share Price}}{\text{EPS}}$$

(Sometimes it is also calculated with reference to closing share price).

$$\text{P/E Ratio} = \frac{\text{Closing Share Price}}{\text{EPS}}$$

It indicates the pay back period to the investors or prospective investors.

**(b) Yield**

$$\text{Yield} = \frac{\text{Dividend}}{\text{Average Share Price}} \times 100$$

$$\text{or} \quad \frac{\text{Dividend}}{\text{Closing Share Price}} \times 100$$

This ratio indicates return on investment; this may be on average investment or closing investment. Dividend (%) indicates return on paid up value of shares. But yield (%) is the indicator of true return in which share capital is taken at its market value.

**(c) Market Value/Book Value per Share**

$$\frac{\text{Market value per share}}{\text{Book value per share}} = \frac{\text{Average Share Price}}{\text{Net worth/ Number of Equity Shares}}$$

$$\text{or} \quad \frac{\text{Closing Share Price}}{\text{Net worth / Number of Equity Shares}}$$

This ratio indicates market response of the shareholders' investment. Undoubtedly, higher the ratios better is the shareholders' position in terms of return and capital gains.

## 1.4    APPLICATION OF RATIO ANALYSIS IN FINANCIAL DECISION MAKING

A popular technique of analysing the performance of a business concern is that of financial ratio analysis. As a tool of financial management, they are of crucial significance. The importance of ratio analysis lies in the fact that it presents facts on a comparative basis and enables drawing of inferences regarding the performance of a firm. Ratio analysis is relevant in assessing the performance of a firm in respect of following aspects:

### 1.4.1   FINANCIAL RATIOS FOR EVALUATING PERFORMANCE

**(a)   Liquidity Position:** With the help of ratio analysis one can draw conclusions regarding liquidity position of a firm. The liquidity position of a firm would be satisfactory if it is able to meet its current obligations when they become due. A firm can be said to have the ability to meet its short-term liabilities if it has sufficient liquid funds to pay the interest on its short maturing debt usually within a year as well the principal. This ability is reflected in the liquidity ratios of a firm. The liquidity ratios are particularly useful in credit analysis by banks and other suppliers of short-term loans.

**(b)   Long-term Solvency:** Ratio analysis is equally useful for assessing the long-term financial viability of a firm. This aspect of the financial position of a borrower is of concern to the long term creditors, security analysts and the present and potential owners of a business. The long term solvency is measured by the leverage/capital structure and profitability ratios which focus on earning power and operating efficiency. Ratio analysis reveals the strengths and weaknesses of a firm in this respect. The leverage ratios, for instance, will indicate whether a firm has a reasonable proportion of various sources of finance or whether heavily loaded with debt in which case its solvency is exposed to serious strain. Similarly, the various profitability ratios would reveal whether or not the firm is able to offer adequate return to its owners consistent with the risk involved.

**(c)   Operating Efficiency:** Ratio analysis throws light on the degree of efficiency in the management and utilisation of its assets. The various activity ratios measure this kind of operational efficiency. In fact, the solvency of a firm is, in the ultimate analysis, dependent upon the sales revenues generated by the use of its assets – total as well as its components.

**(d)   Overall Profitability :** Unlike the outside parties which are interested in one aspect of the financial position of a firm, the management is constantly concerned about the overall profitability of the enterprise. That is, they are concerned about the ability of the firm to meet its short-term as well as long-term obligations to its creditors, to ensure a reasonable return to its owners and secure optimum utilisation of the assets of the firm. This is possible if an integrated view is taken and all the ratios are considered together.

**(e)** **Inter-firm Comparison:** Ratio analysis not only throws light on the financial position of a firm but also serves as a stepping stone to remedial measures. This is made possible due to inter-firm comparison/comparison with industry averages. A single figure of particular ratio is meaningless unless it is related to some standard or norm. One of the popular techniques is to compare the ratios of a firm with the industry average. It should be reasonably expected that the performance of a firm should be in broad conformity with that of the industry to which it belongs. An inter-firm comparison would demonstrate the relative position vis-a-vis its competitors. If the results are at variance either with the industry average or with those of the competitors, the firm can seek to identify the probable reasons and, in the light, take remedial measures.

Ratios not only perform post mortem of operations, but also serve as barometer for future. Ratios have predictory value and they are very helpful in forecasting and planning the business activities for a future. It helps in budgeting.

Conclusions are drawn on the basis of the analysis obtained by using ratio analysis. The decisions affected may be whether to supply goods on credit to a concern, whether bank loans will be made available, etc.

**(f)** **Financial Ratios for Budgeting:** In this field ratios are able to provide a great deal of assistance, budget is only an estimate of future activity based on past experience, in the making of which the relationship between different spheres of activities are invaluable. It is usually possible to estimate budgeted figures using financial ratios. Ratios also can be made use of for measuring actual performance with budgeted estimates. They indicate directions in which adjustments should be made either in the budget or in performance to bring them closer to each other.

## 1.5 LIMITATIONS OF FINANCIAL RATIOS

The limitations of financial ratios are listed below:

(i) *Diversified product lines:* Many businesses operate a large number of divisions in quite different industries. In such cases ratios calculated on the basis of aggregate data cannot be used for inter-firm comparisons.

(ii) *Financial data are badly distorted by inflation:* Historical cost values may be substantially different from true values. Such distortions of financial data are also carried in the financial ratios.

(iii) Seasonal factors may also influence financial data:

**Illustration 2:** A company deals in summer garments. It keeps a high inventory during October - January every year. For the rest of the year its inventory level becomes just 1/4th of the seasonal inventory level.

So liquidity ratios and inventory ratios will produce biased picture. Year end picture may not be the average picture of the business. Sometimes it is suggested to take monthly average inventory data instead of year end data to eliminate seasonal factors. But for external users it is difficult to get monthly inventory figures. (Even in some cases monthly inventory figures may not be available).

(iv) *To give a good shape to the popularly used financial ratios* (*like current ratio, debt- equity ratios, etc.*): The business may make some year-end adjustments. Such window dressing can change the character of financial ratios which would be different had there been no such change.

(v) *Differences in accounting policies and accounting period*: It can make the accounting data of two firms non-comparable as also the accounting ratios.

(vi) *There is no standard set of ratios against which a firm's ratios can be compared*: Some times a firm's ratios are compared with the industry average. But if a firm desires to be above the average, then industry average becomes a low standard. On the other hand, for a below average firm, industry averages become too high a standard to achieve.

(vii) *It is very difficult to generalise whether a particular ratio is good or bad*: For example, a low current ratio may be said 'bad' from the point of view of low liquidity, but a high current ratio may not be 'good' as this may result from inefficient working capital management.

(viii) *Financial ratios are inter-related, not independent*: Viewed in isolation one ratio may highlight efficiency. But when considered as a set of ratios they may speak differently. Such interdependence among the ratios can be taken care of through multivariate analysis.

Financial ratios provide clues but not conclusions. These are tools only in the hands of experts because there is no standard ready-made interpretation of financial ratios.

## 1.6 SUMMARY OF RATIOS

Another way of categorizing the ratios is being shown to you in a tabular form. A summary of the ratios has been tabulated as under:

### 1.6.1 PROFITABILITY RATIOS

These ratios tell us whether a business is making profits - and if so whether at an acceptable rate. The key ratios are:

| Ratio | Calculation | Comments |
|---|---|---|
| *Gross Profit Margin* | [Gross Profit / Revenue] x 100 (expressed as a percentage | This ratio tells us something about the business's ability consistently to control its production costs or to manage the margins it makes on products it buys and sells. Whilst sales value and volumes |

| | | |
|---|---|---|
| | | may move up and down significantly, the gross profit margin is usually quite stable (in percentage terms). However, a small increase (or decrease) in profit margin, however caused can produce a substantial change in overall profits. |
| *Operating Profit Margin* | [Operating Profit / Revenue] x 100 (expressed as a percentage) | Assuming a constant gross profit margin, the operating profit margin tells us something about a company's ability to control its other operating costs or overheads. |
| *Return on Capital Employed ("ROCE")* | Net profit before tax, interest and dividends ("EBIT") / Total Assets (or total assets less current liabilities | ROCE is sometimes referred to as the "primary ratio"; it tells us what returns management has made on the resources made available to them before making any distribution of those returns. |

## 1.6.2 EFFICIENCY RATIOS

These ratios give us an insight into how efficiently the business is employing those resources invested in fixed assets and working capital.

| *Ratio* | *Calculation* | *Comments* |
|---|---|---|
| *Sales /Capital Employed* | Sales / Capital employed | A measure of total asset utilisation. Helps to answer the question - What sales are being generated by each rupee's worth of assets invested in the business? Note, when combined with the return on sales, it generates the primary ratio - ROCE. |
| *Sales or Profit / Fixed Assets* | Sales or profit / Fixed Assets | This ratio is about fixed asset capacity. A reducing sales or profit being generated from each rupee invested in fixed assets may indicate overcapacity or poorer-performing equipment. |
| *Stock Turnover* | Cost of Sales / Average Stock Value | Stock turnover helps answer questions such as "Have we got too much money tied up in inventory"?. An increasing stock turnover figure or one which is much larger than the "average" for an industry, may indicate poor stock management. |

| Credit Given / "Debtor Days" | (Trade debtors (average, if possible) / (Sales)) x 365 | The "debtor days" ratio indicates whether debtors are being allowed excessive credit. A high figure (more than the industry average) may suggest general problems with debt collection or the financial position of major customers. |
|---|---|---|
| Credit taken / "Creditor Days" | ((Trade creditors + accruals) / (cost of sales + other purchases)) x 365 | A similar calculation to that for debtors, giving an insight into whether a business is taking full advantage of trade credit available to it. |

### 1.6.3 LIQUIDITY RATIOS

Liquidity ratios indicate how capable a business is of meeting its short-term obligations as they fall due.

| Ratio | Calculation | Comments |
|---|---|---|
| Current Ratio | Current Assets / Current Liabilities | A simple measure that estimates whether the business can pay debts due within one year from assets that it expects to turn into cash within that year. A ratio of less than one is often a cause for concern, particularly if it persists for any length of time. |
| Quick Ratio (or "Acid Test" | Cash and near cash assets (short-term investments + trade debtors) | Not all assets can be turned into cash quickly or easily. Some - notably raw materials and other stocks - must first be turned into final product, then sold and the cash collected from debtors. The quick ratio therefore adjusts the current ratio to eliminate all assets that are not already in cash (or "near-cash") form. Once again, a ratio of less than one would start to send out danger signals. |

### 1.6.4 STABILITY RATIOS

These ratios concentrate on the long-term health of a business - particularly the effect of the capital/finance structure on the business.

| Ratio | Calculation | Comments |
|---|---|---|
| Gearing | Borrowing (all long-term debts + normal | Gearing (otherwise known as "leverage") measures the proportion of assets invested in a |

| | overdraft) / Net Assets (or Shareholders' Funds) | business that are financed by borrowing. In theory, the higher the level of borrowing (gearing) the higher are the risks to a business, since the payment of interest and repayment of debts are not "optional" in the same way as dividends. However, gearing can be a financially sound part of a business's capital structure particularly if the business has strong, predictable cash flows. |
|---|---|---|
| *Interest cover* | Operating profit before interest / Interest | This measures the ability of the business to "service" its debt. Are profits sufficient to be able to pay interest and other finance costs? |

### 1.6.5  INVESTOR RATIOS

There are several ratios commonly used by investors to assess the performance of a business as an investment.

| *Ratio* | *Calculation* | *Comments* |
|---|---|---|
| *Earnings per share ("EPS")* | Earnings (profits) attributable to ordinary shareholders / Weighted average ordinary shares in issue during the year | EPS measures the overall profit generated for each share in existence over a particular period. |
| *Price-Earnings Ratio ("P/E Ratio")* | Market price of share / Earnings per share | At any time, the P/E ratio is an indication of how highly the market "rates" or "values" a business. A P/E ratio is best viewed in the context of a sector or market average to get a feel for relative value and stock market pricing. |
| *Dividend Yield* | (Latest dividend per ordinary share / Current market price of share) x 100 | This is known as the "payout ratio". It provides a guide as to the ability of a business to maintain a dividend payment. It also measures the proportion of earnings that are being retained by the business rather than distributed as dividends. |

**Illustration 3**

In a meeting held at Solan towards the end of 2004, the Directors of M/s HPCL Ltd. have taken a decision to diversify. At present HPCL Ltd. sells all finished goods from its own warehouse. The company issued debentures on 01.01.2005 and purchased fixed assets on the same day. The purchase prices have remained stable during the concerned period. Following information is provided to you:

**INCOME STATEMENTS**

| | 2004 (Rs.) | | 2005 (Rs.) | |
|---|---|---|---|---|
| Cash Sales | 30,000 | | 32,000 | |
| Credit Sales | 2,70,000 | 3,00,000 | 3,42,000 | 3,74,000 |
| *Less*: Cost of goods sold | | 2,36,000 | | 2,98,000 |
| Gross profit | | 64,000 | | 76,000 |
| *Less*: Expenses | | | | |
| Warehousing | 13,000 | | 14,000 | |
| Transport | 6,000 | | 10,000 | |
| Administrative | 19,000 | | 19,000 | |
| Selling | 11,000 | | 14,000 | |
| Interest on Debenture | | 49,000 | 2,000 | 59,000 |
| Net Profit | | 15,000 | | 17,000 |

**BALANCE SHEET**

| | 2004 (Rs.) | | 2005 (Rs.) | |
|---|---|---|---|---|
| Fixed Assets (Net Block) | - | 30,000 | - | 40,000 |
| Debtors | 50,000 | | 82,000 | |
| Cash at Bank | 10,000 | | 7,000 | |
| Stock | 60,000 | | 94,000 | |
| Total Current Assets (CA) | 1,20,000 | | 1,83,000 | |
| Creditors | 50,000 | | 76,000 | |
| Total Current Liabilities (CL) | 50,000 | | 76,000 | |

| | | |
|---|---|---|
| Working Capital (CA - CL) | 70,000 | 1,07,000 |
| Total Assets | 1,00,000 | 1,47,000 |
| **Represented by:** | | |
| Share Capital | 75,000 | 75,000 |
| Reserve and Surplus | 25,000 | 42,000 |
| Debentures | – | 30,000 |
| | 1,00,000 | 1,47,000 |

You are required to calculate the following ratios for the years 2004 and 2005.

(i)   Gross Profit Ratio

(ii)   Operating Expenses to Sales Ratio.

(iii)   Operating Profit Ratio

(iv)   Capital Turnover Ratio

(v)   Stock Turnover Ratio

(vi)   Net Profit to Net Worth Ratio, and

(vii)   Debtors Collection Period.

Ratio relating to capital employed should be based on the capital at the end of the year. Give the reasons for change in the ratios for 2 years.  Assume opening stock of Rs. 40,000 for the year 2004. Ignore Taxation.

**Solution**

|  | | *Computation of Ratios* | |
|---|---|---|---|
| | | **2004** | **2005** |
| 1. | Gross profit ratio | | |
| | *Gross profit/sales* | $\dfrac{64,000\times100}{3,00,000}$ | $\dfrac{76,000\times100}{3,74,000}$ |
| | | 21.3% | 20.3 |
| 2. | Operating expense to sales ratio | | |
| | *Operating exp / Total sales* | $\dfrac{49,000\times100}{3,00,000}$ | $\dfrac{57,000\times100}{3,74,000}$ |
| | | 16.3% | 15.2% |
| 3. | Operating profit ratio | | |

| | | |
|---|---|---|
| *Operating profit / Total sales* | $\dfrac{15{,}000\times100}{3{,}00{,}000}$ | $\dfrac{19{,}000\times100}{3{,}74{,}000}$ |
| | 5% | 5.08% |

4. Capital turnover ratio
   Sales / capital employed  $\dfrac{3{,}00{,}000}{1{,}00{,}000}=3$   $\dfrac{3{,}74{,}000}{1{,}47{,}000}=2.54$

5. Stock turnover ratio
   COGS / Average stock  $\dfrac{2{,}36{,}000}{50{,}000}=4.7$   $\dfrac{2{,}98{,}000}{77{,}000}=3.9$

6. Net Profit to Networth
   Net profit / Networth  $\dfrac{15{,}000\times100}{1{,}00{,}000}=15\%$   $\dfrac{17{,}000\times100}{1{,}17{,}000}=14.5\%$

7. *Debtors collection period*
   *Average debtors / Average daily sales*   $\dfrac{50{,}000}{739.73}$   $\dfrac{82{,}000}{936.99}$
   (Refer to working note)   67.6 days   87.5 days

**Working note:**

*Average daily sales* = Credit sales / 365   $\dfrac{2{,}70{,}000}{365}$   $\dfrac{3{,}42{,}000}{365}$

Rs.739.73   Rs.936.99

*Analysis*: The decline in the Gross profit ratio could be either due to a reduction in the selling price or increase in the direct expenses (since the purchase price has remained the same). Similarly there is a decline in the ratio of Operating expenses to sales. However since operating expenses have little bearing with sales, a decline in this ratio cannot be necessarily be interpreted as an increase in operational efficiency. An indepth analysis reveals that the decline in the warehousing and the administrative expenses has been partly set off by an increase in the transport and the selling expenses. The operating profit ratio has remained the same in spite of a decline in the Gross profit margin ratio. In fact the company has not benefited at all in terms of operational performance because of the increased sales.

The company has not been able to deploy its capital efficiently. This is indicated by a decline in the Capital turnover from 3 to 2.5 times. In case the capital turnover would have remained at 3 the company would have increased sales and profits by Rs 67,000 and Rs 3,350 respectively.

The decline in the stock turnover ratio implies that the company has increased its investment in stock. Return on Networth has declined indicating that the additional capital employed has failed to increase the volume of sales proportionately. The increase in the Average collection period indicates that the company has become liberal in extending credit on sales. However, there is a corresponding increase in the current assets due to such a policy.

It appears as if the decision to expand the business has not shown the desired results.

**Illustration 4**

Following is the abridged Balance Sheet of Alpha Ltd. :-

| Liabilities | Rs. | Assets | | Rs. |
|---|---|---|---|---|
| Share Capital | 1,00,000 | Land and Buildings | | 80,000 |
| Profit and Loss Account | 17,000 | Plant and Machineries | 50,000 | |
| Current Liabilities | 40,000 | *Less*: Depreciation | 15,000 | 35,000 |
| | | | | 1,15,000 |
| | | Stock | 21,000 | |
| | | Debtors | 20,000 | |
| | | Bank | 1,000 | 42,000 |
| Total | 1,57,000 | Total | | 1,57,000 |

With the help of the additional information furnished below, you are required to prepare Trading and Profit & Loss Account and a Balance Sheet as at 31st March, 2005:

(i) The company went in for reorganisation of capital structure, with share capital remaining the same as follows:

| Share capital | 50% |
|---|---|
| Other Shareholders' funds | 15% |
| 5% Debentures | 10% |
| Trade Creditors | 25% |

Debentures were issued on 1st April, interest being paid annually on 31st March.

(ii) Land and Buildings remained unchanged. Additional plant and machinery has been bought and a further Rs. 5,000 depreciation written off.

(The total fixed assets then constituted 60% of total gross fixed and current assets.)

(iii) Working capital ratio was 8 : 5.

(iv) Quick assets ratio was 1 : 1.

(v)  The debtors (four-fifth of the quick assets) to sales ratio revealed a credit period of 2 months.  There were no cash sales.

(vi)  Return on net worth was 10%.

(vii)  Gross profit was at the rate of 15% of selling price.

(viii)  Stock turnover was eight times for the year.

Ignore Taxation.

**Solution**

| Particulars | % | (Rs.) |
|---|---|---|
| Share capital | 50% | 1,00,000 |
| Other shareholders funds | 15% | 30,000 |
| 5% Debentures | 10% | 20,000 |
| Trade creditors | 25% | 50,000 |
| Total | 100% | 2,00,000 |

Land and Buildings

| | | |
|---|---|---|
| Total liabilities | = | Total Assets |
| Rs. 2,00,000 | = | Total Assets |
| Fixed Assets | = | 60% of total gross fixed assets and current assets |
| | = | Rs. 2,00,000×60/100 = Rs. 1,20,000 |

*Calculation of additions to Plant & Machinery*

| | Rs. |
|---|---|
| Total fixed assets | 1,20,000 |
| *Less*: Land & Buildings | 80,000 |
| Plant and Machinery (after providing depreciation) | 40,000 |
| Depreciation on Machinery up to 31-3-2004 | 15,000 |
| *Add*: Further depreciation | 5,000 |
| Total | 20,000 |

Current assets = Total assets – Fixed assets

= Rs. 2,00,000 – Rs. 1,20,000 = Rs. 80,000

**Calculation of stock**

Quick ratio:

$$= \frac{\text{Current assets - stock}}{\text{Current liabilities}} = 1$$

$$= \frac{\text{Rs. } 80,000 - \text{stock}}{\text{Rs. } 50,000} = 1$$

| | | |
|---|---|---|
| Rs. 50,000 = | Rs. 80,000 – Stock | |
| Stock = | Rs. 80,000 - Rs. 50,000 | |
| = | Rs. 30,000 | |
| Debtors = 4/5th of quick assets | | |
| = (Rs. 80,000 – 30,000)× 4/5 | | |
| = Rs. 40,000 | | |

**Debtors turnover ratio**

$$= \frac{\text{Debtors}}{\text{Credit Sales}} \times 365 \quad = \quad 60 \text{ days}$$

$$= \frac{40,000 \times 12}{\text{Credit Sales}} \times 365 \quad = \quad 2 \text{ months}$$

| | | | | |
|---|---|---|---|---|
| 2 credit sales | = | 4,80,000 | | |
| Credit sales | = | 4,80,000/2 | | |
| | = | 2,40,000 | | |

Gross profit (15% of sales)

Rs. 2,40,000×15/100 = Rs. 36,000

**Return on networth (profit after tax)**

| | | | | |
|---|---|---|---|---|
| Net worth | = | Rs. 1,00,000 + Rs. 30,000 | | |
| | = | Rs. 1,30,000 | | |
| Net profit | = | Rs. 1,30,000×10/100 | = | Rs. 13,000 |
| Debenture interest | = | Rs. 20,000×5/100 | = | Rs. 1,000 |

**Projected profit and loss account for the year ended 31-3-2005**

| | | | |
|---|---|---|---|
| To cost of goods sold | 2,04,000 | By sales | 2,40,000 |
| To gross profit | 36,000 | | |
| | 2,40,000 | | 2,40,000 |
| To debenture interest | 1,000 | By gross profit | 36,000 |
| To administration and other expenses | 22,000 | | |
| To net profit | 13,000 | | |
| | 36,000 | | 36,000 |

**Projected Balance Sheet as at 31st March, 2005**

| Liabilities | Rs. | Assets | | Rs. |
|---|---|---|---|---|
| Share capital | 1,00,000 | Fixed assets | | |
| Profit and loss A/c | 30,000 | Land & buildings | | 80,000 |
| (17,000+13,000) | | Plant & machinery | 60,000 | |
| 5% Debentures | 20,000 | *Less*: Depreciation | 20,000 | 40,000 |
| Current liabilities | | Current assets | | |
| | | Stock | 30,000 | |
| Trade creditors | 50,000 | Debtors | 40,000 | |
| | | Bank | 10,000 | 80,000 |
| | 2,00,000 | | | 2,00,000 |

**Illustration 5**

X Co. has made plans for the next year. It is estimated that the company will employ total assets of Rs. 8,00,000; 50 per cent of the assets being financed by borrowed capital at an interest cost of 8 per cent per year. The direct costs for the year are estimated at Rs. 4,80,000 and all other operating expenses are estimated at Rs. 80,000. the goods will be sold to customers at 150 per cent of the direct costs. Tax rate is assumed to be 50 per cent.

You are required to calculate: (i) net profit margin; (ii) return on assets; (iii) asset turnover and (iv) return on owners' equity.

**Solution**                    **The net profit is calculated as follows:**

|  | Rs. | Rs. |
|---|---|---|
| Sales (150% of Rs. 4,80,000) | | 7,20,000 |
| Direct costs | | 4,80,000 |
| Gross profit | | 2,40,000 |
| Operating expenses | 80,000 | |
| Interest changes (8% of Rs. 4,00,000) | 32,000 | 1,12,000 |
| Profit before taxes | | 1,28,000 |
| Taxes (@ 50%) | | 64,000 |
| Net profit after taxes | | 64,000 |

(i)    Net profit margin $= \dfrac{\text{Profit after taxes}}{\text{Sales}}$ $= \dfrac{\text{Rs.}64,000}{\text{Rs.}7,20,000} = 0.89$ or 8.9%

Net profit margin $= \dfrac{\text{EBIT}(1-T)}{\text{Sales}}$ $= \dfrac{\text{Rs.}1,60,000(1-.5)}{7,20,000} = 0.111$ or 11.1%

(ii)   Return on assets $= \dfrac{\text{EBIT}(1-T)}{\text{Assets}}$ $= \dfrac{\text{Rs.}1,60,000(1-.5)}{8,00,000} = .10$ or 10%

(iii)  Asset turnover $= \dfrac{\text{Sales}}{\text{Assets}}$ $= \dfrac{\text{Rs.}7,20,000}{\text{Rs.}8,00,000} = 0.09$ times

(iv)   Return on equity $= \dfrac{\text{Net profit safter taxes}}{\text{Owners' equity}} = \dfrac{\text{Rs.}64,000}{50\% \text{ of Rs.}8,00,000}$

$= \dfrac{\text{Rs.}64,000}{\text{Rs.}4,00,000} = .16$ or 16%

**Illustration 6**

The total sales (all credit) of a firm are Rs. 6,40,000. It has a gross profit margin of 15 per cent and a current ratio of 2.5. The firm's current liabilities are Rs. 96,000; inventories Rs. 48,000 and cash Rs. 16,000. (a) Determine the average inventory to be carried by the firm, if an inventory turnover of 5 times is expected? (Assume a 360 day year). (b) Determine the average collection period if the opening balance of debtors is intended to be of Rs. 80,000? (Assume a 360 day year).

## Solution

(a)   Inventory turnover $= \dfrac{\text{Cost of goods sold}}{\text{Average inventory}}$

Since gross profit margin is 15 per cent, the cost of goods sold should be 85 per cent of the sales.

Cost of goods sold = .85 × Rs. 6,40,000 = Rs. 5,44,000.

Thus, $= \dfrac{\text{Rs. } 5,44,000}{\text{Average inventory}} = 5$

Average inventory $= \dfrac{\text{Rs. } 5,44,000}{5} = \text{Rs. } 1,08,000$

(b)   Average collection period $= \dfrac{\text{Average debtors}}{\text{Credit sales}} \times 360$

Average debtors $= \dfrac{(\text{Opening debtors} + \text{Closing debtors})}{2}$

Closing balance of debtors is found as follows:

|  | Rs. | Rs. |
|---|---|---|
| Current assets (2.5 of current liabilities) |  | 2,40,000 |
| *Less:* Inventories | 48,000 |  |
| Cash | 16,000 | 64,000 |
| .   Debtors |  | 1,76,000 |

Average debtors $= \dfrac{(\text{Rs. } 1,76,000 + \text{Rs. } 80,000)}{2}$

Rs. 2,56,000 ÷2 = Rs. 1,28,000

Average collection period $= \dfrac{\text{Rs. } 1,28,000}{\text{Rs. } 6,40,000} \times 360 = 72 \text{ days}$

## Illustration 7

Additional information: Profit (after tax at 35 per cent), Rs. 2,70,000; Depreciation, Rs. 60,000; Equity dividend paid, 20 per cent; Market price of equity shares, Rs. 40.

You are required to compute the following, showing the necessary workings:

(a) Dividend yield on the equity shares

(b) Cover for the preference and equity dividends

(c) Earnings per shares

(d) Price-earnings ratio.

**Solution**

(a) *Dividend yield on the equity shares*

$$= \frac{\text{Dividend per share}}{\text{Market price per share}} \times 100 = \frac{\text{Rs. 2 (0.20} \times \text{Rs. 10)}}{\text{Rs. 40}} \times 100 = 5 \text{ per cent}$$

*(b) Dividend coverage ratio*

(i) $\text{Preference} = \dfrac{\text{Profit after taxes}}{\text{Dividend payable to preference shareholders}}$

$$= \frac{\text{Rs. 2,70,000}}{\text{Rs. 27,000 (0.09} \times \text{Rs. 3,00,000)}} = 10 \text{ times}$$

(ii) $\text{Equity} = \dfrac{\text{Profit after taxes - Preference share dividend}}{\text{Dividend payable to equity shareholders at current rate of Rs. 2 per share}}$

$$= \frac{\text{Rs. 2,70,000 - Rs. 27,000}}{\text{Rs. 1,60,000 (80,000 shares} \times \text{Rs. 2)}} = 1.52 \text{ times}$$

*(c) Earnings per equity share*

$$= \frac{\text{Earnings available to equity shareholders}}{\text{Number of equity shares outstanding}} = \frac{\text{Rs. 2,43,00}}{80,000} = \text{Rs. 3.04 per share}$$

(d) *Price-earning (P/E) ratio* $= \dfrac{\text{Market price per share}}{\text{Equity per share}} = \dfrac{\text{Rs. 400}}{\text{Rs. 4.04}} = 13.2 \text{ times}$

**Illustration 8**

The following accounting information and financial ratios of PQR Ltd. relate to the year ended 31st December, 2006:

<table>
<tr><td></td><td></td><td>2006</td></tr>
</table>

| I | Accounting Information: | |
|---|---|---|
| | Gross Profit | 15% of Sales |
| | Net profit | 8% of sales |
| | Raw materials consumed | 20% of works cost |
| | Direct wages | 10% of works cost |
| | Stock of raw materials | 3 months' usage |
| | Stock of finished goods | 6% of works cost |
| | Debt collection period | 60 days |
| | All sales are on credit | |
| II | Financial Ratios: | |
| | Fixed assets to sales | 1 : 3 |
| | Fixed assets to Current assets | 13 : 11 |
| | Current ratio | 2 : 1 |
| | Long-term loans to Current liabilities | 2 : 1 |
| | Capital to Reserves and Surplus | 1 : 4 |

If value of fixed assets as on 31st December, 2005 amounted to Rs. 26 lakhs, prepare a summarised Profit and Loss Account of the company for the year ended 31st December, 2006 and also the Balance Sheet as on 31st December, 2006.

**Answer**

(a) **Working Notes:**

(i) *Calculation of Sales*

$$\frac{\text{Fixed Assets}}{\text{Sales}} = \frac{1}{3}$$

$$\therefore \frac{26,00,000}{\text{Sales}} = \frac{1}{3} \Rightarrow \text{Sales} = \text{Rs.}78,00,000$$

(ii) Calculation of Current Assets

$$\frac{\text{Fixed Assets}}{\text{Current Assets}} = \frac{13}{11}$$

$$\therefore \frac{26,00,000}{\text{Current Assets}} = \frac{13}{11} \Rightarrow \text{Current Assets} = \text{Rs.} 22,00,000$$

(iii) Calculation of Raw Material Consumption and Direct Wages

|  | *Rs.* |
|---|---|
| Sales | 78,00,000 |
| *Less:* Gross Profit | 11,70,000 |
| Works Cost | 66,30,000 |

Raw Material Consumption (20% of Works Cost)  Rs. 13,26,000

Direct Wages (10% of Works Cost)                            Rs.   6,63,000

(iv) Calculation of Stock of Raw Materials (= 3 months usage)

$$= 13,26,000 \times \frac{3}{12} = \text{Rs.} 3,31,500$$

(v) Calculation of Stock of Finished Goods (= 6% of Works Cost)

$$= 66,30,000 \times \frac{6}{100} = \text{Rs.} 3,97,800$$

(vi) Calculation of Current Liabilities

$$\frac{\text{Current Assets}}{\text{Current Liabilities}} = 2$$

$$\frac{22,00,000}{\text{Current Liabilities}} = 2 \Rightarrow \text{Current Liabilities} = \text{Rs.} 11,00,000$$

(vii) Calculation of Debtors

$$\text{Average collection period} = \frac{\text{Debtors}}{\text{Credit Sales}} \times 365$$

$$\frac{\text{Debtors}}{78,00,000} \times 365 = 60 \Rightarrow \text{Debtors} = \text{Rs.} 12,82,191.78 \text{ or Rs.} 12,82,192$$

(viii) Calculation of Long term Loan

$$\frac{\text{Long term Loan}}{\text{Current Liabilities}} = \frac{2}{1}$$

$$\frac{\text{Long term loan}}{11,00,000} = \frac{2}{1} \Rightarrow \text{Long term loan} = \text{Rs. } 22,00,000.$$

(ix) Calculation of Cash Balance

|  |  | Rs. |
|---|---|---|
| Current assets |  | 22,00,000 |
| *Less:* Debtors | 12,82,192 |  |
| Raw materials stock | 3,31,500 |  |
| Finished goods stock | 3,97,800 | 20,11,492 |
| Cash balance |  | 1,88,508 |

(x) *Calculation of Net worth*

| | | |
|---|---|---|
| Fixed Assets | | 26,00,000 |
| Current Assets | | 22,00,000 |
| Total Assets | | 48,00,000 |
| *Less:* Long term Loan | 22,00,000 | |
| Current Liabilities | 11,00,000 | 33,00,000 |
| Net worth | | 15,00,000 |

Net worth = Share capital + Reserves = 15,00,000

$$\frac{\text{Capital}}{\text{Reserves and Surplus}} = \frac{1}{4} \Rightarrow \text{Share Capital} = 15,00,000 \times \frac{1}{5} = \text{Rs. } 3,00,000$$

$$\text{Reserves and Surplus} = 15,00,000 \times \frac{4}{5} = \text{Rs. } 12,00,000$$

**Profit and Loss Account of PQR Ltd.**

**for the year ended 31st December, 2006**

| | *Particulars* | Rs. | *Particulars* | Rs. |
|---|---|---|---|---|
| To | Direct Materials | 13,26,000 | By Sales | 78,00,000 |
| To | Direct Wages | 6,63,000 | | |
| To | Works (Overhead) Balancing figure | 46,41,000 | | |

| | | | |
|---|---|---|---|
| To Gross Profit c/d (15% of Sales) | 11,70,000 | | _____ |
| | 78,00,000 | | 78,00,000 |
| To Selling and Distribution Expenses (Balancing figure) | 5,46,000 | By Gross Profit b/d | 11,70,000 |
| To Net Profit (8% of Sales) | 6,24,000 | | _____ |
| | 11,70,000 | | 11,70,000 |

**Balance Sheet of PQR Ltd.**

**as at 31st December, 2006**

| Liabilities | Rs. | Assets | Rs. |
|---|---|---|---|
| Share Capital | 3,00,000 | Fixed Assets | 26,00,000 |
| Reserves and Surplus | 12,00,000 | Current Assets: | |
| Long term loans | 22,00,000 | Stock of Raw Material | 3,31,500 |
| Current liabilities | 11,00,000 | Stock of Finished Goods | 3,97,800 |
| | | Debtors | 12,82,192 |
| | _____ | Cash | 1,88,508 |
| | 48,00,000 | | 48,00,000 |

**Self Examination Questions**

**A. Objective Type Questions**

1.  Which of the following assets is not a quick current asset for the purpose of calculating acid test ratio?

    (a)  Short term bills receivables

    (b)  Cash

    (c)  Stock

    (d)  Debtors less provision for bad and doubtful debts.

2.  When the current ratio is 2 : 5, and the amount of current liabilities is Rs. 25,000, what is the amount of current assets?

    (a)  Rs. 62,500

    (b)  Rs. 12,500

    (c)  Rs. 10,000

    (d)  None of these.

3.  When quick ratio is 1.5 : 1 and the amount of quick assets Rs. 30,000, what is the amount of quick liabilities?

    (a)  Rs. 20,000

    (b)  Rs. 50,000

    (c)  Rs. 45,000

    (d)  Rs. 30,000.

4.  When opening stock is Rs. 50,000, closing stock Rs. 60,000, and cost of goods sold Rs. 2,20,000, the stock turnover ratio is

    (a)  2 times

    (b)  3 times

    (c)  4 times

    (d)  5 times.

5.  When net sales for the year are Rs. 2,50,000 and debtors Rs. 50,000, the average collection period is:

    (a)  60 days

    (b)  45 days

    (c)  42 days

    (d)  72 days.

6.  Dividing net sales by average debtors would yield

    (a)  Acid test ratio

    (b)  Return on sales ratio

    (c)  Debtors turnover ratio

    (d)  None of these.

7.  Given net profit Rs. 150,000, preference dividend Rs. 25,000, taxes Rs. 10,000 and number of equity shares 1,00,000. What is the Earning per Share (EPS)?

    (a)  Rs. 1.50

    (b)  Rs. 1.25

    (c)  Rs. 1.15

    (d)  None of these.

8.  When net profit is Rs. 2,25,000, taxes Rs. 25,000 and net worth Rs. 10,00,000 what is the rate of return on shareholders' equity?

    (a)  22.5%

    (b)  20%

    (c)  25%

    (d)  Cannot be calculated.

9.  Accounting information given by a company:

    | | |
    |---|---|
    | Total assets turnover | 3 times |
    | Net Profit margin | 10% |
    | Total assets | Rs. 1,00,000 |

    The net profit is:

    (a)  Rs. 10,000

    (b)  Rs. 15,000

    (c)  Rs. 25,000

    (d)  Rs. 30,000.

10. Match the following:

    | (1) | Test of Liquidity | A. | ROI |
    |---|---|---|---|
    | (2) | Test of Profitability | B. | Debtors turnover |
    | (3) | Test of Solvency | C. | Acid test ratio |
    | (4) | Test of Activity | D. | Debt equity ratio |

    | | (1) | (2) | (3) | (4) |
    |---|---|---|---|---|
    | (a) | (A) | (D) | (B) | (C) |
    | (b) | (D) | (A) | (C) | (B) |

(c)  (B)          (C)          (A)          (D)

(d)  (C)          (A)          (D)          (B)

11. Which of the following liabilities are taken into account for acid test ratio?

(1)  Trade creditors

(2)  Bank overdraft

(3)  Bills payable

(4)  Outstanding expenses

(5)  Redeemable debentures.

(a)  1, 2, 3, 4 and 5

(b)  1, 3 and 4

(c)  1, 2, 3 and 4

(d)  1, 3, 4 and 5.

12. ROI - Return on investment is equal to .................

(a)  Net Profit after Tax / Tangible Net Worth

(b)  Net Profit after Tax / Net Tangible Assets

(c)  Net Profit after Tax / Paid up Capital

(d)  Gross Profit / Gross Assets.

13. Balance Sheet of a company indicates that its current ratio is 1.5. Company's net working capital is Rs. one crore. The Current Assets would amount to

(a)  Rs. 3 crore

(b)  Rs.1.5 crore

(c)  Rs.4 crore

(d)  Rs. 2.5 crore.

14. Earnings after Interest and Tax is Rs.20 crore, interest is Rs.4 crore, Income Tax is Rs.16 crore. Interest Coverage Ratio would be

(a)  10

(b)  9

(c)  7.5

(d)  5.

15. A firm's equity multiplier is an indication of its _____ position.

    (a) Liquidity

    (b) Debt

    (c) Asset utilization

    (d) Inventory.

**Answers to Objective Type Questions**

**1.** (c);  **2.** (c);  **3.** (a);  **4.**      (c);  **5.** (d);  **6.** (c);  **7.** (c);  **8.** (b);  **9.** (d);  **10.** (d); 11. (b);

**12.** (b);  **13.** (a);  **14.** (a); **15.** (b)

**B.   Short Answer Type Questions**

1.  Interpret the liquidity conditions of a business in the following circumstances:

    (i)    High Current Ratio, High Quick Ratio;

    (ii)   High Current Ratio, Low Quick Ratio;

    (iii)  Low Current Ratio, High Quick Ratio;

    (iv)  Low Current Ratio, Low Quick Ratio.

2.   Interpret liquidity conditions of a business in the following circumstances:

(i)   *Ratio*

| Ratio | Firm | Industry Average |
|---|---|---|
| Current Ratio | 1.7 | 1.6 |
| Quick Ratio | 1.2 | 0.8 |

(ii)  

| Ratio | Firm | Industry Average |
|---|---|---|
| Current Ratio | 1.2 | 1.5 |
| Quick Ratio | 0.8 | 0.6 |

(iii) 

| Ratio | Firm | Industry Average |
|---|---|---|
| Current Ratio | 2.0 | 1.1 |
| Quick Ratio | 1.5 | 0.7 |

3. (i) High Current and Quick Ratios are accompanied by low absolute cash ratio in SUKA Ltd. What does it imply?

   (ii) High Current ratio in POOJA Ltd. is accompanied by low quick and absolute cash ratios. What does it imply? Does it make any difference if current ratio also comes down?

4. What do you understand by the following terms:
   (a) Earnings per share
   (b) Dividend per share
   (c) Activity ratios
   (d) Leverage ratios
   (e) Return on Investment.

5. Write short notes on the following:
   (a) Price Earning ratio
   (b) Liquidity Ratios
   (c) Importance of financial analysis
   (d) Limitations of Financial ratios
   (e) Use of Financial ratios for Budgeting.

**C. Long Answer Type Questions**

1. What are the usually followed ratio categories for business data analysis? Are they overlapping? Mention at least two financial ratios used in each category.

2. PUTA Ltd. maintains very low cash and bank balance whereas PUJA Ltd., its competitor, maintains high cash balance. Which of the ratios do you use to interpret the cash position of the firms? What would be your interpretation?

3. Can you judge the liquidity of a business undertaking only from the Balance Sheet data? How do you interpret current ratio and quick ratio?

4. How do year-end adjustments affect the liquidity ratios? What precautions are necessary before making liquidity appraisals using current ratio and quick ratio?

5. What are the different ratio measures of profitability? How do you measure profitability of a diversified company?

6. Discuss briefly the need for debt-service coverage ratio. Does it provide sufficient information to the prospective lenders of a firm before entering into a loan agreement?

7. What are the various turnover ratios? Explain their significance.

8. 'Increase in stock turnover and debtors' turnover is not always good'. Do you agree? Give reasons for your answer. Do you think that such increase causes decline in liquidity and profitability?

9. One way to improve the ROI is to improve the capital turnover ratio. If there is a decline in profitability ratio, how far is it possible to improve ROI by increasing capital turnover ratio?

**D.  Practical Problems**

1. Consider the following cash position ratios.

| Particulars | AUTO Ltd. | KUTO Ltd. | SUTO Ltd. | Industry Average |
|---|---|---|---|---|
| Absolute cash ratio | 0.20 | 0.25 | 0.40 | 0.35 |
| Interval measure (days) | 90 | 80 | 75 | 75 |

Interpret the results

(*Hint :* Average daily cash operating expenditure of AUTO Ltd. and KUTO Ltd. are relatively lower)

2. Given below are the profitability ratios of XZ Ltd. and the industry averages :

| Ratios | XZ Ltd. | Industry Average |
|---|---|---|
| Gross Profit (%) | 35 | 32 |
| Operating Profit (%) | 27 | 26 |
| ROI (%) | 18 | 20 |

Comment on the ratios given above.

3. From the following information determine debt-service coverage ratio.

| Debt : | 10% Debentures | Rs. 5,00,000 |
|---|---|---|
| | 12% Term loan | Rs. 1,00,000 |
| | 13.1/2% Term loan | Rs. 1,50,000 |
| | 13% 2nd Debentures | Rs. 2,00,000 |

| Fund from operations : | Rs. | 25,000 |
|---|---|---|
| *Amortizations :* Preliminary Exp. | Rs. | 12,000 |
| Goodwill w/o | Rs. | 15,000 |

| | | |
|---|---|---|
| Depreciation | Rs. | 60,000 |
| Provision for tax | Rs. | 80,000 |
| *Non-operating Income :* | | |
| Interest/Dividend from Investments | Rs. | 16,000 |
| Profit on sale of fixed assets | Rs. | 5,000 |
| Repayment due : | | |
| 10% Debentures Rs. 2,00,000 | | |
| 13.1/2% Term loan Rs. 50,000 | | |

4. A firm's average stock holding period is 90 days and average collection period is 60 days. It wants to relax the collection period by 15 days and increase the holding period by 10 days. Its credit sales and cost of goods sold were Rs. 40 lakhs and Rs. 30 lakhs respectively. How much extra working capital does the firm need for this change? Other things remaining same what would be the impact of this policy on ROI if such extra working capital was financed by long-term fund?

Assume total sales were Rs. 45 lakhs [Take one year = 360 working days].

|  | *Amount* |
|---|---|
|  | *(Rs. in lakhs)* |
| Fixed Assets | 12,650 |
| Inventories | 1,250 |
| Sundry Debtors | 1,000 |
| Cash and Bank | 850 |
|  | 15,750 |
| *Less* : Current Liabilities | 1,500 |
| Long-term Capital Employed : | 14,250 |
| ROI | 15% |
| Operating Profit Ratio | 20% |

The company expects 25% increase in sales and 20% increase in operating profit. For this, it plans to relax collection period by 15 days. But it wants to maintain the present rate of inventory turnover and cash/current assets ratio. Assume that there will be no change in fixed assets. Current liabilities are expected to increase by 25%. Find the effect of such changes on ROI.

5. Given below are the Balance Sheets of PU Ltd. and QU Ltd. as on 31st March, 2006 :

**Balance Sheet**

*(Rs. '000)*

| Liabilities | PU Ltd. | QU Ltd. | Assets | PU Ltd. | QU Ltd. |
|---|---|---|---|---|---|
| *Share capital* | | | Gross Block | | |
| Equity Shares of | | | *Less :* Depreciation | 812 | 917 |
| Rs. 10 each | 500 | 400 | Investments | 100 | 300 |
| 9-1/2% Pref. shares of | | | *Current Assets, Loans* | | |
| Rs. 10 each | 100 | 50 | *and Advances :* | | |
| *Reserve and Surplus* | | | Inventories | 202 | 52 |
| General Reserve | 300 | — | Sundry Debtors | 152 | 64 |
| P&L A/c | 100 | 50 | Cash & Bank | 42 | 32 |
| *Secured Loan* | | | Deposits | 12 | 42 |
| 11% Term Loan | 50 | 620 | Advances | — | 40 |
| 10% Debentures | 100 | 100 | | | |
| *Unsecured Loan* | | | | | |
| 15% Bank Loan | 20 | 20 | | | |
| 18% Short Term Loan | 10 | 15 | | | |
| *Current Liabilities &* | | | | | |
| *Provisions* | | | | | |
| Sundry Creditors | 10 | 10 | | | |
| Outstanding Expenses | 5 | 2 | | | |
| Provision for Taxation | 50 | 40 | | | |
| Proposed Dividend | 75 | 140 | | | |
| | 1320 | 1447 | | 1320 | 1447 |

Find the capital structure ratios of the companies. Comment on their overall capital structure.

Both the companies are willing to raise 3.2 lakhs rupees by issue of debentures. How do you react if 2: 1 debt-equity ratio norm is to be followed?

6.  Dakshinamurthy Ltd. (In short DAK Ltd.) gives you the following information :

|                                        | *(Rs. in lakhs)* |
|----------------------------------------|:----------------:|
| Sales (75% on credit)                  | 40               |
| Purchases (80% on credit)              | 16               |
| Cost of production :                   |                  |
| Material consumed                      | 12               |
| Wages and salaries for production      | 8                |
| Manufacturing expenses                 | 4                |
| Finished goods—Opening Stock           | 2                |

— Completed during the year, 10,000 units

— Sold during the year 9,000 units of goods finished during the year and 90% of the opening stock.

|                   |      |
|-------------------|:----:|
| Opening Debtors   | 4    |
| Closing Debtors   | 2.5  |
| Opening Creditors | 1.5  |
| Closing Creditors | 2.0  |

You are asked to find out:

(i)   Inventory (finished goods) turnover ratio

(ii)  Average collection and payment periods.

Industry average inventory turnover ratio was 8.5, debtors' turnover was 10 and creditors' turnover was 6. Interpret the results.

### UNIT – II : CASH FLOW AND FUNDS FLOW  ANALYSIS

**Learning Objectives**

After studying this unit you will be able to

♦ Understand the meaning of cash flow statement;

♦ Identify the sources and application of cash;

♦ Understand the salient features of AS-3 (Revised);

♦ Prepare a cash flow statement;

♦ Understand and Prepare funds flow statement; and

♦ Understand difference between cash flow statement and funds flow statement, their utility and limitations.

## 2.1    INTRODUCTION

A cash flow statement is a statement which discloses the changes in cash position between the two periods.  For example, a balance sheet, shows the balance of cash as on 31.3.2005 at Rs.30,000/- while the cash balance as per its latest balance sheet as on 31.3.2006 was Rs.40,000/-.  Thus, there has been an inflow of Rs.10,000/- during a year's period.  The cash flow statement outlines the reasons for such inflows or outflows of cash.

The cash flow statement is an important planning tool in the hands of management.  This helps the management in formulating plans for immediate future cash needs.  A projected cash flow statement or a Cash Budget will help the management in estimating as to how much cash will be available at a particular point of time to meet obligations like payment to trade creditors, repayment of cash loans, dividends, etc.  A proper planning of the cash resources will enable the management to make available sufficient cash whenever needed and invest surplus cash, if any in productive and profitable opportunities.

The term cash comprises cash on hand, demand deposits with the banks and includes cash equivalents.  Due to various limitations of Funds flow statements, the cash flow statement has gained prominence and is used by the management as an important tool of financial analysis, planning and management.

## 2.2    UTILITY OF CASH FLOW ANALYSIS

A cash flow statement is useful for short-term planning.  A business enterprise needs sufficient cash to meet its various obligations in the near future such as payment for purchase of fixed assets, payment of debts maturing in the near future, expenses of the business, etc.  A historical analysis of the different sources and applications of cash will enable the

management to make reliable cash flow projections for the immediate future. It may then plan out for investment of surplus or meeting the deficit, if any. Thus, a cash flow analysis is an important financial tool for the management. Its chief advantages are as follows:

♦ Helps in efficient cash management.

♦ Helps in internal financial management.

♦ Discloses the movements of cash.

♦ Discloses the success or failure of cash planning.

## 2.3 LIMITATIONS OF CASH FLOW ANALYSIS

Cash flow analysis is a useful tool of financial analysis. However, it has its own limitations. These limitations are as under:

1. Cash flow statement cannot be equated with the Income Statement. An Income Statement takes into account both cash as well as non-cash items and, therefore, net cash flow does not necessarily mean net income of the business.

2. The cash balance as disclosed by the cash flow statement may not represent the real liquid position of the business since it can be easily influenced by postponing purchases and other payments.

3. Cash flow statement cannot replace the Income Statement or the Funds Flow Statement. Each of them has a separate function to perform.

In spite of these limitations it can be said that cash flow statement is a useful supplementary instrument. It discloses the volume as well as the speed at which the cash flows in the different segments of the business. This helps the management in knowing the amount of capital tied up in a particular segment of the business. The technique of cash flow analysis, when used in conjunction with ratio analysis, serves as a barometer in measuring the profitability and financial position of the business.

The cash flow statement is prepared in accordance with the provisions contended in AS-3 (Revised) issued by the Council of the Institute of Chartered Accountants of India. Students are advised to read the standard thoroughly to learn various intricacies relating to preparation of cash flow statement.

The AS-3 (Revised) while laying down its objectives says that information about the cash flows of an enterprise is useful in providing users of financial statements with a basis to assess the ability of the enterprise to generate cash and cash equivalents and the needs of the enterprise to utilize those cash flows. The economic decisions that are taken by users require an evaluation of the ability of an enterprise to generate cash and cash equivalents and the timing and certainty of their generation.

The Statement deals with the provision of information about the historical changes in cash and cash equivalents of an enterprise by means of a cash flow statement which classifies cash flows during the period from operating, investing and financing activities.

## 2.4 BENEFITS OF CASH FLOW INFORMATION

A cash flow statement, when used in conjunction with the other financial statements, provides information that enables users to evaluate the changes in net assets of an enterprise, its financial structure (including its liquidity and solvency) and its ability to affect the amounts and timing of cash flows in order to adapt to changing circumstances and opportunities. Cash flow information is useful in assessing the ability of the enterprise to generate cash and cash equivalents and enables users to develop models to assess and compare the present value of the future cash flows of different enterprises. It also enhances the comparability of the reporting of operating performance by different enterprises because it eliminates the effects of using different accounting treatments for the same transactions and events.

Historical cash flow information is often used as an indicator of the amount, timing and certainty of future cash flows. It is also useful in checking the accuracy of past assessments of future cash flows and in examining the relationship between profitability and net cash flow and the impact of changing prices.

## 2.5 DEFINITIONS

AS-3 (Revised) has defined the following terms as follows:

*(a)  Cash* comprises cash on hand and demand deposits with banks.

*(b)  Cash equivalents* are short term highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

*(c)  Cash flows* are inflows and outflows of cash and cash equivalents.

*(d)  Operating activities* are the principal revenue-producing activities of the enterprise and other activities that are not investing or financing activities.

Investing activities are the acquisition and disposal of long-term assets and other investments not included in cash equivalents.

*(e)  Financing activities* are activities that result in changes in the size and composition of the owners' capital (including preference share capital in the case of a company) and borrowings of the enterprise.

## 2.6 CASH AND CASH EQUIVALENTS

Cash equivalents are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent, it

must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents; for example, preference shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

Cash flows exclude movements between items that constitute cash or cash equivalent because these components are part of the cash management of an enterprise rather than part of its operating, investing and financing activities. Cash management includes the investment of excess cash in cash equivalents.

## 2.7 PRESENTATION OF CASH FLOW STATEMENT

The cash flow statement should report cash flows during the period classified by operating, investing and financing activities.

An enterprise presents its cash flows from operating, investment and financing activities in a manner which is most appropriate to its business. Classification by activity provides information that allows users to assess the impact of those activities on the financial position of the enterprise and the amount of its cash and cash equivalents. This information may also be used to evaluate the relationships among those activities.

A single transaction may include cash flows that are classified differently. For example, when the instalment paid in respect of a fixed asset acquired on deferred payment basis includes both interest and loan, the interest element is classified under financing activities and the loan element is classified under investing activities.

### 2.7.1 Operating Activities

The amount of cash flows arising from operating activities is a key indicator of the extent to which the operations of the enterprise have generated sufficient cash flows to maintain the operating capability of the enterprise, pay dividends, repay loans and make new investments without recourse to external sources of financing. Information about the specific components of historical operating cash flows is useful, in conjunction with other information, in forecasting future operating cash flows.

Cash flows from operating activities are primarily derived from the principal revenue-producing activities of the enterprise. Therefore, they generally result from the transactions and other events that enter into the determination of net profit or loss. Examples of cash flows from operating activities are:

(a) Cash receipts from the sale of goods and the rendering of services;

(b)   Cash receipts from royalties, fees, commissions and other revenue;

(c)   Cash payments to suppliers for goods and services;

(d)   Cash payments to and on behalf of employees;

(e)   Cash receipts and cash payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;

(f)   Cash payments or refunds of income taxes unless they can be specifically identified with financing and investing activities; and

(g)   Cash receipts and payments relating to futures contracts, forward contracts, option contracts and swap contracts when the contracts are held for dealing or trading purposes.

Some transactions, such as the sale of an item of plant, may give rise to a gain or loss which is included in the determination of net profit or loss. However, the cash flows relating to such transactions are cash flows from investing activities.

An enterprise may hold securities and loans for dealing or trading purposes, in which case they are similar to inventory acquired specifically for resale. Therefore, cash flows arising from the purchase and sale of dealing or trading securities are classified as operating activities. Similarly, cash advances and loans made by financial enterprises are usually classified as operating activities since they relate to the main revenue-producing activity of that enterprise.

### 2.7.2  Investing activities

The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditures have been made for resources intended to generate future income and cash flows. Examples of cash flows arising from investing activities are:

(a)   Cash payments to acquire fixed assets (including intangibles). These payments include those relating to capitalized research and development costs and self-constructed fixed assets;

(b)   Cash receipts from disposal of fixed assets (including intangibles);

(c)   Cash payments to acquire shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing or trading purposes);

(d)   Cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipts from those instruments considered to be cash equivalents and those held for dealing or trading purposes);

(e)   Cash advances and loans made to third parties (other than advances and loans made by a financial enterprise);

(f)   Cash receipts from the repayment of advances and loans made to third parties (other than advances and loans of a financial enterprise);

(g)   Cash payments for futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the payments are classified as financing activities; and

(h)   Cash receipts from futures contracts, forward contracts, option contacts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

When a contract is accounted for as a hedge of an identifiable position, the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

### 2.7.3   Financing Activities

The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds (both capital and borrowings) to the enterprise.  Examples of cash flows arising from financing activities are:

(a)   Cash proceeds from issuing shares or other similar instruments;

(b)   Cash proceeds from issuing debentures, loans, notes, bonds and other short or long-term borrowings; and

(c)   Cash repayments of amounts borrowed.

In addition to the general classification of three types of cash flows, AS-3 (Revised) provides for the treatment of the cash flows of certain special items as under:

*Foreign Currency Cash Flows*

Cash flows arising from transactions in a foreign currency should be recorded in an enterprises reporting currency.

The reporting should be done by applying the exchange rate at the date of cash flow statement.

A rate which approximates the actual rate may also be used.  For example, weighted average exchange rate for a period may be used for recording foreign currency transactions.

The effect of changes in exchange rates on cash and cash equivalents held in foreign currency should be reported as a separate part in the form of reconciliation in order to reconcile cash and cash equivalents at the beginning and end of the period.

Unrealised gains and losses arising from changes in foreign exchange rates are not cash flows.

The difference of amount raised due to changes in exchange rate should not be included in operating investing and financing activities. This shall be shown separately in the reconciliation statement.

### 2.7.4 Extraordinary Items

Any cash flows relating to extraordinary items should as far as possible classify them into operating, investing or financing activities and those items should be separately disclosed in the cash flow statement. Some of the examples for extraordinary items is bad debts recovered, claims from insurance companies, winning of a law suit or lottery etc.

The above disclosure is in addition to disclosure mentioned in AS-5, 'Net Profit or Loss for the period, prior period items and changes in accounting policies.'

### 2.7.5 Interest and Dividends

Cash flows from interest and dividends received and paid should each be disclosed separately.

The treatment of interest and dividends, received and paid, depends upon the nature of the enterprise i.e., financial enterprises and other enterprises.

In case of financial enterprises, cash flows arising from interest paid and interest & Dividends received, should be classified as cash flows from operating activities.

*In case of other enterprises*

Cash outflows arising from interest paid on terms loans and debentures should be classified as cash outflows from financing activities.

Cash outflows arising from interest paid on working capital loans should be classified as cash outflow from operating activities.

Interest and dividends received should be classified as cash inflow from investing activities.

Interest and dividends received should be classified as cash inflow from investing activities.

Dividend paid on equity and preference share capital should be classified as cash outflow from financing activities.

*Taxes on Income*

Cash flows arising from taxes on income should be separately disclosed.

It should be classified as cash flows from operating activities unless they can be specifically identified with financing and investing activities.

When tax cash flows are allocated over more than one class of activity, the total amount of taxes paid is disclosed.

### 2.7.6 Investments in Subsidiaries, Associates and Joint Ventures

Any such investments should be reported in the cash flow statement as investing activity.

Any dividends received should also be reported as cash flow from investing activity.

### 2.7.7 Non-Cash Transactions

Investing and financing transactions that do not require the use of cash or cash equivalents should be excluded from a cash flow statement. Such transactions should be disclosed elsewhere in the financial statements in a way that provides all the relevant information about these investing and financing activities. The exclusion of non-cash transactions from the cash flow statement is consistent with the objective of a cash flow statement as these do not involve cash flows in the current period. Examples of non-cash transactions:

(a) The acquisition of assets by assuming directly related liabilities.

(b) The acquisition of an enterprise by means of issue of shares.

(c) Conversion of debt into equity.

### 2.8 PROCEDURE IN PREPARATION OF CASH FLOW STATEMENT

The procedure used for the preparation of cash flow statement is as follows:

*Calculation of net increase or decrease in cash and cash equivalents accounts:* The difference between cash and cash equivalents for the period may be computed by comparing these accounts given in the comparative balance sheets. The results will be cash receipts and payments during the period responsible for the increase or decrease in cash and cash equivalent items.

*Calculation of the net cash provided or used by operating activities:* It is by the analysis of Profit and Loss Account, Comparative Balance Sheet and selected additional information.

*Calculation of the net cash provided or used by investing and financing activities:* All other changes in the Balance sheet items must be analysed taking into account the additional information and effect on cash may be grouped under the investing and financing activities.

*Preparation of a Cash Flow Statement:* It may be prepared by classifying all cash inflows and outflows in terms of operating, investing and financing activities. The net cash flow provided or used in each of these three activities may be highlighted.

Ensure that the aggregate of net cash flows from operating, investing and financing activities is equal to net increase or decrease in cash and cash equivalents.

Report any significant investing financing transactions that did not involve cash or cash equivalents in a separate schedule to the Cash Flow Statement.

### 2.8.1 Reporting of Cash Flow from Operating Activities

The purpose for determining the net cash from operating activities is to understand why net profit/loss as reported in the Profit and Loss account must be converted. The financial statements are generally prepared on accrual basis of accounting under which the net income will not indicate the net cash provided by or net loss will not indicate the net cash used in operating activities. In order to calculate the net cash flows in operating activities, it is necessary to replace revenues and expenses with actual receipts and payments in cash. This is done by eliminating the non-cash revenues and/non-cash expenses from the given earned revenues and incurred expenses. There are two methods of converting net profit into net cash flows from operating activities-

(i)   Direct method, and

(ii)  Indirect method.

**(i)   Direct Method:** Under direct method, cash receipts from operating revenues and cash payments for operating expenses are arranged and presented in the cash flow statement. The difference between cash receipts and cash payments is the net cash flow from operating activities. It is in effect a cash basis Profit and Loss account. In this case, each cash transaction is analysed separately and the total cash receipts and payments for the period is determined. The summarized data for revenue and expenses can be obtained from the financial statements and additional information. We may convert accrual basis of revenue and expenses to equivalent cash receipts and payments. Make sure that a uniform procedure is adopted for converting accrual base items to cash base items. Under direct method, items like depreciation, amortisation of intangible assets, preliminary expenses, debenture discount, etc. are ignored from cash flow statement since the direct method includes only cash transactions and non-cash items are omitted. Likewise, no adjustment is made for loss or gain on the sale of fixed assets and investments.

**(ii)   Indirect Method:** In this method the net profit (loss) is used as the base and converts it to net cash provided or used in operating activities. The indirect method adjusts net profit for items that affected net profit but did not affect cash. Non-cash and non-operating charges in the Profit and Loss account are added back to the net profit while non-cash and non-operating credits are deducted to calculate operating profit before working capital changes. It is a partial conversion of accrual basis profit to cash basis profit. Necessary adjustments are made for increase or decrease in current assets and current liabilities to obtain net cash from operating activities.

### 2.8.2 Other Disclosure Requirements

If any significant cash and cash equivalent balances held by the enterprise are not available for use by it, it should be disclosed in the cash flow statement. For example cash held by the overseas branch which is not available for use by the enterprise due to exchange control regulations or due to other legal restrictions.

Any additional information to understand the financial position and liquidity position of an enterprise should be disclosed. For example:

The amount of undrawn borrowing facilities that may be available for future operating activities and to settlement of capital commitments, indicating any restrictions on the use of these facilities; and

The aggregate amount of cash flows that represent increases in operating capacity separately from those cash flows that are required to maintain operating capacity.

A reconciliation of cash and cash equivalents given in its cash flow statement with equivalent items reported in the Balance Sheet.

An enterprise should disclose the policy which it adopts in determining the composition of cash and cash equivalent.

The effect of any change in the policy for determining components of cash and cash equivalents should be reported in accordance with AS-5, 'Net Profit or Loss for the period, Prior period items, and Changes in accounting policies'.

### 2.8.3 Format of Cash Flow Statement

AS 3 (Revised) has not provided any specific format for the preparation of cash flow statements, but a general idea can be had from the illustration given in the appendix to the Accounting Standard. There seems to be flexibility in the presentation of cash flow statements. However, a widely accepted format under direct method and indirect method is given below:

**Cash Flow Statement (Direct Method)**                    *Rs.*

Cash Flow from Operating Activities

| | |
|---|---|
| Cash receipts from customers | xxx |
| Cash paid to suppliers and employees | (xxx) |
| Cash generated from operations | xxx |
| Income tax paid | (xxx) |
| Cash flow before extraordinary items | xxx |
| Proceeds from earthquake disaster settlement etc | xxx |

| | | | |
|---|---|---|---|
| Net cash from Operating Activities | (a) | | xxx |
| Cash Flows from Investing Activities | | | |
| Purchase of fixed assets | | (xxx) | |
| Proceeds from sale of equipment | | xxx | |
| Interest received | | xxx | |
| Dividend received | | xxx | |
| Net cash from investing Activities | (b) | | xxx |
| Cash Flows from Financing Activities | | | *Rs.* |
| Proceeds from issuance of share capital | | xxx | |
| Proceeds from long-term borrowings | | xxx | |
| Repayments of long-term borrowings | | (xxx) | |
| Interest paid | | (xxx) | |
| Dividend paid | | (xxx) | |
| Net cash from Financing Activities | (c) | | xxx |
| Net increase (decrease) in Cash and Cash Equivalent | (a+b+c) | | xxx |
| Cash and Cash Equivalents at beginning of period | | | xxx |
| Cash and Cash Equivalent at end of period | | | xxx |
| | | | |
| Cash Flow Statement (Indirect Method) | | | *(Rs.)* |
| Cash Flow from Operating Activities | | | |
| Net profit before tax and extraordinary items | | xxx | |
| Adjustments for: | | | |
| - Depreciation | | xxx | |
| - Foreign exchange | | xxx | |
| - Investments | | xxx | |
| - Gain or loss on sale of fixed assets | | (xxx) | |
| - Interest/dividend | | xxx | |
| Operating profit before working capital changes | | xxx | |
| Adjustments for: | | | |
| - Trade and other receivables | | xxx | |

| | | |
|---|---|---|
| - Inventories | (xxx) | |
| - Trade payable | xxx | |
| Cash generation from operations | xxx | |
|   - Interest paid | (xxx) | |
|   - Direct Taxes | (xxx) | |
| Cash before extraordinary items | xxx | |
| Deferred revenue | xxx | |
| Net cash from Operating Activities | (a) | xxx |
| Cash Flow from Investing Activities | | |
| Purchase of fixed assets | (xxx) | |
| Sale of fixed assets | xxx | |
| Purchase of investments | xxx | |
| Interest received | (xxx) | |
| Dividend received | xxx | |
| Loans to subsidiaries | xxx | |
| Net cash from Investing Activities | (b) | xxx |
| Cash Flow from Financing Activities | | |
| Proceeds from issue of share capital | xxx | |
| Proceeds from long term borrowings | xxx | |
| Repayment to finance/lease liabilities | (xxx) | |
| Dividend paid | (xxx) | |
| Net cash from Financing Activities | (c) | xxx |
| Net increase (decrease) in Cash and Cash Equivalents | (a+b+c) | xxx |
| Cash and Cash Equivalents at the beginning of the year | | xxx |
| Cash and Cash Equivalents at the end of the year | | xxx |

**Cash from Operations** *(Rs.)*

| | | | | |
|---|---|---|---|---|
| Funds from Operations | | | | xxx |
| *Add:* | Increase in Current Liabilities | (excluding Bank Overdraft) | xxx | |
| | Decrease in Current Assets | (excluding cash & bank balance) | xxx | xxx |
| *Less:* | Increase in Current Assets | (excluding cash & bank balance) | xxx | |
| | Decrease in Current Liabilities | (excluding bank overdraft) | xxx | xxx |
| Cash from Operations | | | | xxx |

The concept and technique of preparing a Cash Flow Statement will be clear with the help of illustrations given in the following pages.

**Illustration 1:** From the following information prepare a Cash Flow Statement according to (a) Direct Method (b) Indirect Method as per AS-3 (Revised). Working notes would form part of your answer

(1)                                **BALANCE SHEET**

**AS ON 31.12. 2005**

*(Rs. in '000)*

| | 2005 | 2004 |
|---|---|---|
| **Assets** | | |
| Cash on hand and balances with banks | 200 | 25 |
| Short-term investments | 670 | 135 |
| Sundry debtors | 1,700 | 1,200 |
| Interest receivable | 100 | -- |
| Inventories | 900 | 1,950 |
| Long-term investments | 2,500 | 2,500 |
| Fixed assets at cost | 2,180 | 1,910 |
| *Less:* Accumulated depreciation | (1,450) | (1,060) |
| Fixed assets (net) | 730 | 850 |
| **Total Assets** | 6,800 | 6,660 |

|  | 2005 | 2004 |
|---|---|---|
| **Liabilities** | | |
| Sundry creditors | 150 | 1,890 |
| Interest payable | 230 | 100 |
| Income taxes payable | 400 | 1,000 |
| Long-term debt | 1,110 | 1,040 |
| **Total liabilities** | 1,890 | 4,030 |
| Shareholders' funds | | |
| Share capital | 1,500 | 1,250 |
| Reserves | 3,410 | 1,380 |
| Total shareholders' funds | 4,910 | 2,630 |
| **Total Liabilities and Shareholders' funds** | 6,800 | 6,660 |

(2)                    STATEMENT OF PROFIT AND LOSS

for the period ended 31.12. 2005

*(Rs. in '000)*

| | |
|---|---|
| Sales | 30,650 |
| Cost of sales | (26,000) |
| Gross profit | 4,650 |
| Depreciation | (450) |
| Administrative and selling expenses | (910) |
| Interest expense | (400) |
| Interest income | 300 |
| Dividend income | 200 |
| Foreign exchange loss | (40) |
| Net profit before taxation and extraordinary item | 3,350 |
| Extraordinary item- | |
| Insurance proceeds from earthquake disaster settlement | 180 |
| Net profit after extraordinary item | 3,530 |
| Income tax | (300) |
| Net Profit | 3,230 |

Additional Information: (Figures in Rs. '000).

(a) An amount of 250 was raised from the issue of share capital and a further 250 was raised from long-term borrowings.

(b) Interest expense was 400 of which 170 was paid during the period. 100 relating to interest expense of the prior period was also paid during the period.

(c) Dividends paid were 1,200.

(d) Tax deducted at source on dividends received (included in the tax expense of 300 for the year) amounted to 40.

(e) During the period, the enterprise acquired fixed assets for 350. The payment was made in cash.

(f) Plant with original cost of 80 and accumulated depreciation of 60 was sold for 20.

(g) Foreign exchange loss of 40 represents the reduction in the carrying amount of a short-term investment in foreign currency designated bonds arising out of a change in exchange rate between the date of acquisition of the investment and the balance sheet date.

(h) Sundry debtors and sundry creditors include amounts relating to credit sales and credit purchases only.

**Solution**

<div align="center">

**CASH FLOW STATEMENT**
**(Direct Method)**

</div>

*(Rs. in '000)*

*2005*

| | | |
|---|---:|---:|
| **Cash flows from operating activities** | | |
| Cash receipts from customers | 30,150 | |
| Cash paid to suppliers and employees | (27,600) | |
| Cash generated from operations | 2,550 | |
| Income taxes paid | (860) | |
| Cash flow before extraordinary item | 1,690 | |
| Proceeds from earthquake disaster settlement | 180 | |
| Net cash from operating activities | | 1,870 |
| **Cash flows from investing activities** | | |
| Purchase of fixed assets | (350) | |
| Proceeds from sale of equipment | 20 | |
| Interest received | 200 | |

| | | |
|---|---:|---:|
| Dividend received | 160 | |
| *Net cash from investing activities* | | 30 |
| **Cash Flows from financing activities** | | |
| Proceeds from issuance of share capital | 250 | |
| Proceeds from long-term borrowings | 250 | |
| Repayments of long-term borrowings | (180) | |
| Interest paid | (270) | |
| Dividend paid | (1,200) | |
| *Net cash used in financing activities* | | (1,150) |
| **Net increase in cash and cash equivalents** | | 750 |
| **Cash and cash equivalents at beginning of period** (See Note 1) | | 160 |
| **Cash and cash equivalents at end of period** (See Note 1) | | 910 |

**Notes to the Cash Flow Statement (Direct & Indirect Method)**

**1    Cash and cash equivalents:** Cash and cash equivalents consist of cash on hand and balances with banks, and investments in money-market instruments. Cash and cash equivalents included in the cash flow statement comprise the following balance sheet amounts.

| | *2005* | *2004* |
|---|---:|---:|
| Cash on hand and balances with banks | 200 | 25 |
| Short-term investments | 670 | 135 |
| Cash and cash equivalents | 870 | 160 |
| Effects of exchange rate changes | 40 | -- |
| Cash and cash equivalents as restated | 910 | 160 |

Cash and cash equivalents at the end of the period include deposits with banks of 100 held by a branch which are not freely permissible to the company because of currency exchange restrictions.

The company has undrawn borrowing facilities of 2,000 of which 700 may be used only for future expansion.

2.    Total tax paid during the year (including tax deducted at source on dividends received) amounted to 900.

## CASH FLOW STATEMENT

### (Indirect Method)

*(Rs. in '000)*

| | | *2005* |
|---|---:|---:|
| **Cash flows from operating activities** | | |
| Net profit before taxation, and extraordinary item | | 3,350 |
| Adjustments for: | | |
| Depreciation | 450 | |
| Foreign exchange loss | 40 | |
| Interest income | (300) | |
| Dividend income | (200) | |
| Interest expense | 400 | |
| Operating profit before working capital changes | 3,740 | |
| Increase in sundry debtors | (500) | |
| Decrease in inventories | 1,050 | |
| Decrease in sundry creditors | (1,740) | |
| Cash generated from operations | 2,550 | |
| Income taxes paid | (860) | |
| Cash flows before extraordinary item | 1,690 | |
| Proceeds from earthquake disaster settlement | 180 | |
| *Net cash from operating activities* | | 1,870 |
| **Cash flows from investing activities** | | |
| Purchase of fixed assets | (350) | |
| Proceeds from sale of equipment | 20 | |
| Interest received | 200 | |
| Dividends received | 160 | |
| *Net cash from investing activities* | | 30 |
| **Cash flows from financing activities** | | |
| Proceeds from issuance of share capital | 250 | |
| Proceeds from long-term borrowings | 250 | |

| | | |
|---|---:|---:|
| Repayment of long-term borrowings | (180) | |
| Interest paid | (270) | |
| Dividends paid | (1,200) | |
| *Net cash used in financing activities* | | (1,150) |
| Net increase in cash and cash equivalents | | 750 |
| **Cash and cash equivalents at beginning of period** (See Note 1) | | 160 |
| **Cash and cash equivalents at end of period** (See Note 1) | | 910 |

### Alternative Presentation (Indirect Method)

As an alternative, in an indirect method cash flow statement, operating profit before working capital changes is sometimes presented as follows:

| | |
|---|---:|
| Revenues excluding investment income | 30,650 |
| Operating expenses excluding depreciation | (26,910) |
| Operating profit before working capital changes | 3,740 |

### Working Notes:

The working notes given below do not form part of the cash flow statement. The purpose of these working notes is merely to assist in understanding the manner in which various figures in the cash flow statement have been derived. (Figures are in Rs.'000).

1. *Cash receipts from customers*

| | |
|---|---:|
| Sales | 30,650 |
| *Add:* Sundry debtors at the beginning of the year | 1,200 |
| | 31,850 |
| *Less*: Sundry debtors at the end of the year | 1,700 |
| | 30,150 |

2. *Cash paid to suppliers and employees*

| | |
|---|---:|
| Cost of sales | 26,000 |

|  |  |  |
|---|---:|---:|
| Administrative & selling expenses |  | 910 |
|  |  | 26,910 |
|  |  |  |
| *Add:* Sundry creditors at the beginning of the   year | 1,890 |  |
| Inventories at the end of the year | 900 | 2,790 |
|  |  | 29,700 |
| *Less:* Sundry creditors at the end of the year | 150 |  |
|    Inventories at the beginning of the year | 1,950 | 2,100 |
|  |  | 27,600 |

3.  *Income taxes paid (including tax deducted at source from dividends received)*

|  |  |
|---|---:|
| Income tax expense for the year | 300 |
| (including tax deducted at source from dividends received |  |
|  *Add:* Income tax liability at the beginning of the   year | 1,000 |
|  | 1,300 |
|  *Less:* Income tax liability at the end of the year | 400 |
|  | 900 |

Out of 900, tax deducted at source on dividends received (amounting to 40), is included in cash flows from investing activities and the balance of 860 is included in cash flows from operating activities.

4.  *Repayment of long-term borrowings*

|  |  |
|---|---:|
| Long-term debt at the beginning of the year | 1,040 |
|  *Add:* Long-term borrowings made during the   year | 250 |
|  | 1,290 |
|  *Less:* Long-term borrowings at the end of the   year | 1,110 |
|  | 180 |

5.  *Interest paid*

|  |  |
|---|---:|
| Interest expense for the year | 400 |

| | |
|---|---:|
| *Add:* Interest payable at the beginning of the  year | 100 |
| | 500 |
| *Less:* Interest payable at the end of the year | 230 |
| | 270 |

**Illustration 2:**  Swastik Oils Ltd. has furnished the following information for the year ended 31st March, 2006:

| | *(Rs. in lakhs)* |
|---|---:|
| Net profit | 37,500.00 |
| Dividend (including interim dividend paid) | 12,000.00 |
| Provision for income-tax | 7,500.00 |
| Income-tax paid during the year | 6,372.00 |
| Loss on sale of assets (net) | 60.00 |
| Book value of assets sold | 277.50 |
| Depreciation charged to P&L Account | 30,000.00 |
| Profit on sale of investments | 150.00 |
| Interest income on investments | 41,647.50 |
| Value of investments sold | 3,759.00 |
| Interest expenses | 15,000.00 |
| Interest paid during the year | 15,780.00 |
| Increase in working capital (excluding cash and bank balance) | 84,112.50 |
| Purchase of fixed assets | 21,840.00 |
| Investments on joint venture | 5,775.00 |
| Expenditure on construction work-in-progress | 69,480.00 |
| Proceeds from long-term borrowings | 38,970.00 |
| Proceeds from short-term borrowings | 30,862.50 |
| Opening cash and bank balances | 11,032.50 |
| Closing cash and bank balances | 2,569.50 |

You are required to prepare the cash flow statement in accordance with AS-3 for the year ended 31st March, 2006.  (Make assumptions wherever necessary).

**Solution**

## SWASTIK OILS LIMITED

### Cash Flow Statement for the Year Ended 31st March, 2006

| | |
|---|---:|
| *Cash Flows from Operating Activities* | *(Rs. in lakhs)* |
| Net profit before taxation (37,500 + 7,500) | 45,000.00 |
| Adjustment for: | |
| Depreciation charged to P&L A/c | 30,000.00 |
| Loss on sale of assets (net) | 60.00 |
| Profit on sale of investments | (150.00) |
| Interest income on investments | (3,759.00) |
| Interest expenses | 15,000.00 |
| Operating profit before working capital changes | 86,151.00 |
| Increase (change) in working capital (excluding cash and bank balance) | (84,112.50) |
| Cash generated from operations | 2,038.50 |
| Income tax paid | (6,372.00) |
| Net cash used in operating activities (A) | (4,333.50) |
| *(b)*    *Cash Flow from investing Activities* | |
| Sale of Assets (277.50-60.00) | 217.50 |
| Sale of Investments (41,647.50+150) | 41,797.50 |
| Interest Income on investments (assumed) | 3,759.00 |
| Purchase of fixed assets | (21,840.00) |
| Investments in Joint Venture | (5,775.00) |
| Expenditure on construction work-in-progress | (69,480.00) |
| Net Cash used in investing activities (B) | (51,321.00) |
| *(c)*    *Cash Flow from Financing Activities* | |
| Proceeds from long-term borrowings | 38,970.00 |
| Proceeds from short-term borrowings | 30,862.50 |
| Interest paid | (15,780.00) |

| | |
|---|---|
| Dividends (including interim dividend paid) | (12,000.00) |
| Net cash from financing activities (C) | 42,052.50 |
| Net increase in cash and cash equivalents (A) + (B) + (C) | (13,602.00) |
| Cash and cash equivalents at the beginning of the year | 11,032.50 |
| Cash and cash equivalents at the end of the year | 2,569.50 |

## 2.9   FUNDS FLOW ANALYSIS

Another important tool in the hands of finance managers for ascertaining the changes in financial position of a firm between two accounting periods is known as funds flow statement. Funds flow statement analyses the reasons for change in financial position between two balance sheets. It shows the inflow and outflow of funds i.e., sources and application of funds during a particular period.

Fund Flow Statement summarises for a particular period the resources made available to finance the activities of an enterprise and the uses to which such resources have been put. A fund flow statement may serve as a supplementary financial information to the users.

### 2.9.1   Meaning of Fund

'Fund' means working capital. Working capital is viewed as the difference between current assets and current liabilities. If we see balance sheets of a company for two consecutive years, we can note that working capital in such Balance Sheets are different.

### Illustration 3

Let us see the Balance Sheets of a company for the year ended 31st March, 2006 and 2007.

*(Rupees in Lacs)*

| **Current Assets, Loans and Advances:** | 31.3.2006 | 31.3.2007 |
|---|---|---|
| Inventories | 15,24 | 14,91 |
| Sundry Debtors | 1,26 | 1,83 |
| Cash and Bank | 1,34 | 1,66 |
| Other current Assets | 8 | 9 |
| Loans and Advances | 11,76 | 14,74 |
| | 29,68 | 33,23 |

*Less:* **Current Liabilities and Provisions:**

| | | |
|---|---:|---:|
| Liabilities | 17,76 | 14,83 |
| Provision for Taxation | 6,22 | 7,45 |
| Proposed Dividend | 65 | 2,07 |
| | 24,63 | 24,35 |
| Working Capital | 5,05 | 8,88 |

From the given figures, we find that working capital has increased by Rs. 383 Lacs. What are the reasons of such increase? Fund Flow Statement explains the reasons for such change. Funds may be compared with water tank. It contains a particular water level to which there is inflow of water as well as outflow. If inflow is more than outflow water level will go up and if outflow is more than inflow then water level will come down. Similarly, there is a particular fund level at the Balance Sheet date. Throughout the year there are fund inflows and outflows. So fund experiences a continuous change through the year. At the end of the year, i.e., at the next balance sheet date fund stands at a particular level. If we want to measure the difference between the two dates i.e. Working capital in the first Balance sheet date and Working capital at the next Balance sheet date. This will be given by the differences of the Total Fund Inflows and Total Fund Outflows.

### 2.9.2 Change in Working Capital

Even when a firm is earning adequate profit it may be short of fund for day to day working. Such a situation may be the result of:

(a) Purchase of fixed assets or long-term investments during the phase of extension without raising long-term funds by issue of shares or debentures;

(b) Payment of dividends in excess of profits earned;

(c) Extension of credit to the customers;

(d) Holding larger stock to the current levels; and

(e) Repaying a long-term liability or redemption of preference shares without raising long-term resources.

Conversely, even in a year of loss, working capital may not diminish as much as the amount of loss less depreciation due to many reasons. Change in Working Capital Statement is usually prepared to show any change in working capital between two consecutive Balance Sheet dates.

**Illustration 4**

Given below is the Change in Working Capital Statement of the same company as an example:

**Change in Working Capital Position**

*(Rupees in Lacs)*

| **Current Assets, Loans & Advances** | 31.3.2006 | 31.3.2007 | Change |
|---|---|---|---|
| Inventories | 15,24 | 14,91 | – 33 |
| Sundry Debtors | 1,26 | 1,83 | + 57 |
| Cash and Bank | 1,34 | 1,66 | + 32 |
| Other Current Assets | 8 | 9 | + 1 |
| Loans and Advances | 11,76 | 14,74 | + 298 |
| | 29,68 | 33,23 | 355 |
| *Less* : **Current Liabilities and Provisions** | | | |
| Liabilities | 17,76 | 14,83 | – 293 |
| Provision for Taxation | 6,22 | 7,45 | + 123 |
| Proposed Dividend | 65 | 2,07 | + 142 |
| | 24,63 | 24,35 | – 28 |
| Working Capital | 505 | 888 | 383 |

$$= [355 - (-28)]$$

[Students may note that in Fund Flow Analysis, sometimes provisions for taxation and proposed dividend are excluded from current liabilities. This is just to show the true payments as outflows.]

**2.9.3    Elements of Funds Flow Statement**

We have already seen that there are numerous movements in funds in an accounting year. It is important to understand these movements since they affect the financial position of a company. This is done by preparing a statement known as Funds Flow Statement, also known as Sources and Application of Funds Statement or the Statement of Changes in Financial Position. It shows the various sources and uses of funds during a year. Some of those sources and application are listed below:

*Sources:* Chiefly, these, in the case of a company, are the following:

(i)     Issue of shares and debentures for cash;

(ii)    Long-term loans;

(iii)   Sale of investments and fixed assets;

(iv)    Fund from operations; and

(v)     Decrease in working capital.

*Applications:* Funds expended are chiefly for:

(i)     Purchase of fixed assets and investments;

(ii)    Redemption of debentures and preference shares and repayment of loans;

(iii)   Payment of dividend;

(iv)    Payment of tax; and

(v)     Increase in working capital.

If payment of dividend and tax are shown as fund applications, tax provision and proposed dividend should not be taken to compute the working capital.

There is no prescribed form in which the statement should be prepared. However, it is customary to draw it in a manner as would disclose the main sources of funds and their uses.

### 2.9.3.1  Sources of Fund

*(i)   Issue of shares and debentures for cash:* If shares or debentures are issued at par, the paid-up value constitutes the source of fund. If shares/debentures are issued at a premium, such premium is to be added and if shares/debentures are issued at a discount, such discount is to be subtracted to determine the source of fund.

But issue of bonus shares, conversion of debentures into equity shares or shares issued to the vendors in case of business purchases do not constitute sources of fund.

*(ii)  Long-term Loans:* Amount of long-term loan raised constitutes source of fund.  But if a long-term loan is just renewed for an old loan, then the money received by such renewal becomes the source.

*(iii) Sale of investments and other fixed assets:* Sale proceeds constitute a source of fund.

### Illustration 5

An old machine costing Rs. 8 Lacs, W.D.V. Rs. 2 Lacs was sold for Rs.1.75 Lacs. Here source of fund was only Rs. 1.75 lakhs.

*(iv) Fund from Operations:* Fund generated from operations is calculated as below:

*Net Income*

*Additions*

1. Depreciation of fixed assets

2. Amortization of intangible and deferred charges (i.e. amortization of goodwill, trade marks, patent rights, copyright, discount on issue of shares and debentures, on redemption of preference shares and debentures, preliminary expenses, etc.)

3. Amortization of loss on sale of investments

4. Amortization of loss on sale of fixed assets

5. Losses from other non-operating items

6. Tax provision (created out of current profit)

7. Proposed dividend

8. Transfer to reserve

Subtraction

1. Deferred credit (other than the portion already charged to Profit and Loss A/c)

2. Profit on sale of investment

3. Profit on sale of fixed assets

4. Any subsidy credited to P & L A/c.

5. Any written back reserve and provision.

Here, Fund from Operations, is calculated after adding back tax provision and proposed dividend. Students should note that if provision for taxation and proposed dividend are excluded from current liabilities, then only these items are to be added back to find out the 'Fund from Operations'. By fund from operations if we want to mean gross fund generated before tax and dividend, then this concept is found useful. At the same time, fund from operations may also mean net fund generated after tax and dividend. For explaining the reasons for change in fund it would be better to follow the gross concept.

*(v) Decrease in Working Capital:* It is just for balancing the Fund Flow Statement. This figure will come from change in working capital statement.

### 2.9.3.2 Applications of Fund

*(i) Purchase of fixed assets and investments:* Cash payment for purchase is application of fund. But if purchase is made by issue of shares or debentures, such will not constitute

application of fund. Similarly, if purchases are on credit, these will not constitute fund applications.

*(ii)* *Redemption of debentures, preference shares and repayment of loan*: Payment made including premium (less discount) is to be taken as fund applications.

*(iii)* *& (iv) Payment of dividend and tax:* These two items are to be taken as applications of fund if provisions are excluded from current liabilities and current provisions are added back to profit to determine the 'Fund from Operations'.

*(v)* *Increase in working capital:* It is the balancing figure. This figure will come from change in working capital statement.

### 2.9.3.3 Calculation of Fund from Operations

### Illustration 6

### Profit and Loss Account

| | Rs. | | Rs. |
|---|---|---|---|
| To Stock | 2,90,000 | By Sales | 50,20,000 |
| To Purchases | 27,30,000 | By Stock | 3,40,000 |
| To Wages | 10,10,000 | By Interest Received | 10,000 |
| To Salaries & Admn. Exp. | 6,35,000 | By Transfer from Div. | |
| To Depreciation | 2,70,000 | Equalisation Reserve | 2,00,000 |
| To Investment Reserve | 1,20,000 | By Profit on sale of | |
| To Patents | 15,000 | Machinery | 20,000 |
| To Provision for Income-Tax | 2,70,000 | | |
| To Net Profit | 2,50,000 | | |
| | 55,90,000 | | 55,90,000 |

Funds generated by trading activities before tax was Rs. 7,05,000 as shown below:

|  | Rs. | Rs. |
|---|---|---|
| Net Profit (after tax) |  | 2,50,000 |
| *Add:* Non-cash charges |  |  |
| Depreciation | 2,70,000 |  |
| Patents written off | 15,000 |  |
| Investment Reserve | 1,20,000 | 4,05,000 |
|  |  | 6,55,000 |
| *Less:* Transfer from Dividend |  |  |
| Equalisation Reserve | 2,00,000 |  |
| Profit on sale of machinery | 20,000 | 2,20,000 |
|  |  | 4,35,000 |
| *Add:* Provision for income tax |  | 2,70,000 |
|  |  | 7,05,000 |

### 2.9.3.4  Fund Flow from Opening Balance Sheet

The balance sheet at the end of the very first year of operations of a business is more or less the fund flow statement for that year.  Suppose the balance sheet at the end of the year of a business is as follows:

| Liabilities | Rs. | Assets | Rs. |
|---|---|---|---|
| Share Capital | 8,00,000 | Fixed Assets | 12,00,000 |
| Profit & Loss A/c | 20,000 | *Less*: Depreciation | 1,00,000 |
| 8% Debentures | 3,00,000 |  | 11,00,000 |
| Sundry Creditors | 2,00,000 |  |  |
| Bills Payable | 1,00,000 | Sundry Debtors | 2,00,000 |
| Provision for Taxation | 1,00,000 | Stock-in-trade | 2,00,000 |
| Proposed Dividend | 80,000 | Cash at Bank | 1,00,000 |
| Preliminary Exp. | 20,000 |  |  |
| *Less :* Written off | 20,000 |  | — |
|  | 16,00,000 |  | 16,00,000 |

The Fund Flow Statement of the above mentioned business will be as follows:

| Sources of Fund | *Rs.* | *Rs.* |
|---|---|---|
| Share Capital | | 8,00,000 |
| 8% Debentures | | 3,00,000 |
| Fund from Operations: | | |
| P & L A/c | 20,000 | |
| *Add:* Depreciation | 1,00,000 | |
| Preliminary Exp. w/o | 20,000 | |
| Provision for Taxation | 1,00,000 | |
| Proposed Dividend | 80,000 | 3,20,000 |
| | | 14,20,000 |
| **Applications of Fund** | | |
| Purchase of Fixed Assets | 12,00,000 | |
| Payment of Preliminary Exps. | 20,000 | |
| Working Capital | 2,00,000 | |
| | | 14,20,000 |

### 2.9.4   Uses of Fund Flow Statement

Fund Flow Statement is prepared to explain the change in the working capital position of a business. Particularly there are two flows of funds: long term fund raised by issue of shares, debentures or sale of fixed assets and fund generated from operations which may be taken as a gross before payment of dividend and taxes or net after payment of dividend and taxes. Applications of fund are for investment in fixed assets or repayment of capital. If long-term fund requirement is met just out of long-term sources, then the whole fund generated from operations will be represented by increase in working capital.  On the other hand, if fund generated from operations is not sufficient to bridge a gap of long-term fund requirement, then there will be a decline in working capital.  To evaluate the fund movement either for the existing business or for a proposed business, fund flow statement can be prepared either on historical basis or on projected basis.  Its main use lies in the explanatory power of the fund movement.

### 2.9.5    Importance of Funds Flow Statement

The balance sheet and profit and loss account failed to provide the information which is provided by funds flow statement i.e., changes in financial position of an enterprise. This statement indicates the changes which have taken place between the two accounting dates. This statement by giving details of sources and uses of funds during a given period is of great help to the users of financial information. It is also a very useful tool in the hands of management for judging the financial and operating performance of the company. It also indicates the working capital position which helps the management in taking policy decisions regarding dividend etc.

The projected funds flow statement can also be prepared and thus budgetary control and capital expenditure control can be exercised in the organisation.

### 2.9.6 Analysis of Funds Flow Statement

Funds flow statement is useful for long term analysis. Such an analysis is of great help to management, shareholders, creditors, brokers etc.

1.    The funds flow statement helps in answering the following questions:

   (a)   Where have the profits gone?

   (b)   Why there is an imbalance existing between liquidity position and profitability position of the enterprise?

   (c)   Why is the concern financially solid in spite of losses?

2.    A projected funds flow statement can be prepared and resources can be properly allocated after an analysis of the present state of affairs. The optimal utilisation of available funds is necessary for the overall growth of the enterprise. The funds flow statement prepared in advance gives a clear-cut direction to the management in this regard.

3.    The funds flow statement analysis helps the management to test whether the working capital has been effectively used or not and whether the working capital level is adequate or inadequate for the requirement of business.

4.    The funds flow statement analysis helps the investors to decide whether the company has managed funds properly. It also indicates the credit worthiness of a company which helps the lenders to decide whether to lend money to the company or not. It helps management to take policy decisions and to decide about the financing policies and capital expenditure programme for future.

### 2.9.7    Funds Flow Statement vs. Cash Flow Statement

Both funds flow and cash flow statements are used in analysis of past transactions of a business firm.  The differences between these two statements are given below:

(a) Funds flow statement is based on the accrual accounting system. In case of preparation of cash flow statements all transactions effecting the cash or cash equivalents only is taken into consideration.

(b) Funds flow statement analyses the sources and application of funds of long-term nature and the net increase or decrease in long-term funds will be reflected on the working capital of the firm. The cash flow statement will only consider the increase or decrease in current assets and current liabilities in calculating the cash flow of funds from operations.

(c) Funds Flow analysis is more useful for long range financial planning. Cash flow analysis is more useful for identifying and correcting the current liquidity problems of the firm.

(d) Funds flow statement tallies the funds generated from various sources with various uses to which they are put. Cash flow statement starts with the opening balance of cash and reach to the closing balance of cash by proceeding through sources and uses.

**Illustration 7**

Given below is the Balance Sheet of X Ltd. as on 31st March, 2005, 2006 and 2007.

| | | *31st March* | | | | *31st March* | |
|---|---|---|---|---|---|---|---|
| *Liabilities* | *2005* | *2006* | *2007* | *Assets* | *2005* | *2006* | *2007* |
| | | | *(Rs. in Lacs)* | | | | *(Rs. in Lacs)* |
| Share Capital | 70,00 | 75,00 | 75,00 | Plant & Machinery | 80,00 | 110,00 | 130,00 |
| Reserve | 12,00 | 16,00 | 25,00 | Investments | 35,00 | 30,00 | 45,00 |
| Profit & Loss A/c | 6,00 | 7,00 | 9,00 | Stock | 15,00 | 15,00 | 20,00 |
| 12% Debentures | 10,00 | 5,00 | 10,00 | Debtors | 5,00 | 5,50 | 5,00 |
| Cash Credit | 5,00 | 7,00 | 12,00 | Cash at Bank | 5,00 | 3,00 | 3,25 |
| Creditors | 12,00 | 14,00 | 18,00 | | | | |
| Tax Provision | 11,00 | 17,00 | 28,00 | | | | |
| Proposed Div. | 14,00 | 22,50 | 26,25 | | | | |
| | 140,00 | 163,50 | 203,25 | | 140,00 | 163,50 | 203,25 |

Other Information:

(i) Depreciation:2004-2005 Rs. 500 lacs; 2005-06 Rs. 700 lacs; and 2006-07 Rs. 775 lacs.

(ii) In 2005-06 a part of the 12% debentures was converted into equity at par.

(iii) In the last three years there was no sale of fixed assets.

(iv) In 2005-06 investment costing Rs. 500 lacs was sold for Rs. 510 lacs. The management is confused on the deteriorating liquidity position despite good profit earned by the enterprise. Identify the reasons. Fund Flow Analysis may be adopted for this purpose.

**Solution**

(1) Working Capital of X Ltd. during 2004-05, 2005-06 and 2006-07

|  | 2004-05 | 2005-06 | 2006-07 |
|---|---|---|---|
|  |  |  | (Rs. in Lacs) |
| **Current Assets :** |  |  |  |
| Stock | 15,00 | 15,00 | 20,00 |
| Debtors | 5,00 | 5,50 | 5,00 |
| Cash at Bank | 5,00 | 3,00 | 3,25 |
|  | 25,00 | 23,50 | 28,25 |
| *Less :* **Current Liabilities :** |  |  |  |
| Cash Credit | 5,00 | 7,00 | 12,00 |
| Creditors | 12,00 | 14,00 | 18,00 |
|  | 17,00 | 21,00 | 30,00 |
| Working Capital | 8,00 | 2,50 | (1,75) |
| Decrease in Working Capital | — | 5,50 | 4,25 |

So working capital decreased by Rs. 550 lacs in 2005-06 and Rs. 425 lacs in 2006-07

(2) Profit earned and funds from operations

|  | 2005-06 | 2006-07 |
|---|---|---|
| *Profit during the year :* |  | (Rs. in Lacs) |
| Increase in Profit & Loss A/c | 1,00 | 2,00 |
| Increase in Reserve | 4,00 | 9,00 |
| Tax provision | 17,00 | 28,00 |
| Proposed Dividend | 22,50 | 26,25 |
|  | 44,50 | 65,25 |
| *Less :* Profit on sale of Investment | (10) | — |
| *Add :* Depreciation | 7,00 | 7,75 |
| Fund from operations | 51,40 | 73,00 |

X Ltd. earned Rs. 44,50 lacs profit and Rs. 51,40 Lacs fund in 2005-06. It earned Rs. 62,25 lacs profit and Rs. 73,00 lacs fund in 2006-07.

**(3) Fund Flow Statements**

| | 2005-06 | 2006-07 |
|---|---|---|
| | | *(Rs. in Lacs)* |
| **Sources:** | | |
| Fund from operations | 51,40 | 73,00 |
| Issue of 12% debentures | — | 5,00 |
| Sale of investments | 5,10 | ____ |
| | 56,50 | 78,00 |
| **Applications:** | | |
| Purchase of Plant and Machinery | 37,00 | 27,75 |
| Purchase of Investments | — | 15,00 |
| Tax payment | 11,00 | 17,00 |
| Dividend payment | 14,00 | 22,50 |
| | 62,00 | 82,25 |
| Decrease in Working Capital | 5,50 | 4,25 |

**Comments:**

(1) It appears (Rs. 25,00 lacs) that 48.64% (Rs. 51,40 lacs) × 100 of the fund generated during 2005-06 were used to pay tax and dividend. The percentage became still higher (54.11%)

$\dfrac{Rs.39,50}{Rs.73,00} \times 100$ in 2006-07

(2) In 2005-06 the balance of the fund generated was 51.36% (100 – 48.64%)which is used to finance purchase of plant and machinery. Sources of finance for long-term investment were:

Fund from Operations      71.35% (Rs. 26,40 lacs/Rs. 37,00 lacs) ×100

Sale of Investments      13.78% (Rs. 5,10 lacs / Rs. 37,00 lacs) ×100

Working Capital      14.87% (Rs. 5,50 lacs / Rs. 37,00 lacs) ×100

Thus inadequate long-term fund to finance purchase of plant and machinery deteriorated working capital position. Also the management proposed 30% dividend in 2005-06.

So, liquidity deterioration in 2005-06 was due to (a) deployment of working capital in long term investment and (b) high rate of dividend.

(3) In 2006-07, fund generation was 42.02% more. But dividend was increased from 20% to 30% which absorbed about 30.83% of funds generated. Tax paid to fund generated was also increased from 21.40% to 23.29%, Investment in Plant & Machinery (net of collection by issue of debentures) was 31.16% of the fund generated. Thus margin of 14.73 would remain had there been no investment outside business. This amounts to Rs. 10.75 lacs. So outside investment caused liquidity deterioration in 2006-07.

**Illustration 8**

Given below are the balance sheets of Spark Company for the years ending 31st July, 2006 and 31st July, 2007.

**Balance Sheet for the year ending on 31st July**

|  | (Rs.) 2006 | (Rs.) 2007 |
|---|---|---|
| **CAPITAL AND LIABILITIES** | | |
| Share capital | 3,00,000 | 3,50,000 |
| General reserve | 1,00,000 | 1,25,000 |
| Capital reserve (profit on sale of investment) | - | 5,000 |
| Profit and loss account | 50,000 | 1,00,000 |
| 15% Debentures | 1,50,000 | 1,00,000 |
| Accrued expenses | 5,000 | 6,000 |
| Creditors | 80,000 | 1,25,000 |
| Provision for dividend | 15,000 | 17,000 |
| Provision for taxation | 35,000 | 38,000 |
| Total | 7,35,000 | 8,66,000 |
| *Assets* | | |
| Fixed Assets | 5,00,000 | 6,00,000 |
| *Less*: Accumulated depreciation | 1,00,000 | 1,25,000 |
| Net fixed assets | 4,00,000 | 4,75,000 |
| Long-term investments (at cost) | 90,000 | 90,000 |

| | | |
|---|---|---|
| Stock (at cost) | 1,00,000 | 1,35,000 |
| Debtors (net of provisions for doubtful debts of Rs. 20,000 and Rs. 25,000 respectively for 2003 and 2004) | 1,12,500 | 1,22,500 |
| Bills receivables | 20,000 | 32,500 |
| Prepaid expenses | 5,000 | 6,000 |
| Miscellaneous expenditure | 7,500 | 5,000 |
| Total | 7,35,000 | 8,66,000 |

*Additional Information:*

(i)   During the year 2007, fixed asset with a net book value of Rs. 5,000 (accumulated depreciation Rs. 15,000) was sold for Rs. 4,000.

(ii)  During the year 2007, investments costing Rs. 40,000 were sold, and also investments costing Rs. 40,000 were purchased.

(iii) Debentures were retired at a premium of 10 percent.

(iv)  Tax of Rs. 27,500 was paid for 2006.

(v)   During 2007, bad debts of Rs. 7,000 were written off against the provision for doubtful debt account.

(vi)  The proposed dividend for 2006 was paid in 2007.

You are required to prepare a funds flow statement (i.e. statement of changes in financial position on working capital basis) for the year ended 31st July, 2007.

**Solution**

**Funds Flow Statement for the year ended 31st July, 2007**

*(Rs.)*

**Sources**

| | | |
|---|---|---|
| Working capital from operations | 1,71,000 | |
| Sale of fixed asset | 4,000 | |
| Sale of investments | 45,000 | |
| Share capital issued | 50,000 | |
| Total Funds Provided | | 2,70,000 |

Uses

| | | |
|---|---|---|
| Purchase of fixed assets | 1,20,000 | |
| Purchase of investments | 40,000 | |
| Payment of debentures (at a premium of 10%) | 55,000 | |
| Payment of dividend | 15,000 | |
| Payment of taxes | 27,500 | |
| Total Funds Applied | | 2,57,500 |
| Increase in Working Capital | | 12,500 |

*Working Notes:*

(a) **Funds from Operations:**

| | Rs. |
|---|---|
| Profit and loss balance on 31st July, 2007 | 1,00,000 |
| *Add:* Depreciation | 40,000 |
| Loss on sale of asset | 1,000 |
| Misc. expenditure written off | 2,500 |
| Transfer to reserve | 25,000 |
| Premium on redemption of debentures | 5,000 |
| Provision for dividend | 17,000 |
| Provision for taxation | 30,500 |
| | 2,21,000 |
| *Less:* Profit and loss balance on 31st July, 2006 | 50,000 |
| Funds from Operations | 1,71,000 |

(b) Depreciation for the year 2007 was Rs. 40,000. The accumulated depreciation on 31st July, 2006 was Rs. 1,00,000 of which Rs. 15,000 was written off during the year on account of sale of asset. Thus, the balance on 31st July, 2007 should have been Rs. 85,000. Since the balance is Rs. 1,25,000, the company would have provided a depreciation of Rs. 40,000 (i.e. Rs. 1,25,000 – Rs. 85,000) during the year 2007.

(c) Fixed assets were of Rs. 5,00,000 in 2006. With the sale of a fixed asset costing Rs. 20,000 (i.e. Rs. 5,000 + Rs. 15,000) this balance should have been Rs. 4,80,000. But the balance on 31st July, 2007 is Rs. 6,00,000. This means fixed assets of Rs. 1,20,000 were acquired during the year.

(d) Profit on the sale of investment, Rs. 5,000 has been credited to capital reserve account. It implies that investments were sold for Rs. 45,000 (i.e. Rs. 40,000 + Rs. 5,000).

The provision for taxation during the year 2007 is Rs. 30,500 [i.e. Rs. 38,000 – (Rs. 35,000 – Rs. 27,500)].

Bad debts written off against the provision account have no significance for funds flow statement, as they do not affect working capital.

**Illustration 9**

The summarized Balance Sheet of Xansa Ltd. as on 31-12-005 and 31-12-2006 are as follows:

|  | *31-12-2005* | *31-12-2006* |
|---|---|---|
| *Assets* | | |
| Fixed assets at cost | 8,00,000 | 9,50,000 |
| Less: Depreciation | 2,30,000 | 2,90,000 |
| Net | 5,70,000 | 6,60,000 |
| Investments | 1,00,000 | 80,000 |
| Current Assets | 2,80,000 | 3,30,000 |
| Preliminary expenses | 20,000 | 10,000 |
|  | 9,70,000 | 10,80,000 |
| *Liabilities* | | |
| Share Capital | 3,00,000 | 4,00,000 |
| Capital reserve | – | 10,000 |
| General reserve | 1,70,000 | 2,00,000 |
| Profit & Loss account | 60,000 | 75,000 |
| Debentures | 2,00,000 | 1,40,000 |
| Sundry Creditors | 1,20,000 | 1,30,000 |
| Tax Provision | 90,000 | 85,000 |
| Proposed dividend | 30,000 | 36,000 |
| Unpaid dividend | – | 4,000 |
|  | 9,70,000 | 10,80,000 |

During 2006, the company –

(a) Sold one machine for Rs. 25,000 the cost of the machine was Rs. 64,000 and depreciation provided for it amounted to Rs. 35,000.

(b) Provided Rs. 95,000 as depreciation.

(c) Redeemed 30% of debentures at Rs. 103.

(d) Sold investments at profit and credited to capital reserve; and

(e) Decided to value the stock at cost, whereas earlier the practice was to value stock at cost less 10%. The stock according to books on 31-12-2005 was Rs. 54,000 and stock on 31-12-2006 was Rs. 75,000, which was correctly valued at cost.

You are required to prepare the following statements:

(i) Funds from Operations

(ii) Sources and application of funds and statement of changes in working capital.

(iii) Fixed assets account and loss on sale of machinery account.

**Solution**

**Working Notes:**

### Fixed Assets A/c

| | Rs. | | Rs. |
|---|---|---|---|
| To Balance b/d | 8,00,000 | By Sale of Machinery A/c | 64,000 |
| To Cash Purchases (Balancing figure) | 2,14,000 | By Balance c/d | 9,50,000 |
| | 10,14,000 | | 10,14,000 |

### Sale on Machinery A/c

| | Rs. | | Rs. |
|---|---|---|---|
| To Fixed Assets (original cost) | 64,000 | By Provision for Depreciation (provided till date) | 35,000 |
| | | By Cash (sales) | 25,000 |
| | | By Loss (P & L A/c) | 4,000 |
| | 64,000 | | 64,000 |

### Provision for Depreciation of Fixed Assets A/c

| | Rs. | | Rs. |
|---|---|---|---|
| To Sale of Machinery a/c | 35,000 | By Balance b/d | 2,30,000 |
| To Balance c/d | 2,90,000 | By Profit & Loss A/c | 95,000 |
| | 3,25,000 | | 3,25,000 |

### Statement of Funds generated from Operations

|  |  | (Rs.) |
|---|---:|---:|
| Profit & Loss A/c (Carried forward to B/S) |  | 75,000 |
| *Add:* Fixed Assets (loss on sales) | 4,000 |  |
| Depreciation | 95,000 |  |
| Premium on redemption of Debentures (60,000×3/100) | 1,800 |  |
| Preliminary expenses written off | 10,000 |  |
| Provision for Income-tax | 85,000 |  |
| Proposed Dividend | 36,000 |  |
| Transfer to General Reserve | 30,000 | 2,61,800 |
|  |  | 3,36,800 |
| *Less:* |  |  |
| Profit and Loss A/c Opening Balance | 60,000 |  |
| Increase in Opening Stock value (54,000×10/90) | 6,000 | 66,000 |
| **Funds generated from operation** |  | 2,70,800 |

### Funds flow Statement of Xansa Ltd. for the year ended 31-12-2006

|  |  | (Rs.) |
|---|---|---:|
| **Sources of Funds:** |  |  |
| Issue of Shares |  | 1,00,000 |
| Sale of Investments |  | 30,000 |
| Sale of Machinery |  | 25,000 |
| Funds generated from operations |  | 2,70,800 |
|  | Total | 4,25,800 |
|  |  |  |
| **Application of Funds:** |  |  |
| Purchase of Fixed Assets |  | 2,14,000 |
| Redemption of Debentures with 3% Premium i.e., (60,000×103/100) |  | 61,800 |
| Dividend paid for the last year (Rs. 30,000 – Rs. 4,000 unpaid dividend) |  | 26,000 |
| Taxes paid belonging to last year |  | 90,000 |
| Increase in Working Capital (balancing figure) |  | 34,000 |
|  | Total | 4,25,800 |

### Statement of Changes in Working Capital

| Particulars | 2005 | 2006 | + | - |
|---|---|---|---|---|
| **Current Assets** | 2,86,000 | 3,30,000 | 44,000 | - |
| (including 6,000 on account of revaluation of stock) | | | | |
| **Current Liabilities** | 1,20,000 | 1,30,000 | - | 10,000 |
| Net Working capital | 1,66,000 | 2,00,000 | | |
| Increase in Working Capital | 34,000 | - | - | 34,000 |
| | 2,00,000 | 2,00,000 | 44,000 | 44,000 |

**Self Examination Questions**

**A. Objective Type Questions**

1. The term cash includes

    (a) Cash and Bank Balances

    (b) All the Current Assets

    (c) All the Current Liabilities

    (d) None of the above.

2. "Cash flow statement reveals the effects of transactions involving movement of cash". This statement is

    (a) Correct

    (b) Incorrect

    (c) Partially Correct

    (d) Irrelevant.

3. The Preparation of Cash flow statement is governed by AS-3 (Revised). This statement is

    (a) False

    (b) True

    (c) Partially true

    (d) Cannot say.

4. A cash flow statement is like an income statement

   (a) I agree

   (b) I disagree

   (c) I cannot say

   (d) The statement is ambiguous.

5. Funds flow statement and cash flow statement are one and the same

   (a) True

   (b) False

   (c) I cannot say

   (d) The statement is irrelevant.

6. Increase in the amount of bills payable results in

   (a) Increase in cash

   (b) Decrease in cash

   (c) No change in cash

   (d) I cannot say.

7. Cash from operations is equal to

   (a) Net profit plus increase in outstanding expenses

   (b) Net profit plus increase in debtors

   (c) Net profit plus increase in stock

   (d) None of the above.

8. Cash equivalents are short term highly liquid investments that are readily convertible into known amounts of cash and which are subject to an insignificant risk of changes in value.

   (a) I agree

   (b) I do not agree

   (c) I cannot say

   (d) Irrelevant.

9. For an investment to qualify as a cash equivalent, it must be readily convertible to a known amount of

   (a) Gold

   (b) Cash

   (c) Investment

   (d) Real estate.

10. Non-cash transactions

    (a) Form part of cash flow statement

    (b) Do not form part of cash flow statement

    (c) May or may not form part of cash flow statement

    (d) I cannot say whether they are part of cash flow statement.

**Answers to Objective Type Questions**

**1.** (a); **2.** (a); **3.** (b) **4.** (b); **5.** (b); **6.** (a); **7.** (a); **8.** (a); **9.** (b); **10.** (a);

**B. Long Answer Type Questions**

1. What is a cash flow statement? Discuss briefly its major classification.

2. Distinguish between Funds flow statement and Cash flow statement.

3. Outline the Importance of cash flow statement in managing cash flows of a business organization.

4. Explain the technique of preparing a cash flow statement with imaginary figures.

5. Explain the difference between direct and indirect methods of reporting cash flows from operating activities as per AS-3 (Revised).

**C. Practical Problems**

1. From the following Summary Cash Account of X Ltd. prepare Cash Flow Statement for the year ended 31st March, 2006 in accordance with AS-3 (Revised) using the direct method. The Company does not have any cash equivalents.

### Summary Cash Account for the year ended 31.3.2006

| | | | |
|---|---|---|---|
| Balance on 1-4-2005 | 50 | Payment of Suppliers | 2,000 |
| Issue of Equity Share | 300 | Purchase of Fixed Assets | 200 |
| Receipts from Customers | 2,800 | Overhead expense | 200 |

| Sale of Fixed Assets | 100 | Wags and Salaries | 100 |
|---|---|---|---|
| | | Taxation | 250 |
| | | Dividend | 50 |
| | | Repayment of Bank Loan | 300 |
| | | Balance on 31-3-2006 | 150 |
| | 3,250 | | 3,250 |

2.  Ms. Jyoti of Star Oils Limited has collected the following information for the preparation of cash flow statement for the year 2005:

*(Rs. in lakhs)*

| | |
|---|---|
| Net Profit | 25,000 |
| Dividend (including dividend tax) paid | 8,535 |
| Provision for Income-tax | 5,000 |
| Income-tax paid during the year | 4,248 |
| Loss on sale of assets (net) | 40 |
| Book value of the assets sold | 185 |
| Depreciation charged to Profit & Loss Account | 20,000 |
| Amortisation of Capital grant | 6 |
| Profit on sale of Investments | 100 |
| Carrying amount of Investment sold | 27,765 |
| Interest income on investments | 2,506 |
| Interest expenses | 10,000 |
| Interest paid during the year | 10,520 |
| Increase in Working Capital (excluding Cash & Bank balance) | 56,075 |
| Purchase of fixed assets | 14,560 |
| Investment in joint venture | 3,850 |
| Expenditure on construction work-in-progress | 34,740 |
| Proceeds from calls in arrear | 2 |
| Receipt of grant for capital projects | 12 |
| Proceeds from long-term borrowings | 25,980 |
| Proceeds from short-term borrowings | 20,575 |
| Opening cash and Bank balance | 5,003 |
| Closing Cash and Bank balance | 6,988 |

*Required:* Prepare the Cash Flow Statement for the year 2005 in accordance with AS-3, Cash Flow Statements issued by the Institute of Chartered Accountants of India. (Make necessary assumption).

3. The summarized Balance Sheets of XYZ Ltd. as at 31st December, 2004 and 2005 are given below:

*(Rs.)*

| *Particulars* | *2004* | *2005* |
|---|---|---|
| **Liabilities** | | |
| Share capital | 4,50,000 | 4,50,000 |
| General Reserve | 3,00,000 | 3,10,000 |
| Profit and Loss account | 56,000 | 68,000 |
| Creditors | 1,68,000 | 1,34,000 |
| Provision for tax | 75,000 | 10,000 |
| Mortgage loan | --- | 2,70,000 |
| | 10,49,000 | 12,42,000 |
| | | |
| **Assets** | | |
| Fixed assets | 4,00,000 | 3,20,000 |
| Investments | 50,000 | 60,000 |
| Stock | 2,40,000 | 2,10,000 |
| Debtors | 2,10,000 | 4,55,000 |
| Bank | 1,49,000 | 1,97,000 |
| | 10,49,000 | 12,42,000 |

**Additional information:**

(a) Investments costing Rs.8,000 were sold during the year 2005 for Rs.8,500.

(b) Provision for tax made during the year was Rs.9,000.

(c) During the year, part of the fixed assets costing Rs.10,000 was sold for Rs.12,000 and the profit was included in profit and loss account.

(d) Dividend paid during the year amounted to Rs.40,000.

You are required to prepare a Statement of Sources and Uses of cash.

4. The following are the changes in the account balances taken from the Balance Sheets of P Q Ltd. as at the beginning and end of the year:

*Changes in Rupees in debit or credit*

| | |
|---|---:|
| Equity share capital 30,000 shares of Rs.10 each issued and fully paid | 0 |
| Capital reserve | (49,200) |
| 8% debentures | (50,000) |
| Debenture discount | 1,000 |
| Freehold property at cost/revaluation | 43,000 |
| Plant and machinery at cost | 60,000 |
| Depreciation on plant and machinery | (14,400) |
| Debtors | 50,000 |
| Stock and work-in-progress | 38,500 |
| Creditors | (11,800) |
| Net profit for the year | (76,500) |
| Dividend paid in respect of earlier year | 30,000 |
| Provision for doubtful debts | (3,300) |
| Trade investments at cost | 47,000 |
| Bank | (64,300) |
| | 0 |

You are informed that:

(a)  Capital reserve as at the end of the year represented realized profits on sale of one freehold property together with surplus arising on the revaluation of balance of freehold properties.

(b)  During the year plant costing Rs.18,000 against which depreciation provision of Rs.13,500 was lying was sold for Rs.7,000.

(c)  During the middle of the year Rs.50,000 debentures were issued for cash at a discount of Rs.1,000.

(d)  The net profit for the year was after crediting the profit on sale of plant and charging debenture interest.

You are required to prepare a cash flow statement which will explain, why bank borrowing has increased by Rs.64,300 during the year end.  Ignore taxation.

5.  Given below are the condensed Balance Sheets of M.M. Kusha Ltd. for two years and the statement of Profit and Loss for one year:

*(Rs. lakhs)*

| As at 31st March | 2005 | 2004 |
|---|---|---|
| Share Capital | | |
| In Equity shares of Rs.100 each | 150 | 110 |
| 10% Redeemable Preference Shares of Rs.100 each | 10 | 40 |
| Capital Redemption Reserve | 10 | -- |
| General Reserve | 15 | 10 |
| Profit and Loss Account balance | 30 | 20 |
| 8% Debentures with Convertible Option | 20 | 40 |
| Other Term Loans | 15 | 30 |
| | 250 | 250 |
| Fixed assets less Depreciation | 130 | 100 |
| Long-Term Investments | 40 | 50 |
| Working Capital | 80 | 100 |
| | 250 | 250 |

**Statement of Profit and Loss for the year ended 31st March, 2005**

*(Rs. lakhs)*

| | | |
|---|---|---|
| Sales | | 600 |
| *Less:* Cost of sale | | 400 |
| | | 200 |
| Establishment charges | 30 | |
| Selling and distribution expenses | 60 | |
| Interest expenses | 5 | |
| Loss on sale of equipment (Book value Rs.40 lakhs) | 15 | 110 |
| | | 90 |
| Interest income | 4 | |
| Dividend income | 2 | |
| Foreign exchange gain | 10 | |
| Damages received for loss of reputation | 14 | 30 |

|  |  |
|---|---|
|  | 120 |
| Depreciation | 50 |
|  | 70 |
| Taxation | 30 |
|  | 40 |
| Dividends | 15 |
| Net Profit carried to Balance Sheet | 25 |

You are informed by the accountant that ledgers relating to debtors, creditors and stock for both the years were seized by the income-tax authorities and it would take at least two months to obtain copies of the same.  However, he is able to furnish the following data:

*(Rs. lakhs)*

| Particulars | 2005 | 2004 |
|---|---|---|
| Dividend receivable | 2 | 4 |
| Interest receivable | 3 | 2 |
| Cash on hand and with bank | 7 | 10 |
| Investments maturing within two months | 3 | 2 |
|  | 15 | 18 |
| Interest payable | 4 | 5 |
| Taxes payable | 6 | 3 |
|  | 10 | 8 |
| Current ratio | 1.5 | 1.4 |
| Acid test ratio | 1.1 | 0.8 |

It is also gathered that debenture-holders owning 50% of the debentures outstanding as on 31-3-2004 exercised the option for conversion into equity shares during the financial year and the same was put through.

You are required to prepare a direct method cash flow statement for the financial year, 2005 in accordance with Accounting Standard (AS 3) revised.

# CHAPTER 4

## FINANCING DECISIONS

### UNIT – I : COST OF CAPITAL

**Learning Objectives**

After studying this unit you will be able to learn

♦ What is cost of capital?

♦ How to measure the cost of each component of capital?

♦ What is weighted average cost of capital (WACC) and marginal cost of capital? and;

♦ How cost of capital is important in financial management?

### 1.1 INTRODUCTION

The financing decision relates to the composition of relative proportion of various sources of finance. The financial management weighs the merits and demerits of different sources of finance while taking the financing decision. A business can be financed from either the shareholders funds or borrowings from outside agencies. The shareholders funds include equity share capital, preference share capital and the accumulated profits whereas borrowings from outsiders include borrowed funds like debentures and loans from financial institutions. The borrowed funds have to be paid back with interest and some amount of risk is involved if the principal and interest is not paid. Equity has no fixed commitment regarding payment of dividends or principal amount and therefore, no risk is involved. It is the decision of the business to decide the ratio of borrowed funds and owned funds. However, most of the companies use a combination of both the shareholders funds and borrowed funds. Whether the companies choose shareholders funds or borrowed funds, each type of fund carries a cost. Borrowed funds involve interest payment whereas equities, as such do not have any fixed obligation but definitely they involve a cost. The cost of equity is the minimum return the shareholders would have received if they had invested elsewhere. Both types of funds incur cost and this is the cost of capital to the company. This means, cost of capital is the minimum return expected by the company.

The financing decision is an important managerial decision. It influences the shareholder's return and risk. As a result, the market value of the share may be affected by the financing decision. Subsequently, whenever funds are to be raised to finance investments, capital

structure decision is involved. The process of financing or capital structure decision is depicted in the figure below. A demand for raising funds generates a new capital structure since a decision has to be made as to the quantity and forms of financing. This decision will involve an analysis of the existing capital structure and the factors governing the decision. The company's policy to retain or distribute earnings affects the shareholders claims. Retention of earnings strengthens the shareholders position. The debt-equity mix of the company is also affected by the new financing decision of the company. The financing mix (debt-equity mix) has implications for the shareholders' earnings and risk, which in turn, will affect the cost of capital and the market value of the firm.
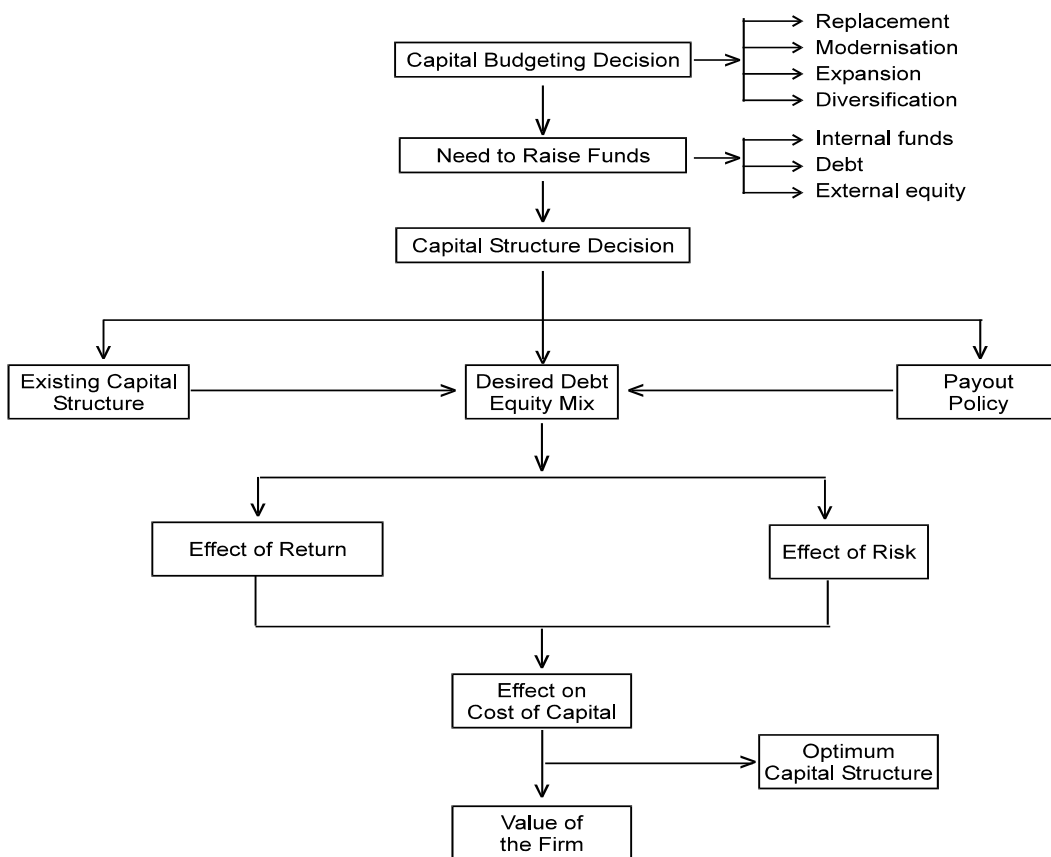


**Financing Decision Process**

## 1.2    DEFINITION OF COST OF CAPITAL

Cost of capital maybe defined as the cut off rate for determining estimated future cash proceeds of a project and eventually deciding whether the project is worth undertaking or not. It is also the minimum rate of return that a firm must earn on its investment which will maintain the market value of share at its current level.

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

It can also be said as the required return necessary to make a capital budgeting project - such as building a new factory - worthwhile. Cost of capital includes the cost of debt and the cost of equity.

The cost of capital determines how a company can raise money maybe through a stock issue, borrowing, or a mix of the two. This is the rate of return that a firm would receive if it invested its money someplace else with similar risk.

Another way to think of the cost of capital is as the opportunity cost of funds, since this represents the opportunity cost for investing in assets with the same risk as the firm.  When investors are shopping for places in which to invest their funds, they have an opportunity cost. The firm, given its riskiness, must strive to earn the investor's opportunity cost.  If the firm does not achieve the return investors expect (i.e. the investor's opportunity cost), investors will not invest in the firm's debt and equity.  As a result, the firm's value (both their debt and equity) will decline.

The total capital for a firm is the value of its equity plus the cost of its debt (the cost of debt should be continually updated as the cost of debt changes as a result of interest rate changes).

The cost of capital is given as:

$$K_c = (1-\delta)K_e + \delta K_d$$

Where,

$K_c$    =    Weighted cost of capital for the firm

$\delta$    =    Debt to capital ratio, $D / (D + E)$

$K_e$    =    Cost of equity

$K_d$ = After tax cost of debt

D = Market value of the firm's debt, including bank loans and leases

E = Market value of all equity (including warrants, options, and the equity portion of convertible securities)

## 1.3 MEASUREMENT OF COST OF CAPITAL

The cost of capital is useful in determining a financial plan. A company has to employ a combination of creditor's and owner's funds. As more than one type of capital is used in a company, the composite cost of capital can be determined after the cost of each type of funds has been obtained. The first step is, therefore, the calculation of specific cost which is the minimum financial obligation required to secure the use of capital for a particular source.

In order to calculate the specific cost of each type of capital, recognition should be given to the explicit and the implicit cost. The explicit cost of any source of capital may be defined as the discount rate that equals that present value of the cash inflows that are incremental to the taking of financing opportunity with the present value of its incremental cash outflows.

Implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm was accepted.

The explicit cost arises when funds are raised and when funds are used, implicit cost arises. For capital budgeting decisions, cost of capital is nothing but the explicit cost of capital.

Now the different components of cost of capital i.e. each source of finance have been discussed in detail.

### 1.3.1 COST OF DEBT

A bond is a long term debt instrument or security. Bonds issued by the government do not have any risk of default. The government honour obligations on its bonds. Bonds of the public sector companies in India are generally secured, but they are not free from the risk of default. The private sector companies also issue bonds, which are also called debentures in India. A company in India can issue secured or unsecured debentures. In the case of a bond or debenture, the rate of interest is generally fixed and known to investors. The principal of a redeemable bond or bond with a maturity is payable after a specified period, called maturity period.

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

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

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

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

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

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

**1.3.1.1    Cost of Debentures***:* The cost of debentures and long term loans is the contractual interest rate adjusted further for the tax liability of the company. When the firm employs debt, it must ensure that common shareholder's earnings are not diluted. To keep the earnings unchanged, the firm must earn a return equal to the interest rate of debt. If the firm earns less than the interest rate, market share price would be adversely affected. In calculating weighted (average) cost of capital, cost of debt (after tax) should be used.

For a company, the higher the interest charges, the lower the amount of tax payable by the company. An illustration will help you in understanding this point.

**Illustration 1:** Consider two companies X and Y:

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

Assume an effective rate of tax of 35 percent

**Solution**

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

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

**1.3.1.1.1 Cost of Irredeemable Debentures:** Cost of debentures not redeemable during the life time of the company.

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

Where, $K_d$ = Cost of debt after tax

I = Annual interest rate

NP = Net proceeds of debentures

t = Tax rate

Suppose a company issues 1,000, 15% debentures of the face value of Rs. 100 each at a discount of Rs. 5. Suppose further, that the under-writing and other costs are Rs. 5,000/- for the total issue. Thus Rs. 90,000 is actually realised, i.e., Rs. 1,00,000 minus Rs. 5,000 as discount and Rs. 5,000 as under-writing expenses. The interest per annum of Rs. 15,000 is therefore the cost of Rs. 90,000, actually received by the company. This is because interest is a charge on profit and every year the company will save Rs. 7,500 as tax, assuming that the income tax rate is 50%. Hence the after tax cost of Rs. 90,000 is Rs. 7,500 which comes to 8.33%.

**1.3.1.1.2 Cost of Redeemable Debentures:** If the debentures are redeemable after the expiry of a fixed period, the cost of debentures would be:

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

Where, I = Annual interest payment

NP = Net proceeds of debentures

RV = Redemption value of debentures

t = Tax rate

N = Life of debentures.

**Illustration 2:** A company issued 10,000, 10% debentures of Rs. 100 each on 1.4.2006 to be matured on 1.4.2011. If the market price of the debentures is Rs. 80. Compute the cost of debt assuming 35% tax rate.

**Solution**

$$K_d = \frac{I\,(1-t) + \dfrac{RV - NP}{N}}{\dfrac{RV + NP}{2}}$$

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

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

$$= 0.1166$$

$$= 0.12$$

**1.3.1.2    Value of Bonds:** It is comparatively easy to find out the present value of a bond since its cash flows and the discount rate can be determined easily.  If there is no risk of default, then there is no difficulty in calculating the cash flows associated with a bond.  The expected cash flows consist of annual interest payments plus repayment of principal.  The appropriate capitalisation or discount rate would depend upon the risk of the bond.  The risk in holding a government bond is less than the risk associated with a debenture issued by a company.  Therefore, a lower discount rate would be applied to the cash flows of the government bond and a higher rate to the cash flows of the company debenture.

**1.3.1.2.1 Amortisation of Bond:** A bond may be amortised every year i.e. principal is repaid every year rather than at maturity.  In such a situation, the principal will go down with annual payments and interest will be computed on the outstanding amount.  The cash flows of the bonds will be uneven.

The formula for determining the value of a bond or debenture that is amortised every year is as follows:

$$V_B = \frac{C_1}{(1+k_d)^1} + \frac{C_2}{(1+k_d)^2} + \ldots\ldots + \frac{C_n}{(1+k_d)^n}$$

$$V_B = \sum_{t=1}^{n} \frac{C_t}{(1+k_d)^t}$$

**Illustration 3:** Reserve Bank of India is proposing to sell a 5-year bond of Rs. 5,000 at 8 per cent rate of interest per annum.  The bond amount will be amortised equally over its life.  What

is the bond's present value for an investor if he expects a minimum rate of return of 6 per cent?

**Solution**

The amount of interest will go on declining as the outstanding amount of bond will be reducing due to amortisation. The amount of interest for five years will be:

First year:        Rs. 5,000 × 0.08 = Rs. 400;

Second year:    (Rs. 5,000 – Rs. 1,000) × 0.08 = Rs. 320;

Third year:       (Rs. 5,000 – Rs. 1,000) × 0.08 = Rs. 240;

Fourth year:     (Rs. 5,000 – Rs. 1,000) × 0.08 = Rs. 160; and

Fifth year:        (Rs. 5,000– Rs.1,000) × 0.08 = Rs. 108.

The outstanding amount of bond will be zero at the end of fifth year.

Since Reserve Bank of India will have to return Rs. 1,000 every year, the outflows every year will consist of interest payment and repayment of principal:

First year:        Rs. 1000 + Rs. 400 = Rs. 1,400;

Second year:    Rs. 1000 + Rs. 320 = Rs. 1,320;

Third year:       Rs. 1000 + Rs. 240 = Rs. 1,240;

Fourth year:     Rs. 1000 + Rs. 160 = Rs. 1,160; and

Fifth year:        Rs. 1000 + Rs. 108 = Rs. 1,108.

Referring to the present value table at the end of the study material, the value of the bond is calculated as follows:

$$V_B = \frac{1,400}{(1.06)^1} + \frac{1,320}{(1.06)^2} + \frac{1,240}{(1.06)^3} + \frac{1,160}{(1.06)^4} + \frac{1,080}{(1.06)^5}$$

$$= 1,400 \times 0.943 + 1,320 \times 0.890 + 1,240 \times 0.840 + 1,160 \times 0.792 + 1,080 \times 0.747$$

$$= 1,320.20 + 1,174.80 + 1,041.60 + 918.72 + 806.76$$

$$= Rs. 5,262.08$$

### 1.3.2    COST OF PREFERENCE SHARES

The cost of preference share capital is the dividend expected by its holders. Though payment of dividend is not mandatory, non-payment may result in exercise of voting rights by them. The payment of preference dividend is not adjusted for taxes as they are paid after taxes and

is not deductible. The cost of preference share capital is calculated by dividing the fixed dividend per share by the price per preference share.

**Illustration 4:** If Reliance Energy is issuing preferred stock at Rs.100 per share, with a stated dividend of Rs.12, and a floatation cost of 3% then, what is the cost of preference share?

**Solution**

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

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

**1.3.2.1 Cost of Irredeemable Preference Shares:** Cost of irredeemable preference shares

$$= \frac{PD}{PO}$$

Where,

PD = Annual preference dividend

PO = Net proceeds in issue of preference shares.

**Illustration 5:** XYZ & Co. issues 2,000 10% preference shares of Rs. 100 each at Rs. 95 each. Calculate the cost of preference shares.

**Solution**

$$K_p = \frac{PD}{PO}$$

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

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

$$= 0.1053$$

**1.3.2.2 Cost of Redeemable Preference Shares:** If the preference shares are redeemable after the expiry of a fixed period the cost of preference shares would be:

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

Where,

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

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

It would, thus, be seen that both in the case of debt as well as preference shares, cost of capital is calculated by reference to the obligations incurred and proceeds received. The net proceeds received must be taken into account in working out the cost of capital.

**Illustration 6:** Referring to the earlier question but taking into consideration that if the company proposes to redeem the preference shares at the end of 10th year from the date of issue. Calculate the cost of preference share?

**Solution**

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

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

### 1.3.3 COST OF EQUITY

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

Cost of equity capital is the rate of return which equates the present value of expected dividends with the market share price.

The calculation of equity capital cost raises a lot of problems.  Its purpose is to enable the corporate manager, to make decisions in the best interest of equity holders.  In theory the management strives to maximize the position of equity holders and the effort involves many decisions.  Different methods are employed to compute the cost of equity capital.

**(a)  Dividend Price Approach:** Here, cost of equity capital is computed by dividing the current dividend by average market price per share.  This dividend price ratio expresses the cost of equity capital in relation to what yield the company should pay to attract investors.  However, this method cannot be used to calculate cost of equity of units suffering losses.

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

Where,

$K_e$ = Cost of equity

$D_1$ = Annual dividend

$P_o$ = Market value of equity (ex dividend)

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

**(b)  Earning/ Price Approach:** The advocates of this approach co-relate the earnings of the company with the market price of its share. Accordingly, the cost of ordinary share capital would be based upon the expected rate of earnings of a company. The argument is that each investor expects a certain amount of earnings, whether distributed or not from the company in whose shares he invests.

Thus, if an investor expects that the company in which he is going to subscribe for shares should have at least a 20% rate of earning, the cost of ordinary share capital can be construed on this basis. Suppose the company is expected to earn 30% the investor will be prepared to pay Rs. 150 $\left(\text{Rs.}\dfrac{30}{20}\times100\right)$ for each share of Rs. 100. This approach is similar to the dividend price approach; only it seeks to nullify the effect of changes in the dividend policy. This approach also does not seem to be a complete answer to the problem of determining the cost of ordinary share since it ignores the factor of capital appreciation or depreciation in the market value of shares.

**(c)  Dividend Price + Growth Approach:** Earnings and dividends do not remain constant and the price of equity shares is also directly influenced by the growth rate in dividends.

Where earnings, dividends and equity share price all grow at the same rate, the cost of equity capital may be computed as follows:

$$K_e = (D/P) + G$$

Where,

D = Current dividend per share

P = Market price per share

G = Annual growth rate of earnings of dividend.

**Illustration 7:** A company has paid dividend of Rs. 1 per share (of face value of Rs. 10 each) last year and it is expected to grow @ 10% next year. Calculate the cost of equity if the market price of share is Rs. 55.

**Solution**

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

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

$$= .1202 \text{ (approx.)}$$

**(d) Earnings Price + Growth Approach:** This approach is an improvement over the earlier methods. But even this method assumes that dividend will increase at the same rate as earnings, and the equity share price is the regulator of this growth as deemed by the investor. However, in actual practice, rate of dividend is recommended by the Board of Directors and shareholders cannot change it. Thus, rate of growth of dividend subsequently depends on director's attitude. The dividend method should, therefore, be modified by substituting earnings for dividends. So, cost of equity will be given by:

$$K_e = (E/P) + G$$

Where,

E = Current earnings per share

P = Market share price

G = Annual growth rate of earnings.

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

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

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

$$Y_t = \frac{D_t + P_{t-1}}{P_{t-1}}$$

Where,

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

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

**(f) Capital Asset Pricing Model Approach (CAPM):** This model describes the linear relationship between risk and return for securities. The risk a security is exposed to are diversifiable and non-diversifiable. The diversifiable risk can be eliminated through a portfolio consisting of large number of well diversified securities. The non-diversifiable risk is assessed in terms of beta coefficient (b or β) through fitting regression equation between return of a security and the return on a market portfolio.
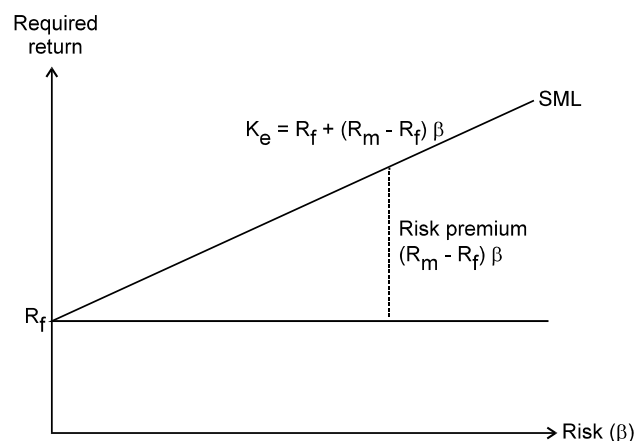


**Cost of Equity under CAPM**

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

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

Where,

$K_e$ = Cost of equity capital

$R_f$ = Rate of return on security

b = Beta coefficient

$R_m$ = Rate of return on market portfolio
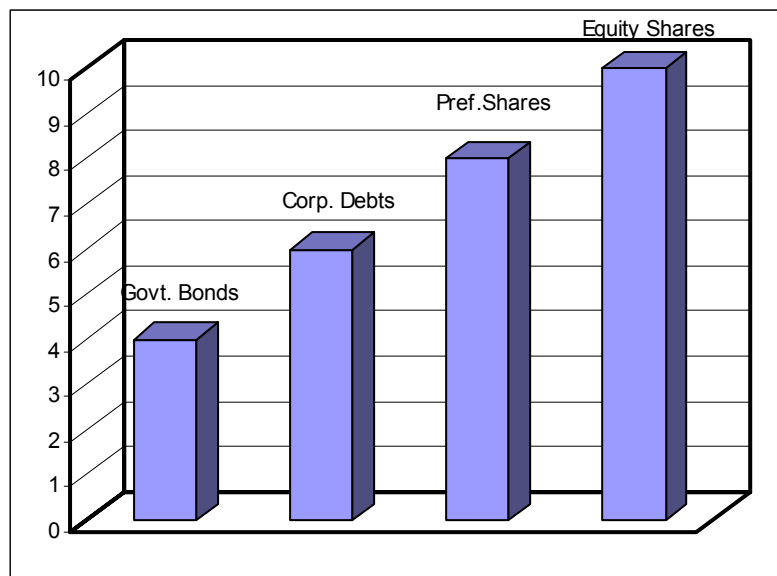


**Risk Return relationship of various securities**

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

The idea behind CAPM is that investors need to be compensated in two ways- time value of money and risk. The time value of money is represented by the risk-free rate in the formula and compensates the investors for placing money in any investment over a period of time. The other half of the formula represents risk and calculates the amount of compensation the investor needs for taking on additional risk. This is calculated by taking a risk measure (beta) which compares the returns of the asset to the market over a period of time and compares it to the market premium.

The CAPM says that the expected return of a security or a portfolio equals the rate on a risk-

free security plus a risk premium. If this expected return does not meet or beat the required return, then the investment should not be undertaken.

The shortcomings of this approach are:

(a)  Estimation of betas with historical data is unrealistic; and

(b)  Market imperfections may lead investors to unsystematic risk.

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

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

**Illustration 8:** Calculate the cost of equity capital of H Ltd., whose risk free rate of return equals 10%. The firm's beta equals 1.75 and the return on the market portfolio equals to 15%.

**Solution**

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

$$K_e = .10 + 1.75 (.15 - .10)$$

$$= .10 + 1.75 (.05)$$

$$= .1875$$

### 1.3.4    COST OF RETAINED EARNINGS

Like another source of fund, retained earnings involve cost.  It is the opportunity cost of dividends foregone by shareholders.

The given figure depicts how a company can either keep or reinvest cash or return it to the shareholders as dividends. (Arrows represent possible cash flows or transfers.) If the cash is reinvested, the opportunity cost is the expected rate of return that shareholders could have obtained by investing in financial assets.
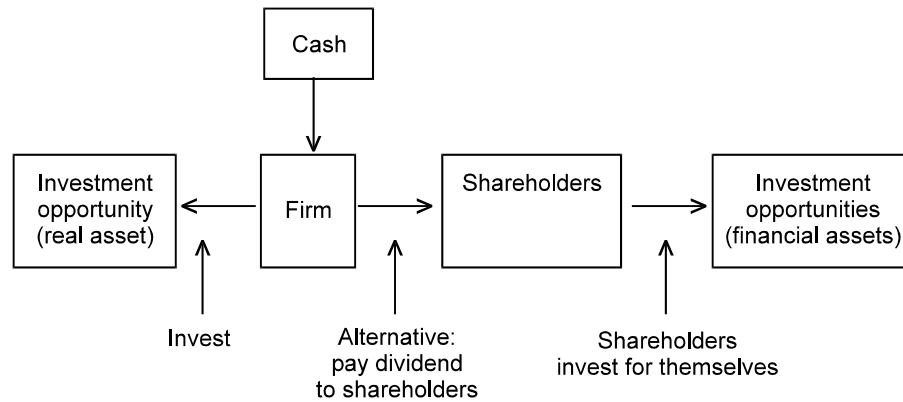
**Cost of Retained Earnings**

There are two approaches to measure this opportunity cost. One approach is by using discounted cash flow (DCF) method and the second approach is by using capital asset pricing model.

(a)  *By DCF*   :     $K_s = \dfrac{D_1}{P_0} + G$

Where,

D₁ = Dividend

$\quad\quad$ $D_1$ $\quad$ = $\quad$ Dividend

$\quad\quad$ $P_0$ $\quad$ = $\quad$ Current market price

$\quad\quad$ G $\quad$ = $\quad$ Growth rate.

(b)  *By CAPM* :     $K_s = R_f + b\,(R_m - R_f)$

Where,

$\quad\quad$ $K_s$ $\quad$ = $\quad$ Cost of equity capital

$\quad\quad$ $R_f$ $\quad$ = $\quad$ Rate of return on security

$\quad\quad$ b $\quad$ = $\quad$ Beta coefficient

$\quad\quad$ $R_m$ $\quad$ = $\quad$ Rate of return on market portfolio

**Illustration 9**: ABC Company provides the following details:

$D_0$ $\quad$ = $\quad$ Rs. 4.19 $\quad\quad$ $P_0$ $\quad$ Rs. 50 $\quad\quad\quad$ G = 5%

Calculate the cost of retained earnings based on DCF method.

**Solution**

$$K_s = \frac{D_1}{P_0} + G$$

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

$$= \frac{Rs.\,4.19\,(1.05)}{Rs.50} + 0.05$$

$$= 0.088 + 0.05$$

$$= 13.8\%$$

**Illustration 10:** ABC Company provides the following details:

$R_f = 7\%$       $b = 1.20$       $R_M - R_f = 6\%$

Calculate the cost of retained earnings based on CAPM method.

**Solution**

$$K_s = R_f + b\,(R_M - R_f)$$

$$= 7\% + 1.20\,(6\%)$$

$$= 7\% + 7.20$$

$$K_s = 14.2\%$$

**1.3.5 COST OF DEPRECIATION**

Depreciation provisions may be considered in a similar manner to retained earnings - they have an opportunity cost and represent an increased stake in the firm by its shareholders. However, a distribution of depreciation provisions would produce a capital reduction, probably requiring outstanding debts to be repaid due to the depletion of the capital base, the security against which the debt was obtained. This indicates a proportional combination between the cost of debt repaid and the cost of retained earnings to calculate the cost of capital in the form of depreciation provisions.

**1.4 WEIGHTED AVERAGE COST OF CAPITAL (WACC)**

As you know the capital funding of a company is made up of two components: debt and equity. Lenders and equity holders each expect a certain return on the funds or capital they have provided. The cost of capital is the expected return to equity owners (or shareholders) and to debt holders, so weighted average cost of capital tells the return that both stakeholders -

equity owners and lenders - can expect. WACC, in other words, represents the investors' opportunity cost of taking on the risk of putting money into a company. Since every company has a capital structure i.e. what percentage of debt comes from retained earnings, equity shares, preference shares, and bonds, so by taking a weighted average, it can be seen how much interest the company has to pay for every rupee it borrows. This is the weighted average cost of capital.

The weighted average cost of capital for a firm is of use in two major areas: in consideration of the firm's position and in evaluation of proposed changes necessitating a change in the firm's capital. Thus, a weighted average technique may be used in a quasi-marginal way to evaluate a proposed investment project, such as the construction of a new building.

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

$$K_0 = \% \, D(mkt) \, (K_i) \, (1 - t) + (\% \, Psmkt) \, K_p + (C_s \, mkt) \, Ke$$

Where,

| | | |
|---|---|---|
| $K_0$ | = | Overall cost of capital |
| $K_i$ | = | Before tax cost of debt |
| $1 - t$ | = | 1 – Corporate tax rate |
| $K_p$ | = | Cost of preference capital |
| Ke | = | Cost of equity |
| % Dmkt | = | % of debt in capital structure |
| %Psmkt | = | % of preference share in capital structure |
| % Cs | = | % of equity share in capital structure. |

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

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

Investors use WACC as a tool to decide whether or not to invest. The WACC represents the minimum rate of return at which a company produces value for its investors. Let's say a

company produces a return of 20% and has a WACC of 11%. By contrast, if the company's return is less than WACC, the company is shedding value, which indicates that investors should put their money elsewhere.

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

### 1.4.1  CALCULATION OF  WACC

| Capital Component | Cost | Times | % of capital structure | Total |
|---|---|---|---|---|
| Retained Earnings | 10% | X | 25% | 2.50% |
| Common Stocks | 11% | X | 10% | 1.10% |
| Preferred Stocks | 9% | X | 15% | 1.35% |
| Bonds | 6% | X | 50% | 3.00% |
| Total | | | | 7.95% |

So the WACC of this company is 7.95%.

But there are problems in determination of weighted average cost of capital.  These mainly relate to computation of equity capital and the assignment of weights to the cost of specific source of financing.  Assignment of weights can be possible either on the basis of marginal weighting or historical weighting.  The most serious limitation of marginal weighting is that it does not consider the long run implications of firm's current financing.  The validity of the assumption of historical weighting is that choosing between the book value weights and market value weights.  While the book value weights may be operationally convenient, the market value basis is theoretically more consistent, sound and a better indicator of firm's capital structure. The desirable practice is to employ market weights to compute the firm's cost of capital. This rationale rests on the fact that the cost of capital measures the cost of issuing securities – stocks as well as bonds – to finance projects, and that these securities are issued at market value, not at book value.

**Illustration 11:** Calculate the WACC using the following data by using:

(a)   Book value weights

(b)   Market value weights

The capital structure of the company is as under:

|  | Rs. |
|---|---|
| Debentures (Rs. 100 per debenture) | 5,00,000 |
| Preference shares (Rs. 100 per share) | 5,00,000 |
| Equity shares (Rs. 10 per share) | 10,00,000 |
|  | 20,00,000 |

The market prices of these securities are:

Debenture      Rs. 105 per debenture

Preference    Rs. 110 per preference share

Equity          Rs. 24 each.

*Additional information:*

(1)  Rs. 100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10 year maturity.

(2)  Rs. 100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10 year maturity.

(3)  Equity shares has Rs. 4 floatation cost and market price Rs. 24 per share.

The next year expected dividend is Rs. 10 with annual growth of 5%.  The firm has practice of paying all earnings in the form of dividend.

Corporate tax rate is 50%.

**Solution**

Cost of equity

$$\text{Cost of equity} = K_e = \frac{10}{20} + .05$$

$$= .05 + .05$$

$$= .10$$

$$\text{Cost of debt} = K_d = \frac{10(1-.5) + \frac{(100 - 96)}{10}}{\frac{(100 + 96)}{2}}$$

$$=\left(\frac{5+.4}{196}\right)\times 2 = .055 \text{ (approx.)}$$

$$\text{Cost of preference shares} = K_p = \left(\frac{5+\dfrac{2}{10}}{\dfrac{198}{2}}\right)$$

$$=\left(\frac{5.2}{q}\right) = .053 \text{ (approx.)}$$

**Calculation of WACC using book value weights**

| Source of capital | Book Value | Specific cost (K%) | Total cost |
|---|---|---|---|
| 10% Debentures | 5,00,000 | .055 | 27,500 |
| 5% Preference shares | 5,00,000 | .053 | 26,500 |
| Equity shares | 10,00,000 | .10 | 1,00,000 |
| | 20,00,000 | | 1,54,000 |

$$K_0 = \frac{\text{Rs.}1,54,000}{\text{Rs.}20,00,000} = 0.077 \text{ (approx.)}$$

**Calculation of WACC using market value weights**

| Source of capital | Book Value | Specific cost (K%) | Total cost |
|---|---|---|---|
| 10% Debentures | 5,25,000 | .055 | 28,875 |
| 5% Preference shares | 5,50,000 | .053 | 29,150 |
| Equity shares | 24,00,000 | .10 | 2,40,000 |
| | 34,75,000 | | 2,98,025 |

$$K_0 = \frac{\text{Rs.}2,98,025}{\text{Rs.}34,75,000} = 0.08576 \text{ (approx.)}$$

## 1.5 MARGINAL COST OF CAPITAL

The marginal cost of capital may be defined as the cost of raising an additional rupee of capital. Since the capital is raised in substantial amount in practice marginal cost is referred to

as the cost incurred in raising new funds. Marginal cost of capital is derived, when the average cost of capital is calculated using the marginal weights. The marginal weights represent the proportion of funds the firm intends to employ. Thus, the problem of choosing between the book value weights and the market value weights does not arise in the case of marginal cost of capital computation. To calculate the marginal cost of capital, the intended financing proportion should be applied as weights to marginal component costs. The marginal cost of capital should, therefore, be calculated in the composite sense. When a firm raises funds in proportional manner and the component's cost remains unchanged, there will be no difference between average cost of capital (of the total funds) and the marginal cost of capital. The component costs may remain constant upto certain level of funds raised and then start increasing with amount of funds raised. For example, the cost of debt may remain 7% (after tax) till Rs. 10 lakhs of debt is raised, between Rs. 10 lakhs and Rs. 15 lakhs, the cost may be 8% and so on. Similarly, if the firm has to use the external equity when the retained profits are not sufficient, the cost of equity will be higher because of the floatation costs. When the components cost start rising, the average cost of capital will rise and the marginal cost of capital will however, rise at a faster rate.

**Illustration 12:** ABC Ltd. has the following capital structure which is considered to be optimum as on 31st March, 2006.

|  | Rs. |
|---|---|
| 14% debentures | 30,000 |
| 11% Preference shares | 10,000 |
| Equity (10,000 shares) | 1,60,000 |
|  | 2,00,000 |

The company share has a market price of Rs. 23.60. Next year dividend per share is 50% of year 2006 EPS. The following is the trend of EPS for the preceding 10 years which is expected to continue in future.

| Year | EPS (Rs.) | Year | EPS Rs.) |
|---|---|---|---|
| 1997 | 1.00 | 2002 | 1.61 |
| 1998 | 1.10 | 2003 | 1.77 |
| 1999 | 1.21 | 2004 | 1.95 |
| 2000 | 1.33 | 2005 | 2.15 |
| 2001 | 1.46 | 2006 | 2.36 |

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is Rs. 96.

Preference share Rs. 9.20 (with annual dividend of Rs. 1.1 per share) were also issued. The company is in 50% tax bracket.

(A) Calculate after tax:

   (i)   Cost of new debt

   (ii)  Cost of new preference shares

   (iii) New equity share (consuming new equity from retained earnings)

(B) Calculate marginal cost of capital when no new shares are issued.

(C) How much needs to be spent for capital investment before issuing new shares? 50% of the 2006 earnings are available as retained earnings for the purpose of capital investment.

(D) What will the marginal cost of capital when the funds exceeds the amount calculated in (C), assuming new equity is issued at Rs. 20 per share?

**Solution**

**(A)** (i)   **Cost of new debt**

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

$$= \frac{16(1-.5)}{96} = .0833$$

   (ii)  **Cost of new preference shares**

$$K_p = \frac{P}{O}$$

$$= \frac{1.1}{9.2} = .12$$

   (iii) **Cost of new equity shares**

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

$$= \frac{1.18}{23.60} + 0.10 = 10.10 \quad = 0.15$$

**Calculation of $D_1$**

$D_1$ = 50% of 2006 EPS = 50% of 2.36 = Rs. 1.18

**(B)**

| Type of Capital | Proportion | Specific Cost | Product |
|---|---|---|---|
| (1) | (2) | (3) | (2) × (3) = (4) |
| Debt | 0.15 | 0.0833 | 0.0125 |
| Preference | 0.05 | 0.12 | 0.0060 |
| Equity | 0.80 | 0.15 | 0.1200 |
| | Marginal cost of capital | | 0.1385 |

**(C)** The company can spend the following amount:

Retained earnings = (.50) (2.36 × 10,000)

= Rs. 11,800

The ordinary equity is 80% of total capital

$$\text{Capital investment} = \frac{\text{Rs.}11,800}{.80} = \text{Rs.}14,750$$

**(D)** If the company require fund in excess of Rs. 14,750 it will have to issue new shares.

The cost of new issue will be

$$K_e = \frac{\text{Rs.}1.18}{20} + .10 = .159$$

The marginal cost of capital will be

| Type of Capital | Proportion | Specific Cost | Product |
|---|---|---|---|
| (1) | (2) | (3) | (2) × (3) = (4) |
| Debt | 0.15 | 0.0833 | 0.0125 |
| Preference | 0.05 | 0.1200 | 0.0060 |
| Equity (New) | 0.80 | 0.1590 | 0.1272 |
| | | | 0.1457 |

## 1.6 CONCLUSION

The determination of cost of capital is thus beset with a number of problems in dynamic world

of today. Conditions which are present now may not remain static in future. Therefore, howsoever cost of capital is determined now, it is dependent on certain conditions or situations which are subject to change.

Firstly, the firms' internal structure and character change. For instance, as the firm grows and matures, its business risk may decline resulting in new structure and cost of capital.

Secondly, capital market conditions may change, making either debt or equity more favourable than the other.

Thirdly, supply and demand for funds may vary from time to time leading to change in cost of different components of capital.

Fourthly, the company may experience subtle change in capital structure because of retained earnings unless its growth rate is sufficient to call for employment of debt on a continuous basis.

Because of these reasons the firm should periodically re-examine its cost of capital before determining annual capital budget.

---

**UNIT – II : CAPITAL STRUCTURE DECISIONS**

**Learning Objectives**

After studying this unit you will be able to learn

♦   What is capital structure?

♦   What are optimal capital structure, and the theories relating to the value of firm; and

♦   Understand EBIT-EPS break even or indifference analysis and construct and interpret an EBIT-EPS chart.

### 2.1    MEANING OF CAPITAL STRUCTURE

Capital structure refers to the mix of a firm's capitalisation and includes long term sources of funds such as debentures, preference share capital, equity share capital and retained earnings.   According to Gerstenberg   capital structure is "the make-up of a firm's capitalisation".   The decisions regarding the forms of financing, their requirements and their relative proportions in total capitalisation are known as capital structure decisions.  In arriving at and accomplishing this goal, the finance manager must take extreme care and prudence keeping in mind factors under which the company has to operate as also certain guiding principles of financing.  Accordingly, he should choose a pattern of capital which minimises cost of capital and maximises the owners' return.

### 2.2    CHOICE OF CAPITAL STRUCTURE

A firm has the choice to raise funds for financing its investment proposals from different sources in different proportions.  It can:

(a)   Exclusively use debt, or

(b)   Exclusively use equity capital, or

(c)   Exclusively use preference capital, or

(d)   Use a combination of debt and equity in different proportions, or

(e)   Use a combination of debt, equity and preference capital in different proportions, or

(f)   Use a combination of debt and preference capital in different proportions.

The choice of the combination of these sources is called capital structure mix.  But the question is which of the pattern should the firm choose?

**Constraints to Capital Structure**

Well, while choosing a suitable financing pattern, certain fundamental principles should be

---

kept in mind, which are discussed below:

**(a)** *Cost Principle:* According to this principle an ideal pattern or capital structure is one that minimises cost of capital structure and maximises earnings per share (EPS). Debt capital is cheaper than equity capital from the point of its cost and interest being deductible for income tax purpose, where no such deduction is allowed for dividends. Consequently effective rate of interest which the company has to bear would be less than the nominal rate at which debentures are issued. This requires the mix of debt finance with equity finance so as to reduce the aggregate cost of capital.

**(b)** *Risk Principle:* According to this principle, reliance is placed more on common equity for financing capital requirements than excessive use of debt. Use of more and more debt and preference capital affects share values and in unfavourable situation share prices may consequently drop. There are two risks associated with this principle:

(i) *Business risk:* It is an unavoidable risk because of the environment in which the firm has to operate and business risk is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses. Revenues and expenses are affected by demand of firm products, variations in prices and proportion of fixed cost in total cost.

(ii) *Financial risk:* It is a risk associated with the availability of earnings per share caused by use of financial leverage. It is also unavoidable if firm does not use debt in its capital structure.

Generally, a firm should neither be exposed to high degree of business risk and low degree of financial risk or vice-versa, so that shareholders do not bear a higher risk.

**(c)** *Control Principle:* While designing a capital structure, the finance manager may also keep in mind that existing management control and ownership remains undisturbed. Issue of new equity will dilute existing control pattern and also it involves higher cost. Issue of more debt causes no dilution in control, but causes a higher degree of financial risk. This concern over dilution of control is mostly felt in closely-held companies.

**(d)** *Flexibility Principle:* By flexibility it means that the management chooses such a combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too. In attaining flexibility cost considerations should be kept in mind. If the company is loaded with a debt of 18% and funds are available at 15%, it can return old debt with new debt, at a lesser interest rate.

Besides these principles, other factors such as nature of industry, timing of issue and competition in the industry are also being considered. Timing of raising capital should take into account the state of economy and capital market. Industries facing severe competition also resort to more equity than debt.

Thus a finance manager in designing a suitable pattern of capital structure must bring about satisfactory compromise between these important principles. The compromise can be reached by assigning weights to these principles in terms of various characteristics of the company.

## 2.3 SIGNIFICANCE OF CAPITAL STRUCTURE

The capital structure decisions are so significant in financial management, as they influence debt – equity mix which ultimately affects shareholders return and risk. Since cost of debt is cheaper, firm prefers to borrow rather than to raise from equity. The value of equity depends on earnings per share. So long as return on investment is more than the cost of borrowing, extra borrowing increases the earnings per share. However, beyond a limit, it increases the risk and share price may fall because shareholders may assume that their investment is associated with more risk. But the effect of fall in share price due to heavy load of debt is difficult to measure. Market factors are so highly psychological and complex as they hardly follow these theoretical considerations. However, an appropriate debt -equity mix can be determined empirically within the company taking into consideration the following factors:

### 2.3.1 Leverages

There are two leverages associated with the study of capital structure, namely operating leverage and financial leverage. Operating leverage exists when a firm has a fixed cost that must be defrayed regardless of volume of business. The contrast to the operating leverage, financial leverage refers to mix of debt and equity in the capitalisation of a firm. In order to decide proper financial policy, operating leverage may also be taken into consideration, as the financial leverage is a superstructure built on the operating leverage. The operating profits otherwise known as earnings before interest and tax (EBIT), serves as a fulcrum in defining these two leverages. Financial leverage represents the relationship between firms earnings before interest and tax and earnings available for equity holders. When there is an increase in EBIT, there is a corresponding increase in market price of equity share. However, increased use of debt in the capital structure which proportionately increases EBIT has certain limitations. If debt is employed in greater proportions, marginal cost of debt will also increase and share price may fall down as investors feel it is risky. On the other, in spite of increased risk, market share price may increase because investors speculate future profits. Thus before using financial leverage, its impact on EPS must be weighed. The degree of financial leverage can be found out as:

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

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

### 2.3.2 Trading on Equity

The term 'trading on equity' is derived from the fact that debts are contracted and loans are raised mainly on the basis of equity capital. Those who provide debt have a limited share in the firm's earnings and hence want to be protected in terms of earnings and values represented by equity capital. Since fixed charges do not vary with the firms earnings before interest and tax, a magnified effect is produced on earnings per share. Whether the leverage is favourable in the sense increase in earnings per share more proportionately to the increased earnings before interest and tax depends on the profitability of investment proposals. If the rate of return on investment exceeds their explicit cost financial leverage is said to be positive.

However, the determination of optimal level of debt is a formidable task and is a major policy decision. Determination of optimal level of debt involves equalising between return and risk. Though, there are number of approaches to determine the level of debt, they cannot be considered as satisfactory and as such can serve only as a guideline. Whatever approaches may be followed for determining the optimal level of debt, the objective of maximising share price should be borne in mind.

EBIT-EPS analysis is a widely used tool to determine level of debt in a firm. Through this analysis, a comparison can be drawn for various methods of financing by obtaining indifference point. It is a point to the EBIT level at which EPS remain unchanged irrespective of debt level equity mix. For example indifference point for the capital mix (equity share capital and debt) can be determined as follows:

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

Where,

EBIT = Indifference point

$E_1$ = Number of equity shares in Alternative 1

$E_2$ = Number of equity shares in Alternative 2

$I_1$ = Interest charges in Alternative 1

$I_2$ = Interest charges in Alternative 2

T = Tax-rate

Alternative 1= All equity finance

Alternative 2= Debt-equity finance.

The chief deficiency of this method is that it does not take into account the implicit cost associated with debt.

The concepts of leverages and EBIT-EPS analysis would be dealt in detail separately for better understanding.

### 2.3.3 Coverage Ratio

The ability of the firm to use debt in the capital structure can also be judged in terms of coverage ratio namely EBIT/Interest. Higher the ratio, greater is the certainty of meeting interest payments.

### 2.3.4 Cash flow analysis

It is a good supporting tool for EBIT-EPS analysis in framing a suitable capital structure. To determine the debt capacity, cash flow under adverse conditions should be examined. A high debt equity ratio is not risky if the company has the ability to generate cash flows. It would, therefore be possible to increase the debt until cash flows equal the risk set out by debt.

The main drawback of this approach is that it fails to take into account uncertainty due to technological developments or changes in political climate.

These approaches as discussed above do not provide solution to the problem of determining an appropriate level of debt. However, with the information available a range can be determined for an optimum level of debt in the capital structure.

### 2.4 OPTIMAL CAPITAL STRUCTURE

The theory of optimal capital structure deals with the issue of the right mix of debt and equity in the long term capital structure of a firm. This theory states that if a company takes on debt, the value of the firm increases up to a point. Beyond that point if debt continues to increase then the value of the firm will start to decrease. Similarly if the company is unable to repay the debt within the specified period then it will affect the goodwill of the company in the market and may create problems for collecting further debt. Therefore, the company should select its appropriate capital structure with due consideration to the factors mentioned above.

### 2.5 EBIT-EPS ANALYSIS

The basic objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the firm's expected range of earnings before interest and taxes (EBIT). EPS measures a firm's performance for the investors. The level of EBIT varies from year to year and represents the success of a firm's operations. EBIT-EPS analysis is a vital tool for designing the optimal capital structure of a firm. The objective of this analysis is to find the EBIT level that will equate EPS regardless of

the financing plan chosen.

### 2.5.1 Financial Break-even and Indifference Analysis

Financial break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charges i.e. interest and preference dividends. It denotes the level of EBIT for which the firm's EPS equals zero. If the EBIT is less than the financial breakeven point, then the EPS will be negative but if the expected level of EBIT is more than the breakeven point, then more fixed costs financing instruments can be taken in the capital structure, otherwise, equity would be preferred. EBIT-EPS breakeven analysis is used for determining the appropriate amount of debt a firm might carry.

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

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

Where,

EBIT = Indifference point

$E_1$ = Number of equity shares in Alternative 1

$E_2$ = Number of equity shares in Alternative 2

$I_1$ = Interest charges in Alternative 1

$I_2$ = Interest charges in Alternative 2

T = Tax-rate

Alternative 1= All equity finance

Alternative 2= Debt-equity finance.

The indifference point can also be depicted graphically as:
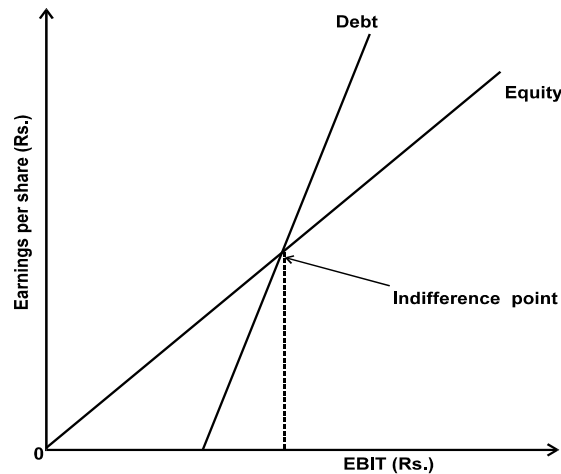


**Debt-Equity Indifference Point**

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

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

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

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

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

**Solution**

**Calculation of Earnings per share under the three options:**

| Particulars | Option I (Issue of equity only) | Option II (Issue of debentures only) | Option III (Issue of equity and debentures equally) |
|---|---|---|---|
| | *(Rs. in lakhs)* | *(Rs in lakhs)* | *(Rs in lakhs)* |
| Number of Equity Shares (lakhs): | | | |
| Existing | 10 | 10 | 10.00 |
| Now issued | 2 | - | 0.50 |
| Total | 12 | 10 | 10.50 |
| 16% debentures | Nil | Rs. 50 lakhs | Rs. 25 lakhs |
| | | | |
| Estimated total income: | | | |
| From current operations | 60 | 60 | 60 |
| From new projects | 40 | 40 | 40 |
| | 100 | 100 | 100 |
| *Less:* Interest on 16% debentures | - | 8 | 4 |
| Profit before tax | 100 | 92 | 96 |
| Tax at 50% | 50 | 46 | 48 |
| Profit after tax | 50 | 46 | 48 |
| EPS | Rs. 4.17 | Rs. 4.60 | Rs. 4.57 |

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

## 2.6 COST OF CAPITAL, CAPITAL STRUCTURE AND MARKET PRICE OF SHARE

The financial leverage has a magnifying effect on earnings per share, such that for a given level of financial percentage increases with EBIT beyond the point of financial indifference, there will be more than proportionate change in the same direction in the earnings per share. The financing decision of the firm is one of the basic conditions oriented to the achievement of

maximisation for the shareholders wealth. The capital structure should be examined from their view point of its impact on the value of the firm. If the capital structure affects the total value of the firm, a firm should select such a financing mix (a combination of debt and equity) which will maximise the market value of the firm. Such an optimum leverage not only maximises the value of the company and wealth of its owners, but also minimises the cost of capital. As a result, the company is able to increase its economic rate of investment and growth.

In theory, capital structure can affect the value of the firm by affecting either its expected earnings or cost of capital or both. While financing mix cannot affect the total earnings, it can affect the share of earnings belonging to the share holders. But financial leverage can largely influence the value of the firm through the cost of capital.

## 2.7 CAPITAL STRUCTURE THEORIES

The following approaches explain the relationship between cost of capital, capital structure and value of the firm:

(a) Net income approach

(b) Net operating income approach

(c) Modigliani-Miller approach

(d) Traditional approach.

However, the following assumptions are made to understand this relationship.

♦ There are only two kinds of funds used by a firm i.e. debt and equity.

♦ Taxes are not considered.

♦ The payout ratio is 100%

♦ The firm's total financing remains constant

♦ Business risk is constant over time

♦ The firm has perpetual life.

**(a) Net Income Approach (NI):** According to this approach, capital structure decision is relevant to the value of the firm. An increase in financial leverage will lead to decline in the weighted average cost of capital, while the value of the firm as well as market price of ordinary share will increase. Conversely a decrease in the leverage will cause an increase in the overall cost of capital and a consequent decline in the value as well as market price of equity shares.

**Ke, Kd and Ko**
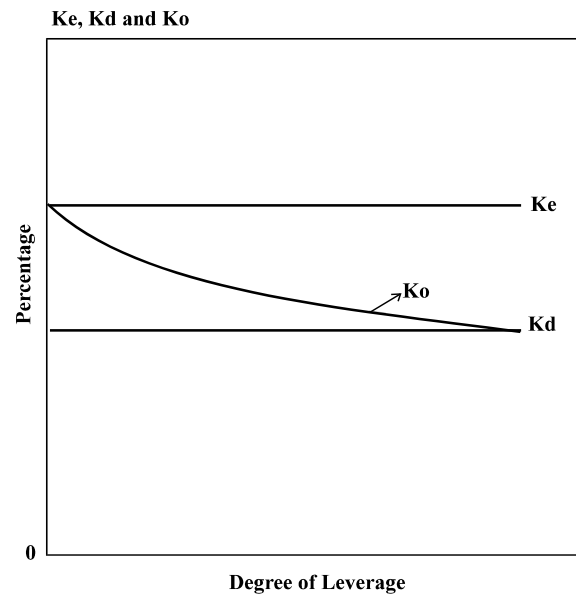


From the above diagram, $k_e$ and $k_d$ are assumed not to change with leverage. As debt increases, it causes weighted average cost of capital to decrease.

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

$$V = S + D$$

Where,   V = Value of the firm

S = Market value of equity

D = Market value of debt

Market value of equity (S) = $\dfrac{NI}{K_e}$

Where,

NI   = Earnings available for equity shareholders

$K_e$   = Equity Capitalisation rate

Under, NI approach, the value of the firm will be maximum at a point where weighted average cost of capital is minimum. Thus, the theory suggests total or maximum possible debt financing for minimising the cost of capital. The overall cost of capital under this approach is :

$$\text{Overall cos t of capital} = \frac{\text{EBIT}}{\text{Value of the firm}}$$

Thus according to this approach, the firm can increase its total value by decreasing its overall cost of capital through increasing the degree of leverage. The significant conclusion of this approach is that it pleads for the firm to employ as much debt as possible to maximise its value.

**Illustration 2**: Rupa Company's EBIT is Rs. 5,00,000. The company has 10%, 20 lakh debentures. The equity capitalization rate i.e. $K_e$ is 16%.

You are required to calculate:

(i) Market value of equity and value of firm

(ii) Overall cost of capital.

**Solution**

(i) *Statement showing value of firm*

|  | Rs. |
|---|---|
| Net operating income/EBIT | 5,00,000 |
| *Less:* Interest on debentures (10% of Rs. 20,00,000) | 2,00,000 |
| Earnings available for equity holders i.e. NI | 3,00,000 |
| Equity capitalisation rate ($K_e$) | 16% |
| Market value of equity $(S) = \dfrac{NI}{K_e} = \left( \dfrac{3,00,000}{16.00} \times 100 \right)$ | 18,75,000 |
| Market value of debt (D) | 20,00,000 |
| Total value of firm V = S + D | 38,75,000 |

$$(ii) \quad \text{Overall cost of capital} = \frac{\text{EBIT}}{\text{Value of firm}} = \frac{5,00,000}{38,75,000} = 12.90\%$$

**(b) Net Operating Income Approach (NOI):** NOI means earnings before interest and tax. According to this approach, capital structure decisions of the firm are irrelevant. Any change in the leverage will not lead to any change in the total value of the firm and the market price of shares, as the overall cost of capital is independent of the degree of leverage. As a result, the division between debt and equity is irrelevant. An increase in the use of debt which is apparently cheaper is offset by an increase in the equity capitalisation rate. This happens because equity investors seek higher compensation as they are opposed to greater risk due to

the existence of fixed return securities in the capital structure.
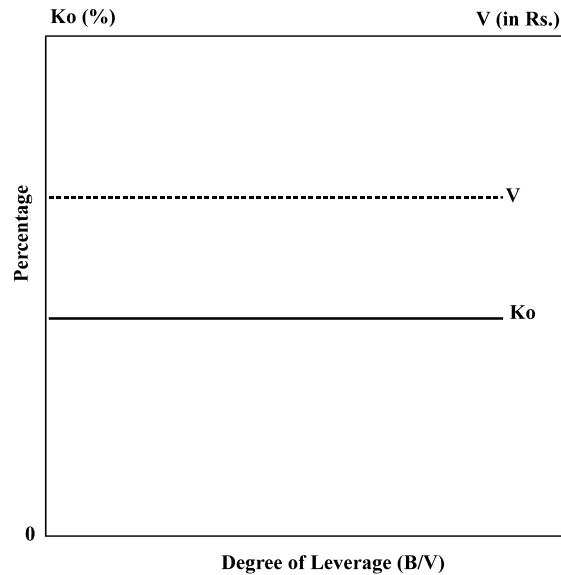


The above diagram shows that $K_o$ (Overall capitalisation rate) and (debt – capitalisation rate) are constant and $K_e$ (Cost of equity) increases with leverage.

**Illustration 3***:* Amita Ltd's. operating income is Rs. 5,00,000. The firms cost of debt is 10% and currently firm employs Rs. 15,00,000 of debt. The overall cost of capital of the firm is 15%.

You are required to determine:

(i)   Total value of the firm.

(ii)  Cost of equity.

**Solution**

(i)                                **Statement showing value of the firm**

|  | *Rs.* |
|---|---|
| Net operating income/EBIT | 5,00,000 |
| *Less:* Interest on debentures (10% of Rs. 15,00,000) | 1,50,000 |
| Earnings available for equityholders | 3,50,000 |
| Total cost of capital ($K_0$) (given) | 15% |

Value of the firm $V = \dfrac{EBIT}{k_0} = \dfrac{5,00,000}{0.15}$          33,33,333

(ii) *Calculation of cost of equity*

$$Ke = \frac{\text{Earnings available for equity holders}}{\text{Value of equity(s)}}$$

                                                      *Rs.*

Market value of debt (D)          15,00,000

Market value of equity (s) S = V − D = 33,33,333 − 15,00,000      18,33,333

$$\text{Cost of equity } (K_e) = \frac{\text{Earnings availabe for equityholders}}{\text{Market value of equity}}$$

Or,               $= \dfrac{\text{EBIT - Interest paid on debt}}{\text{Market value of equity}}$

$$= \frac{5,00,000 - 1,50,000}{18,33,333}$$

$$= \frac{Rs.\,3,50,000}{18,33,333} = 19.09\%$$

$$K_o = K_e \left( \frac{S}{V} \right) + K_d \left( \frac{D}{V} \right)$$

$$K_e = K_o \left( \frac{V}{S} \right) - K_d \left( \frac{D}{S} \right)$$

$$= 0.15 \left( \frac{33,33,333}{18,33,333} \right) - 0.10 \left( \frac{15,00,000}{18,33,333} \right)$$

$$= \frac{1}{18,33,333} \left[ (0.15 \times 33,33,333) - (0.10 \times 15,00,000) \right]$$

$$= \frac{1}{18,33,333} \left[ 5,00,000 - 1,50,000 \right] = 19.09\%$$

**(c) Modigliani-Miller Approach (MM):** The NOI approach is definitional or conceptual and lacks behavioural significance. It does not provide operational justification for irrelevance of capital structure. However, Modigliani-Miller approach provides behavioural justification for constant overall cost of capital and, therefore, total value of the firm.

The approach is based on further additional assumptions like:

♦ Capital markets are perfect. All information is freely available and there are no transaction costs.

♦ All investors are rational.

♦ Firms can be grouped into 'Equivalent risk classes' on the basis of their business risk.

♦ Non-existence of corporate taxes.

Based on the above assumptions, Modigliani-Miller derived the following three propositions.

(i) Total market value of a firm is equal to its expected net operating income dividend by the discount rate appropriate to its risk class decided by the market.

(ii) The expected yield on equity is equal to the risk free rate plus a premium determined as per the following equation: $K_c = K_o + (K_o - K_d) B/S$

(iii) Average cost of capital is not affected by financial decision.

**Ke, Kd and Ko**
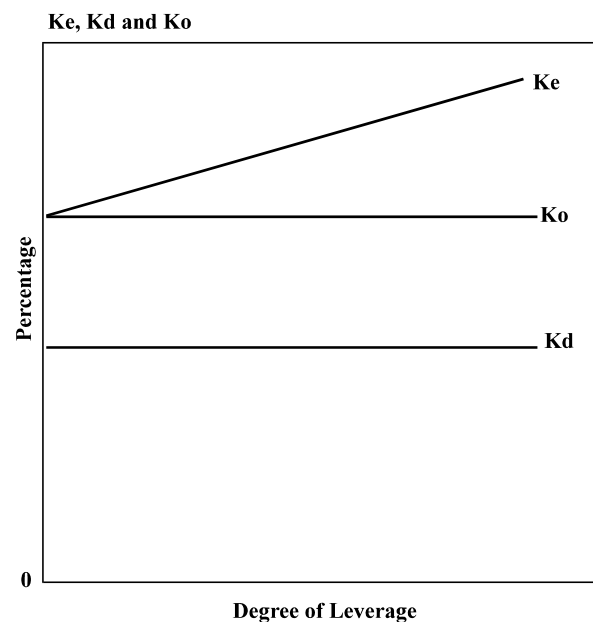
It is evident from the above diagram that the average cost of the capital ($K_o$) is a constant and not affected by leverage.

The operational justification of Modigliani-Miller hypothesis is explained through the functioning of the arbitrage process and substitution of corporate leverage by personal leverage. Arbitrage refers to buying asset or security at lower price in one market and selling it at higher price in another market. As a result equilibrium is attained in different markets. This is illustrated by taking two identical firms of which one has debt in the capital structure while the other does not. Investors of the firm whose value is higher will sell their shares and instead buy the shares of the firm whose value is lower. They will be able to earn the same return at lower outlay with the same perceived risk or lower risk. They would, therefore, be better off.

The value of the levered firm can either be neither greater nor lower than that of an unlevered firm according this approach. The two must be equal. There is neither advantage nor disadvantage in using debt in the firm's capital structure.

Simply stated, the Modigliani Miller approach is based on the thought that no matter how the capital structure of a firm is divided among debt, equity and other claims, there is a conservation of investment value. Since the total investment value of a corporation depends upon its underlying profitability and risk, it is invariant with respect to relative changes in the firm's financial capitalisation. The approach considers capital structure of a firm as a whole pie divided into equity, debt and other securities. According to MM, since the sum of the parts must equal the whole, therefore, regardless of the financing mix, the total value of the firm stays the same as shown in the figures below:



FIRM VALUE          FIRM VALUE
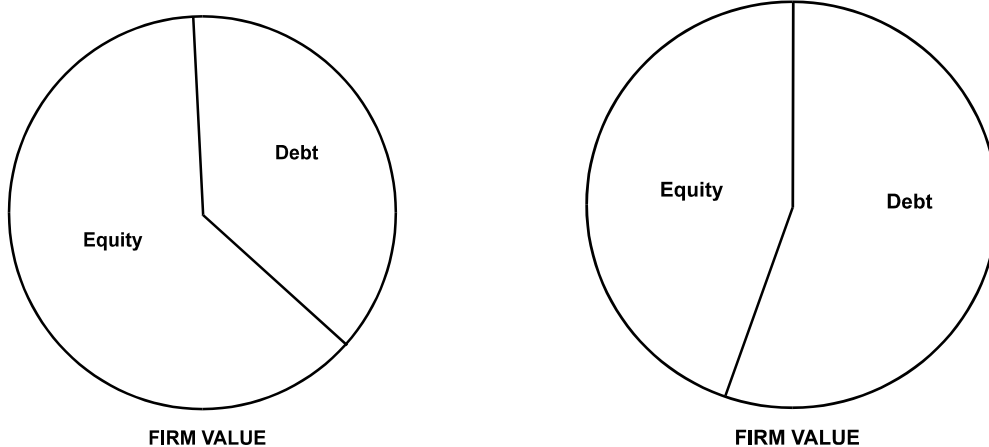
The shortcoming of this approach is that the arbitrage process as suggested by Modigliani-Miller will fail to work because of imperfections in capital market, existence of transaction cost and

presence of corporate income taxes.

However in their 1963 article, they recognised that the value of the firm will increase or cost of capital will decrease where corporate taxes exist. As a result there will be some difference in the earnings of equity and debt-holders in an levered and unlevered firm and value of levered firm will be greater than the value of unlevered firm by an amount equal to amount of debt multiplied by corporate tax rate.

**Illustration 4***: When value of levered firm is more than the value of unlevered firm*

There are two firms N and M, having same earnings before interest and taxes i.e. EBIT of Rs. 20,000. Firm M is levered company having a debt of Rs. 1,00,000 @ 7% rate of interest. The cost of equity of N company is 10% and of M company is 11.50%.

Find out how arbitrage process will be carried on?

**Solution**

|  | Firms | |
| --- | ---: | ---: |
|  | N | M |
| NOI/EBIT | Rs. 20,000 | Rs. 20,000 |
| Debt | – | Rs. 1,00,000 |
| $K_e$ | 10% | 11.50% |
| $K_d$ | – | 7% |

Value of equity (S) = $\dfrac{\text{NOI} - \text{Interest}}{\text{Cost of equity}}$

$$S_N = \frac{20,000}{10\%} \quad = \text{Rs. } 2,00,000$$

$$S_M = \frac{20,000 - 7,000}{11.50\%} \quad = \text{Rs. } 1,13,043$$

$V_N$ = Rs. 2,00,000

$V_M$ = 1,13,043 + 1,00,000   {V = S + D}

= Rs. 2,13,043

Assume you have 10% share of levered company. i.e. M. Therefore, investment in 10% of equity of levered company = 10% × 1,13,043 = Rs. 11,304.3

Return will be 10% of (20,000 – 7,000) = Rs. 1,300.

*Alternate Strategy will be:*

Sell your 10% share of levered firm for Rs. 11,304.3 and borrow 10% of levered firms debt i.e. 10% of Rs. 1,00,000 and invest the money i.e. 10% in unlevered firms stock:

Total resources /Money we have = 11,304.3 + 10,000 = 21,304.3 and you invest 10% of 2,00,000 = Rs. 20,000

Surplus cash available with you is = 21,304.3 – 20,000 = Rs. 1,304.3

Your return = 10% EBIT of unlevered firm – Interest to be paid on borrowed funds

i.e. = 10% of Rs. 20,000 – 7% of Rs. 10,000 = 2,000 – 700 = Rs. 1,300

i.e. your return is same i.e. Rs. 1,300 which you are getting from 'N' company before investing in 'M' company. But still you have Rs. 1,304.3 excess money available with you. Hence, you are better off by doing arbitrage.

**Illustration 5*: When value of unlevered firm is more than the value of levered firm***

There are two firms U and L having same NOI of Rs. 20,000 except that the firm L is a levered firm having a debt of Rs. 1,00,000 @ 7% and cost of equity of U & L are 10% and 18% respectively.

Show how arbitrage process will work.

**Solution**

|  | *Firms* | |
|---|---|---|
|  | *U* | *L* |
| NOI/EBIT | Rs. 20,000 | Rs. 20,000 |
| Debt capital | – | Rs. 1,00,000 |
| $K_d$ | – | 7% |
| $K_e$ | 10% | 18% |

Value of equity capital (s) = $\left(\dfrac{EBIT - Interest}{K_e}\right)$

$$= \dfrac{20,000}{0.10} \qquad \dfrac{20,000 - 7,000}{0.18}$$

$$= Rs.\ 2,00,000 \qquad Rs.\ 72,222$$

Total value of the firm
V = S + D          Rs. 2,00,000          Rs. 72,222 + 1,00,000

= Rs. 1,72,222

Assume you have 10% share of unlevered firm i.e. investment of 10% of Rs. 2,00,000 = Rs. 20,000 and Return @ 10% on Rs. 20,000.  Investment will be 10% of earnings available for equity i.e. 10% × 20,000 = Rs. 2,000.

*Alternative strategy:*

Sell your share in unlevered firm for Rs. 20,000 and buy 10% share of levered firm's equity plus debt

| | |
|---|---|
| i.e. 10% equity of levered firm | =  7,222 |
| 10% debt of levered firm | = 10,000 |
| Total investment | = 17,222 |

Your resources are Rs. 20,000

Surplus cash available = Surplus – Investment = 20,000 – 17,222 = Rs. 2,778

Your return on investment is:

| | |
|---|---|
| 7% on debt of Rs. 10,000 | 700 |
| 10% on equity i.e. 10% of earnings available for equity holders i.e. (10% × 13,000) | 1,300 |
| Total return | 2,000 |

i.e. in both the cases the return received is Rs. 2,000 and still you have excess cash of Rs. 2,778.

Hence, you are better off i.e you will start selling unlevered company shares and buy levered company's shares thereby pushing down the value of shares of unlevered firm and increasing the value of levered firm till equilibrium is reached.

**(d)  Traditional Approach:** This approach favours that as a result of financial leverage up to some point, cost of capital comes down and value of firm increases.  However, beyond that point, reverse trends emerge.

The principle implication of this approach is that the cost of capital is dependent on the capital structure and there is an optimal capital structure which minimises cost of capital.  At the optimal capital structure, the real marginal cost of debt and equity is the same.  Before the optimal point, the real marginal cost of debt is less than real marginal cost of equity and beyond this point the real marginal cost of debt is more than real marginal cost of equity.

**Ke, Kd and Ko**



Degree of Leverage
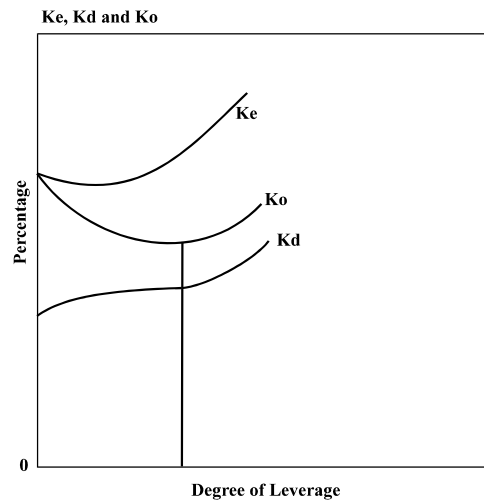
The above diagram suggests that cost of capital is a function of leverage. It declines with $K_d$ (debt) and starts rising. This means that there is a range of capital structure in which cost of capital is minimised. The net income approach argues that leverage always affects overall cost of capital and value of the firm. Optimum capital structure occurs at the point where value of the firm is highest and the cost of capital at the lowest.

According to net operating income approach capital structure decisions are totally irrelevant. Modigliani-Miller supports the net operating income approach but provides behavioural justification.

The traditional approach strikes a balance between these extremes.

According to this approach the firm should strive to reach the optimal capital structure and its total valuation through a judicious use of the both debt and equity in capital structure. At the optimal capital structure the overall cost of capital will be minimum and the value of the firm is maximum. It further states that the value of the firm increases with financial leverage upto a certain point. Beyond this point the increase in financial leverage will increase its overall cost of capital and hence the value of firm will decline. This is because the benefits of use of debt may be so large that even after off setting the effect of increase in cost of equity, the overall cost of capital may still go down. However, if financial leverage increases beyond a acceptable limit the risk of debt investor may also increase, consequently cost of debt also starts increasing. The increasing cost of equity owing to increased financial risk and increasing cost of debt makes the overall cost of capital to increase.

**Illustration 6:** Indra company has EBIT of Rs. 1,00,000. The company makes use of debt and equity capital. The firm has 10% debentures of Rs. 5,00,000 and the firm's equity

capitalization rate is 15%.

You are required to compute:

(i) Current value of the firm

(ii) Overall cost of capital.

**Solution**

(i) *Calculation of total value of the firm*

|  | Rs. |
|---|---|
| EBIT | 1,00,000 |
| *Less:* Interest (@10% on Rs. 5,00,000) | 50,000 |
| Earnings available for equity holders | 50,000 |
| Equity capitalization rate i.e. $K_e$ | 15% |

$$\text{Value of equity holders} = \frac{\text{Earnings available for equity holders}}{K_e}$$

$$= \frac{50,000}{0.15} = Rs.\, 3,33,333$$

|  |  |
|---|---|
| Value of Debt (given) D | 5,00,000 |
| Total value of the firm V = D + S {5,00,000 + 3,33,333) | 8,33,333 |

(ii) Overall cost of capital $= K_o = K_e\left(\dfrac{S}{V}\right) + K_d\left(\dfrac{D}{V}\right)$

$$= 0.15\left(\frac{3,33,333}{8,33,333}\right) + 0.10\left(\frac{5,00,000}{8,33,333}\right)$$

$$= \frac{1}{8,33,333}\left[50,000 + 50,000\right]$$

$$= 12.00\%$$

## 2.8   CAPITAL STRUCTURE AND TAXATION

The leverage irrelevance theorem of MM is valid if the perfect market assumptions underlying their analysis are satisfied. However, in the face of imperfections characterising the real world capital markets, the capital structure of a firm may affect its valuation. Presence of taxes is a major imperfection in the real world. This section examines the implications of corporate and personal taxes for the capital structure.

### 2.8.1  Corporate Taxes

When taxes are applicable to corporate income, debt financing is advantageous. This is because dividends and retained earnings are not deductible for tax purposes; interest on debt is a tax-deductible expense. As a result, the total income available for both stockholders and debt-holders is greater when debt capital is used.

**Illustration 7***:* There are two firms Company A and B having net operating income of Rs. 15,00,000 each.  Company B is a levered company whereas Company A is all equity company.  Debt employed by Company B is of Rs. 7,00,000 @ 11%.  The tax rate applicable to both the companies is 25%.  Calculate earnings available for equity and debt for both the firms.

**Solution**

*Statement of calculation of earnings available to equity holders and debt holders*

| | Company A | Company B |
|---|---|---|
| Net operating income | 15,00,000 | 15,00,000 |
| *Less:* Interest on Debt (11% of Rs. 7,00,000) | – | 77,000 |
| Profit before taxes | 15,00,000 | 14,23,000 |
| *Less:* Tax @ 25% | 3,75,000 | 3,55,750 |
| Profit after tax/Earnings available in equity holders | 11,25,000 | 10,67,250 |
| Total earnings available to equity holders + Debt holders | 11,25,000 | 10,67,250 + 77,000 =11,44,250 |

As we can see that the earnings in case of Company B is more than the earnings of Company A because of tax shield available to shareholders of Company B due to the presence of debt structure in Company B.  The interest is deducted from EBIT without tax deduction at the corporate level; equity holders also get their income after tax deduction due to which income of both the investors increase to the extent of tax saving on the interest paid i.e. tax shield i.e. 25% × 77,000 = 19,250 i.e. difference in the income of two companies' earnings i.e. 11,44,250 – 11,25,000  = Rs. 19,250.

**Over Capitalization**

It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest. This situation mainly arises when the existing capital is not effectively utilized on account of fall in earning capacity of the company while company has raised funds more than its requirements. The chief sign of over-capitalisation is the fall in payment of dividend and interest leading to fall in value of the shares of the company.

**Causes of over capitalization:**

Over-capitalisation arises due to following reasons:

(i)    Raising more money through issue of shares or debentures than company can employ profitably.

(ii)   Borrowing huge amount at higher rate than rate at which company can earn.

(iii)  Excessive payment for the acquisition of fictitious assets such as goodwill etc.

(iv)  Improper provision for depreciation, replacement of assets and distribution of dividends at a higher rate.

(v)   Wrong estimation of earnings and capitalization.

**Consequences of over-capitalisation**

Over-capitalisation shall result into following consequences

(i)    Considerable reduction in the rate of dividend and interest payments.

(ii)   Reduction in the market price of shares.

(iii)  Resorting of "window dressing".

(iv)  Some company may opt for reorganization.  However, sometimes the matter goes worse, the company may go into liquidation.

**Remedies for over-capitalisation**

Following steps may be adopted to avoid the evil consequences of over-capitalisation

(i)    Company should go for thorough reorganization.

(ii)   Buyback of shares.

(iii)  Reduction in claims of debenture-holders and creditors.

(iv)  Value of share may also be reduced. This will result insufficient funds for the company to carry out replacement of assets.

**Under capitalization**

It is just reverse of over-capitalisation. It is a state, when its actual capitalization is lower than its proper capitalization as warranted by its earning capacity.

This situation normally happens with companies which have insufficient capital but large secret reserves in the form of considerable appreciation in the values of the fixed assets not brought into the books.

According to Gerstenberg "a corporation may be under capitalized when the rate of profit is exceptionally high in relation to the return enjoyed by similar situated companies in the same industry. He adds further that in case of such companies "the assets may be worth more than the values reflected in the books". Other authors such as Hoagland also confirms this view by defining "an excess of true asset values over the aggregate of stocks and bonds outstandings".

**Consequences of under capitalization**

Under-capitalisation results in following consequences:

(i)    The dividend rate will be higher in comparison of similarly situated other companies.

(ii)   Market value of shares shall be higher than value of share of other similar companies because their earning rate being considerably more than the prevailing rate on such securities.

(iii)  Real value of shares shall be higher than their book value.

**Effects of under capitalization**

Under-capitalisation has the following effects:

(i)    It encourages acute competition. High profitability encourages new entrepreneurs to come into same type of business.

(ii)   High rate of dividend encourages the workers' union to demand high wages.

(iii)  Normally common people (consumers) start feeling that they are being exploited.

(iv)   Management may resort to manipulate the share values.

(v)    Invite more government control and regulation on the company and higher taxation also.

**Remedies**

Following steps may be adopted to avoid the evil consequences of under capitalization.

(i)    The shares of the company should be split up. This will reduce dividend per share, though EPS shall remain unchanged.

(ii)   Issue of Bonus Shares is the most appropriate measure as this will reduce both dividend per share and the average rate of earning.

(iii)  By revising upward the par value of shares in exchange of the existing shares held by them.

**Conclusion:**

From above discussion it can be said that both over capitalization and under capitalisation are bad.

However, over capitalisation is more dangerous to the company, shareholders and the society than under capitalization.

The situation of under capitalization can be handled more easily than the situation of over-capitalisation.

Moreover under capitalization is not an economic problem but a problem of adjusting capital structure.

Thus, under capitalization should be considered less dangerous, both situations are bad and every company should strive to have a proper capitalization.

**UNIT – III : BUSINESS RISK AND FINANCIAL RISK**

**Learning Objectives**

After studying this unit, you will be able to

♦ Define, discuss, and quantify "business risk" and "financial risk";

♦ Define operating and financial leverage and identify causes of both;

♦ Define, calculate, and interpret a firm's degree of operating, financial, and total leverage;

♦ Calculate a firm's operating break-even (quantity) point and break-even (sales) point; and

♦ Understand what is involved in determining the appropriate amount of financial leverage for a firm?

## 3.1    INTRODUCTION

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

The proportion of short and long-term debt is considered when analyzing capital structure. Capital structure refers to a firm's debt-to-equity ratio, which provides insight into how risky a company is. Usually a company more heavily financed by debt poses greater risk.

Firms can obtain their long-term financing from either debt or equity or some combination of debt and equity. Capital structure decisions by firms will have an effect on the expected profitability of the firm, the risks facing debt holders and shareholders, the probability of failure, the cost of capital and the market value of the firm.

Risk facing the common shareholders is a function of i.e. is affected by two types of risks, namely business risk and financial risk.

Risk Facing Common Shareholders = f {Business Risk, Financial Risk}

### 3.1.1    BUSINESS RISK AND FINANCIAL RISK

Business risk refers to the risk associated with the firm's operations. It is the uncertainty about the future operating income (EBIT), i.e. how well can the operating income be predicted? Business risk can be measured by the standard deviation of the Basic Earning Power ratio.
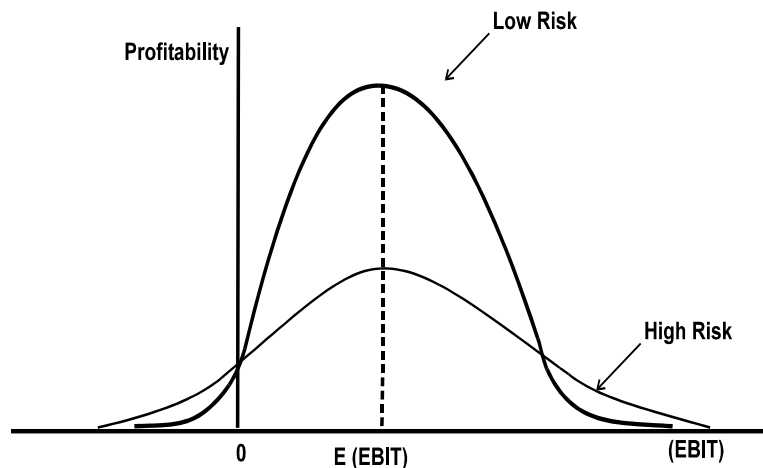
Financial risk refers to the additional risk placed on the firm's shareholders as a result of debt use i.e. the additional risk a shareholder bears when a company uses debt in addition to equity financing. Companies that issue more debt instruments would have higher financial risk than companies financed mostly or entirely by equity. Financial risk can be measured by ratios such as the firm's financial leverage multiplier, total debt to assets ratio or degree of financial leverage. A company's risk is composed of financial risk, which is linked to debt, and risk, which is often linked to economic climate. If a company is entirely financed by equity, it would pose almost no financial risk, but, it would be susceptible to business risk or changes in the overall economic climate.

Leverage refers to the ability of a firm in employing long term funds having a fixed cost, to enhance returns to the owners. In other words, leverage is the amount of debt that a firm uses to finance its assets. The use of various financial instruments or borrowed capital, to increase the potential return of an investment.

A firm with a lot of debt in its capital structure is said to be highly levered. A firm with no debt is said to be unlevered.

## 3.2    DEBT VERSUS EQUITY FINANCING

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

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

♦    A profitable business effectively pays less for debt capital than equity for another reason: the debt interest can be offset against pre-tax profits before the calculation of the

corporate tax, thus reducing the tax paid.

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

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

One reason is financial distress risk. This could be induced by the requirement to pay interest regardless of the cash flow of the business. If the firm goes through a rough period in its business activities it may have trouble paying its bondholders, bankers and other creditors their entitlement.

The relationship between Expected return (Earnings per share) and the level of gearing can be represented as:
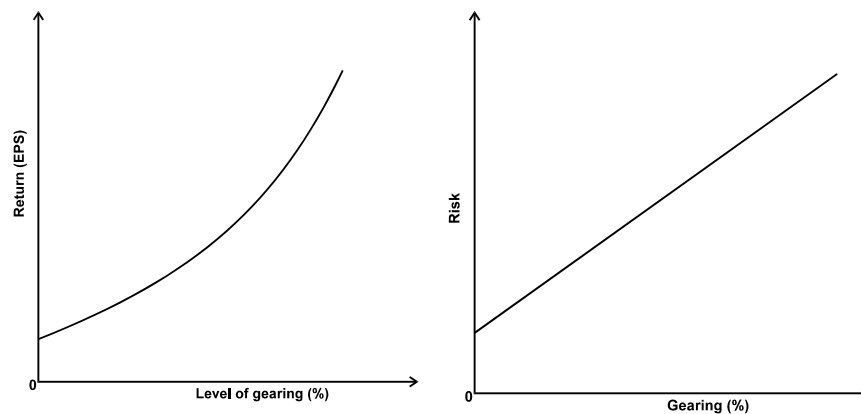


**Relationship between leverage and risk**

Leverage can occur in either the *operating or financing* portions of the income statement. The effect of leverage is to *magnify* the effects of changes in sales volume on earnings. Leverage serves to increase both expected return and risk to the firm's stockholders.

Leverage helps both the investor and the firm to invest or operate. However, it comes with greater risk. If an investor uses leverage to make an investment and the investment moves against the investor, his or her loss is much greater than it would have been if the investment had not been leveraged - leverage magnifies both gains and losses. In the business world, a company can use leverage to try to generate shareholder wealth, but if it fails to do so, the interest expense and credit risk of default destroys shareholder value.

Most companies use debt to finance operations. By doing so, a company increases its leverage because it can invest in business operations without increasing its equity. For example, if a company formed with an investment of Rs. 50 lakhs from investors, the equity in

the company is Rs. 50 lakhs - this is the money the company uses to operate. If the company uses debt financing by borrowing Rs. 200 lakhs, the company now has Rs. 250 lakhs to invest in business operations and more opportunity to increase value for shareholders.

## 3.3    TYPES OF LEVERAGE

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

There are three commonly used measures of leverage in financial analysis. These are:

(i)    Operating Leverage

(ii)   Financial Leverage

(iii)  Combined Leverage

### 3.3.1  OPERATING LEVERAGE

Operating leverage (OL) maybe defined as the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all the fixed and variable costs. The use of assets for which a company pays a fixed cost is called operating leverage. With fixed costs the percentage change in profits accompanying a change in volume is greater than the percentage change in volume. The higher the turnover of operating assets, the greater will be the revenue in relation to the fixed charge on those assets.
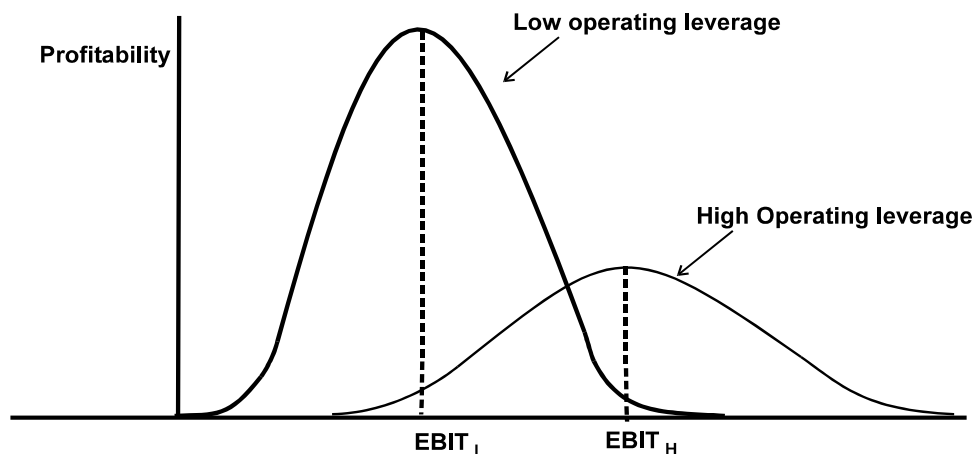


Operating leverage is a function of three factors:

(i)    Rupee amount of fixed cost,

(ii)   Variable contribution margin, and

(iii)   Volume of sales.

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

$$OL = \frac{N(P-V)}{N(P-V)-F}$$

Where,

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

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

Operating leverage is directly proportional to business risk. More operating leverage leads to more business risk, for then a small sales decline causes a big profit. This can be illustrated graphically as:
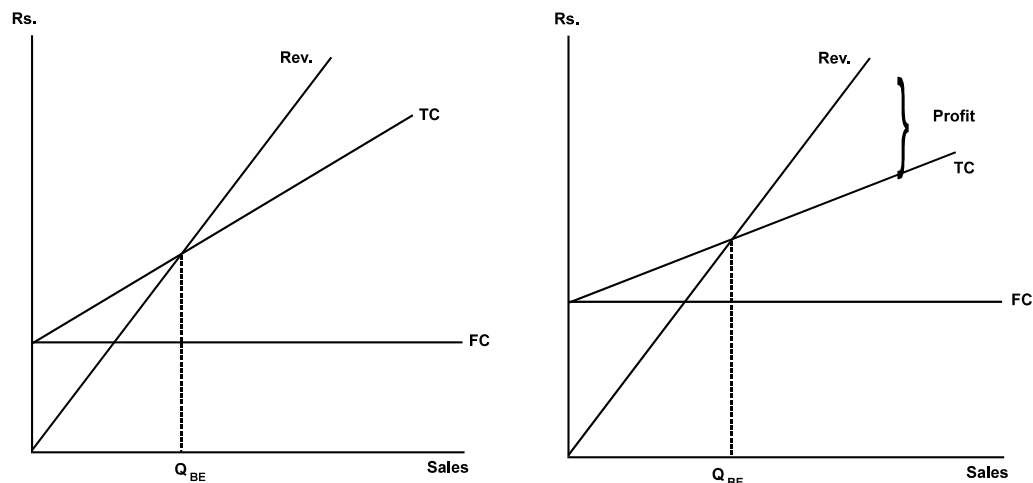
**Illustration 1:** A Company produces and sells 10,000 shirts. The selling price per shirt is Rs. 500. Variable cost is Rs. 200 per shirt and fixed operating cost is Rs. 25,00,000.

(a)   Calculate operating leverage.

(b)   If sales are up by 10%, then what is the impact on EBIT?

**Solution**

(a)                           **Statement of Profitability**

|  |  |
|---|---:|
|  | *Rs.* |
| Sales Revenue (10,000 × 500) | 50,00,000 |
| *Less:* Variable Cost (10,000 × 200) | 20,00,000 |
| Contribution | 30,00,000 |
| *Less:* Fixed Cost | 25,00,000 |
| EBIT | 5,00,000 |

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{30\,\text{lakhs}}{5\,\text{lakhs}} = 6\ \text{times}$$

(b)

$$OL = \frac{\%\,\Delta\,\text{in EBIT}}{\%\,\Delta\,\text{in sales}}$$

$$6 = \frac{x / 5,00,000}{5,00,000 / 50,00,000}$$

$$x = 30,000$$

$$\therefore\ \Delta\text{EBIT} = 30,000 / 5,00,000$$

$$= 6\%$$

### 3.3.2   FINANCIAL LEVERAGE

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

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

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

$$FL = \frac{Y}{Y - I}$$

Or, $$FL = \frac{EBIT}{EBIT - Interest}$$

Where,

Y = EBIT at a point for which the degree of financial leverage is being calculated

I = Amount of interest charges

**Illustration 2:** Suppose there are two firms with the same operating leverage, business risk, and probability distribution of EBIT and only differ with respect to their use of debt (capital structure).

| Firm U | Firm L |
|---|---|
| No debt | Rs. 10,000 of 12% debt |
| Rs. 20,000 in assets | Rs. 20,000 in assets |
| 40% tax rate | 40% tax rate |

*Firm U: Unleveraged*

| | Economy | | |
|---|---|---|---|
| | *Bad* | *Avg.* | *Good* |
| Probability | 0.25 | 0.50 | 0.25 |
| EBIT | Rs. 2,000 | Rs. 3,000 | Rs. 4,000 |
| Interest | 0 | 0 | 0 |
| EBIT | Rs. 2000 | Rs. 3,000 | Rs. 4,000 |
| Taxes (40%) | 800 | 1,200 | 1,600 |
| NI | Rs. 1,200 | Rs. 1,800 | Rs. 2,400 |

*Firm L: Leveraged*

| | Economy | | |
|---|---|---|---|
| | *Bad* | *Avg.* | *Good* |
| Probability | 0.25 | 0.50 | 0.25 |
| EBIT | Rs. 2,000 | Rs. 3,000 | Rs. 4,000 |
| Interest | 1,200 | 1,200 | 1,200 |
| EBIT | Rs. 800 | Rs. 1,800 | Rs. 2,800 |

| | Bad | Avg. | Good |
|---|---|---|---|
| Taxes (40%) | 320 | 720 | 1,120 |
| NI | Rs. 480 | Rs.1080 | Rs. 1,680 |

*Same as for Firm U.

### Ratio comparison between leveraged and unleveraged firms

| FIRM U | Bad | Avg. | Good |
|---|---|---|---|
| BEP(=EBIT/TOTAL ASSETS) | 10.0% | 15.0% | 20.0% |
| ROE(=PAT/NETWORTH) | 6.0% | 9.0% | 12.0% |
| TIE(INTEREST COVERAGE RATIO (=EBIT/INTEREST) | ∞ | ∞ | ∞ |

| FIRM L | Bad | Avg. | Good |
|---|---|---|---|
| BEP | 10.0% | 15.0% | 20.0% |
| ROE | 4.8% | 10.8% | 16.8% |
| TIE | 1.67% | 2.50% | 3.30% |

### Risk and return for leveraged and unleveraged firms

*Expected Values:*

| | Firm U | Firm L |
|---|---|---|
| E(BEP) | 15.0% | 15.0% |
| E(ROE) | 9.0% | 10.8% |
| E(TIE) | ∞ | 2.5x |

*Risk Measures:*

| | Firm U | Firm L |
|---|---|---|
| $\sigma_{ROE}$ | 2.12% | 4.24% |
| $CV_{ROE}$ | 0.24 | 0.39 |

Thus, the effect of leverage on profitability and debt coverage can be seen from the above example. For leverage to raise expected ROE, BEP must be greater than kd i.e. BEP > kd because if kd > BEP, then the interest expense will be higher than the operating income produced by debt-financed assets, so leverage will depress income. As debt increases, TIE decreases because EBIT is unaffected by debt, and interest expense increases (Int Exp = $k_d$D).

Thus, it can be concluded that the basic earning power (BEP) is unaffected by financial leverage. Firm L has higher expected ROE because BEP > $k_d$ and it has much wider ROE (and EPS) swings because of fixed interest charges. Its higher expected return is accompanied by higher risk.

### 3.3.3 DEGREE OF COMBINED LEVERAGE

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

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

$$\text{Degree of combined leverage} = \text{Degree of operating leverage} \times \text{Degree of financial leverage}$$

$$DCL = DOL \times DFL$$

Where,

DCL = Degree of combined leverage

DOL = Degree of operating leverage

DFL = Degree of financial leverage

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

**Illustration 3:** A firm's details are as under:

| | |
|---|---|
| Sales (@100 per unit) | Rs. 24,00,000 |
| Variable Cost | 50% |
| Fixed Cost | Rs. 10,00,000 |

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

Calculate:

(a)   Operating Leverage

(b)    Financial Leverage

(c)   Combined Leverage

(d)   Return on Investment

(e)   If the sales increases by Rs. 6,00,000; what will the new EBIT?

**Solution**

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

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

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

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

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

(e)   Operating Leverage  = 6

$$6 = \dfrac{\Delta\,\text{EBIT}}{.25}$$

$$\Delta\ EBIT = \frac{6 \times 1}{4} = 1.5$$

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

New EBIT = 5,00,000

**Illustration 4:** Betatronics Ltd. has the following balance sheet and income statement information:

### Balance Sheet as on March 31st

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

### Income Statement for the year ending March 31

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

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

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

**Solution**

**(a) Calculation of Degree of Operating (DOL), Financial (DFL) and Combined leverages (DCL).**

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

$$= 1.27$$

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

$$= 1.37$$

DCL = DOL×DFL

$$= 1.27×1.37 = 1.75$$

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

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

*Working Notes:*

(i) Variable Costs = Rs. 60,000 (total cost – depreciation)

(ii) Variable Costs at:

(a) Sales level, Rs. 4,08,000 = Rs. 72,000

(b)   Sales level, Rs. 2,72,000 =  Rs. 48,000

**Illustration 5:** Calculate the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and Financial Plan A and B:

| | |
|---|---|
| Installed Capacity | 4,000 units |
| Actual Production and Sales | 75% of the Capacity |
| Selling Price | Rs. 30 Per Unit |
| Variable Cost | Rs. 15 Per Unit |
| *Fixed Cost:* | |
| Under Situation I | Rs. 15,000 |
| Under Situation-II | Rs.20,000 |

*Capital Structure:*

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

**Solution**

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

(i) *Operating Leverage*

$$\frac{C}{OP} = \quad Rs. \frac{45,000}{30,000} \qquad Rs. \frac{45,000}{25,000}$$

$$= \qquad 1.5 \qquad\qquad 1.8$$

(ii) *Financial Leverages*

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

$$\text{Financial Leverage} = \frac{OP}{PBT} = Rs. \frac{30,000}{28,000} = 1.07 \quad Rs. \frac{30,000}{24,000} = 1.04$$

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

$$\text{Financial Leverage} = \frac{OP}{PBT} = Rs. \frac{25,000}{23,000} = 1.09 \quad Rs. \frac{25,000}{24,000} = 1.04$$

(iii) *Combined Leverages*

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

**Self Examination Questions**

**A. Objective Type Questions**

1.  A firm's cost of capital is the:

    (a) Cost of borrowing money

    (b) Cost of issuing stock

    (c) Cost of bonds

    (d) Overall cost of financing to the firm.

2.  The cost of debt financing is generally _____ the cost of preferred or common equity financing.

    (a) Less than

    (b) More than

    (c) Equal to

    (d) Not enough information to tell.

3.  The cost of issuing new stock is called:

    (a) The cost of equity

    (b) Flotation costs

    (c) Marginal cost of capital

    (d) None of the above.

4.  The cost of each component of a firm's capital structure multiplied by its weight in the capital structure is called the:

    (a) Marginal cost of capital

    (b) The cost of debt

    (c) Weighted average cost of capital

    (d) None of the above.

5.  When establishing their optimal capital structure, firms should strive to:

    (a) Minimize the weighted average cost of capital

    (b) Minimize the amount of debt financing used

    (c) Maximize the marginal cost of capital

    (d) None of the above.

6. The _____ is the percentage change in operating income that results from a percentage change in sales.

   (a) Degree of financial leverage

   (b) Breakeven point

   (c) Degree of operating leverage

   (d) Degree of combined leverage.

7. If interest expenses for a firm rise, we know that firm has taken on more _____.

   (a) Financial leverage

   (b) Operating leverage

   (c) Fixed assets

   (d) None of the above.

8. The _____ is the percentage change in earnings per share that results from a percentage change in operating income.

   (a) Degree of combined leverage

   (b) Degree of financial leverage

   (c) Breakeven point

   (d) Degree of operating leverage.

9. Combined leverage is the percentage change in relationship between sales and _____.

   (a) Operating income

   (b) Operating leverage

   (c) Earnings per share

   (d) Breakeven point.

10. A highly leveraged firm is _____ risky than its peers.

   (a) Less

   (b) More

   (c) The same

   (d) None of the above.

11. An advantage of debt financing is:

    (a) Interest payments are tax deductible

    (b) The use of debt, up to a point, lowers the firm's cost of capital

    (c) Does not dilute owner's earnings

    (d) All of the above.

12. The cost of equity capital is all of the following EXCEPT:

    (a) The minimum rate that a firm should earn on the equity-financed part of an investment

    (b) A return on the equity-financed portion of an investment that, at worst, leaves the market price of the tock unchanged

    (c) By far the most difficult component cost to estimate

    (d) Generally lower than the before-tax cost of debt.

13. In calculating the costs of the individual components of a firm's financing, the corporate tax rate is important to which of the following component cost formulae?

    (a) Common stock

    (b) Debt

    (c) Preferred stock

    (d) None of the above.

14. Market values are often used in computing the weighted average cost of capital because

    (a) This is the simplest way to do the calculation

    (b) This is consistent with the goal of maximizing shareholder value

    (c) This is required in India by the SEBI

    (d) This is a very common mistake.

15. An EBIT-EPS indifference analysis chart is used for_____

    (a) Evaluating the effects of business risk on EPS

    (b) Examining EPS results for alternative financing plans at varying EBIT levels

    (c) Determining the impact of a change in sales on EBIT

    (d) Showing the changes in EPS quality over time.

**Answers to Objective Type Questions**

**1.** (d); **2.** (a); **3.** (b); **4.** (c); **5.** (a); **6.** (c); **7.** (a); **8.** (b); **9.** (c); **10.** (b); **11.** (d); **12.** (d); **13.** (b); **14.** (b); **15.** (b)

**B. Short Answer Type Questions**

1. Write short notes on:

   (a) Weighted average cost of capital

   (b) Marginal cost of capital

   (c) Indifference point.

2. Differentiate between the following:

   (a) Business risk and Financial risk

   (b) Operating leverage and Financial leverage

   (c) Net Income approach and Net Operating Income approach of Capital Structure.

**C. Long Answer Type Questions**

1. Explain briefly major considerations in capital structure planning.

2. Explain briefly the four approaches for determining the cost of equity shares.

3. Explain briefly, Modigliani and Miller approach on cost of capital.

4. Explain briefly the traditional theory of capital structure.

5. Define Operating Leverage and Financial Leverage. How the two leverages can be measured?

6. Explain the impact of Financial Leverage on earning per share.

7. What is Combined Leverage? Explain its significance in financial planning of a firm.

8. Explain the advantages of equity financing.

9. What are the advantages of debt financing from the point of company and investors?

**D. Practical Problems**

1. (a) A company issues Rs. 10,00,000 16% debentures of Rs. 100 each. The company is in 35% tax bracket. You are required to calculate the cost of debt after tax. If debentures are issued at (i) Par, (ii) 10% discount and (iii) 10% premium.

   (b) If brokerage is paid at 2% what will be cost of debentures if issue is at par?

2. A company's share is quoted in market at Rs. 40 currently. A company pays a dividend of Rs. 2 per share and investors expect a growth rate of 10% per year, compute:

   (a) The company's cost of equity capital.

   (b) If anticipated growth rate is 11% p.a. calculate the indicated market price per share.

(c) If the company's cost of capital is 16% and anticipated growth rate is 10% p.a., calculate the market price if dividend of Rs. 2 per share is to be maintained.

3. Three companies A, B & C are in the same type of business and hence have similar operating risks. However, the capital structure of each of them is different and the following are the details:

|  | | A | B | C |
|---|---|---|---|---|
| Equity Share capital | Rs. | 4,00,000 | 2,50,000 | 5,00,000 |
| [Face value Rs. 10 per share] | | | | |
| Market value per share | Rs. | 15 | 20 | 12 |
| Dividend per share | Rs. | 2.70 | 4 | 2.88 |
| Debentures | Rs. | Nil | 1,00,000 | 2,50,000 |
| [Face value per debenture Rs. 100] | | | | |
| Market value per debenture | Rs. | — | 125 | 80 |
| Interest rate | | — | 10% | 8% |

Assume that the current levels of dividends are generally expected to continue indefinitely and the income tax rate at 50%.

You are required to compute the weighted average cost of capital of each company.

4. ZED Limited is presently financed entirely by equity shares. The current market value is Rs. 6,00,000. A dividend Rs. 1,20,000 has just been paid. This level of dividends is expected to be paid indefinitely. The company is thinking of investing in a new project involving a outlay of Rs. 5,00,000 now and is expected to generate net cash receipts of Rs. 1,05,000 per annum indefinitely. The project would be financed by issuing Rs. 5,00,000 debentures at the market interest rate of 18%.

Ignoring tax consideration:

(1) Calculate the value of equity shares and the gain made by the shareholders if the cost of equity rises to 21.6%.

(2) Prove that weighted average cost of capital is not affected by gearing.

5. The following figures are made available to you:

Net profits for the year                                                           18,00,000

*Less:* Interest on secured debentures at 15% p.a.

| | |
|---|---|
| (Debentures were issued 3 months after the | |
| commencement of the year) | 1,12,500 |
| Profit before tax | 16,87,500 |
| *Less:* Income-tax at 35% and dividend distribution | |
| Tax | 8,43,750 |
| Profit after tax | 8,43,750 |
| Number of equity shares (Rs. 10 each) | 1,00,000 |
| Market quotation of equity share | Rs. 109.70 |

The company has accumulated revenue reserves of Rs. 12 lakhs. The company is examining a project calling for an investment obligation of Rs. 10 lakhs. This investment is expected to earn the same rate as funds already employed.

You are informed that a debt equity ratio (Debt divided by debt plus equity) higher than 60% will cause the price earning ratio to come down by 25% and the interest rate on additional borrowals will cost company 300 basis points more than on their current borrowal in secured.

You are required to advise the company on the probable price of the equity share, if

(a) The additional investment were to be raised by way loans; or

(b) The additional investment were to be raised by way of equity.

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

7. A company provides the following figures:

| | *Rs.* |
|---|---|
| Profit | 26,00,000 |
| *Less:* Interest on debentures @ 12% | 6,00,000 |
| Profit before tax | 20,00,000 |

| | |
|---|---:|
| *Less:* Income-tax @ 50% | 10,00,000 |
| Profit after tax | 10,00,000 |
| Number of equity shares | |
| (of Rs. 10 each) | 4,00,000 |
| Earning per share (EPS) | 2.50 |
| Ruling price in market | 25 |
| P/E (Price/Earning) Ratio | 10 |

The company has undistributed reserves of Rs. 60,00,000.

The company needs Rs. 20,00,000 for expansion; this amount will earn the same rate as funds already employed. You are informed that a debt equity ratio higher than 35% pulls the PE ratio down to 8 and raises the interest rate on additional amount borrowed at 14%. You are required to ascertain the probable price of the share if-

(i)    The additional funds are raised as a loans; or

(ii)    The amount is raised by issuing equity shares.

8.    EXE Limited is considering three financing plans. The key information is as follows:

(a)    Total investment to be raised is  Rs. 2,00,000

(b)    Plans of Financing Proportion

| Plan | Equity | Debt | Preference Shares |
|---|---|---|---|
| A | 100% | — | — |
| B | 50% | 50 | — |
| C | 50% | - | 50% |

(c)    Cost of debt 8%; Cost of preference 8%

(d)    Tax rate 50%

(Assume no dividend tax)

(e)    Equity shares of face value of Rs. 10 each will be issued at a premium of Rs. 10 per share.

(g)     Expected EBIT is Rs. 80,000

You are required to determine for each plan:

(i)    Earning per share

    (ii)   The Financial break-even point.

    (iii)  Compute the EBIT range among the plans of indifference.

9.   Calculate the Operating Leverage from the following data:

| | |
|---|---|
| Sales | Rs. 50,000 |
| Debt/Equity | 3:1 |
| Interest rate | 12% |
| Operating profit | Rs. 20,00,000 |

10.  Calculate the Degree of Operating Leverage, Degree of Financial Leverage and the Degree of Combined Leverage for the following firms and interpret the results:

| | P | Q | R |
|---|---|---|---|
| Output (unit) | 3,00,000 | 75,000 | 5,00,000 |
| Fixed Costs (Rs.) | 3,50,000 | 7,00,000 | 5,00,000 |
| Unit Variable costs (Rs) | 1.00 | 7.50 | 0.10 |
| Interest expenses (Rs.) | 25,000 | 40,000 | – |
| Unit Selling price (Rs.) | 3.00 | 25.00 | 0.50 |

11.  XYZ Ltd. sells 2000 units @ Rs. 10 per unit. The variable cost of production is Rs. 7 and Fixed cost is Rs. 1,000. The company raised the required funds by issue of 100, 10% deben- tures @ Rs. 100 each and 2000 equity shares @ Rs. 10 per share. The sales of XYZ Ltd. are expected to increase by 20%. Assume tax rate of company is 50%. You are required to calculate the impact of increase in sales on earning per share.

12.  The following figures relate to two companies:

| | | *(Rs. in lakhs)* |
|---|---|---|
| | *P Ltd.* | *Q Ltd.* |
| Sales | 500 | 1,000 |
| *Less :* Variable costs | 200 | 300 |
| Contribution | 300 | 700 |
| *Less :* Fixed costs | 150 | 400 |
| EBIT | 150 | 300 |
| *Less :* Interest | 50 | 100 |
| Profit before tax (PBT) | 100 | 200 |

You are required to :

(i) Calculate the operating, financial and combined leverages for the two companies; and

(ii) Comment on the relative risk position of them.

13. The capital structure of ABC Ltd. consist of an ordinary share capital of Rs. 5,00,000 (equity shares of Rs. 100 each at par value) and Rs. 5,00,000 (10% debenture of Rs. 100 each). Sales increased from 50,000 units to 60,000 units, the selling price is Rs. 12 per unit, variable cost amounts to Rs. 8 per unit and fixed expenses amount to Rs. 1,00,000. The income tax rate is assumed to be 50%.

You are required to calculate the following:

(a) The percentage increase in earning per share;

(b) The degree of financial leverage at 50,000 units and 60,000 units;

(c) The degree of operating leverage at 50,000 units and 60,000 units;

(d) Comment on the behaviour E.P.S., operating and financial leverage in relation to increases in sales from 50,000 units to 60,000 units.

14. A firm has sales of Rs. 75,00,000, variable cost of Rs. 42,00,000 and fixed cost of Rs. 6,00,000. It has a debt of Rs. 45,00,000 at 9% and equity of Rs. 55,00,000.

(i) What is the firm's R.O.I.?

(ii) Does it have favourable financial leverage?

(iii) What are the operating, financial and combined leverage of the firm ?

(iv) If the sales drop to Rs. 50,00,000, what will be the new E.B.I.T. ?

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

| | |
|---|---|
| Installed Capacity | 4,000 units |
| Actual Production and Sales | 75% of the Capacity |
| Selling Price | Rs. 30 Per Unit |
| Variable Cost | Rs. 15 Per Unit |
| Fixed Cost: | |
| Under Situation I | Rs. 15,000 |
| Under Situation II | Rs. 20,000 |

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

16. From the following prepare Income statement of Company A, B and C.

| Company | A | B | C |
|---|---|---|---|
| Financial Leverage | 3 : 1 | 4 : 1 | 2 : 1 |
| Interest | Rs. 200 | Rs. 300 | Rs. 1,000 |
| Operating Leverage | 4 : 1 | 5 : 1 | 3 : 1 |
| Variable cost as a percentage to sales sales | 66 2/3% | 75% | 50% |
| Income tax rate | 45% | 45% | 45% |

# CHAPTER 5

## TYPES OF FINANCING

**Learning Objectives**

After studying this chapter, you will be able to

♦ Understand the different sources of finance available to a business;

♦ Differentiate between the various long term, medium term and short term sources of finance;

♦ Understand the meaning and purpose of Venture Capital financing;

♦ Understand the meaning and purpose of securitisation and debt securitization;

♦ Understand the concept of lease financing;

♦ Understand the financing of export trade by banks; and

♦ Understand the various financial instruments dealt with in the International market.

### 1. INTRODUCTION

One of the most important consideration for an entrepreneur–company in implementing a new project or undertaking expansion, diversification, modernisation and rehabilitation scheme is ascertaining the cost of project and the means of finance. There are several sources of finance/funds available to any company. An effective appraisal mechanism of various sources of funds available to a company must be instituted in the company to achieve its main objectives. Such a mechanism is required to evaluate risk, tenure and cost of each and every source of fund. The selection of the fund source is dependent on the financial strategy pursued by the company, the leverage planned by the company, the financial conditions prevalent in the economy and the risk profile of both the company as well as the industry in which the company operates. Each and every source of fund has some advantages as well as disadvantages.

### 2. FINANCIAL NEEDS AND SOURCES OF FINANCE OF A BUSINESS

**2.1 Financial Needs of a Business:** Business enterprises need funds to meet their different

types of requirements. All the financial needs of a business may be grouped into the following three categories:

*(i) Long term financial needs:* Such needs generally refer to those requirements of funds which are for a period exceeding 5-10 years. All investments in plant, machinery, land, buildings, etc., are considered as long term financial needs. Funds required to finance permanent or hard core working capital should also be procured from long term sources.

*(ii) Medium term financial needs:* Such requirements refer to those funds which are required for a period exceeding one year but not exceeding 5 years. For example, if a company resorts to extensive publicity and advertisement campaign then such type of expenses may be written off over a period of 3 to 5 years. These are called deferred revenue expenses and funds required for them are classified in the category of medium term financial needs. Sometimes long term requirements, for which long term funds cannot be arranged immediately may be met from medium term sources and thus the demand of medium term financial needs, are generated. As and when the desired long term funds are made available, medium term loans taken earlier may be paid off.

*(iii) Short term financial needs:* Such type of financial needs arise to finance in current assets such as stock, debtors, cash, etc. Investment in these assets is known as meeting of working capital requirements of the concern. Firms require working capital to employ fixed assets gainfully. The requirement of working capital depends upon a number of factors which may differ from industry to industry and from company to company in the same industry. The main characteristic of short term financial needs is that they arise for a short period of time not exceeding the accounting period. i.e., one year.

The basic principle for meeting the short term financial needs of a concern is that such needs should be met from short term sources, and for medium term financial needs from medium term sources and long term financial needs from long term sources. Accordingly, the method of raising funds is to be decided with reference to the period for which funds are required. Basically, there are two sources of raising funds for any business enterprise. viz., owner's capital and borrowed capital. The owner's capital is used for meeting long term financial needs and it primarily comes from share capital and retained earnings. Borrowed capital for all the other types of requirement can be raised from different sources such as debentures, public deposits, loans from financial institutions and commercial banks, etc.

The following section shows at a glance the different sources from where the three aforesaid types of finance can be raised in India.

**2.2  Sources of Finance of a Business**

*(i)   Long-term*

1.   Share capital or Equity share

2.   Preference shares

3.   Retained earnings

4.   Debentures/Bonds of different types

5.   Loans from financial institutions

6.   Loans from State Financial Corporation

7.   Loans from commercial banks

8.   Venture capital funding

9.   Asset securitisation

10. International financing like Euro-issues, Foreign currency loans

*(ii)  Medium-term*

1.   Preference shares

2.   Debentures/Bonds

3.   Public deposits/fixed deposits for duration of three years

4.   Commercial banks

5.   Financial institutions

6.   State financial corporations

7.   Lease financing/Hire-Purchase financing

8.   External commercial borrowings

9.   Euro-issues

10. Foreign Currency bonds

*(iii)  Short-term*

1.   Trade credit

2.   Accrued expenses and deferred income

3. Commercial banks

4. Fixed deposits for a period of 1 year or less

5. Advances received from customers

6. Various short-term provisions

It is evident from the above section that funds can be raised from the same source for meeting different types of financial requirements.

**2.3 Financial sources of a business can also be classified as follows by using different basis :**

1. *According to period:*

(i) Long term sources

(ii) Medium term sources

(iii) Short term sources

2. *According to ownership:*

(i) Owners capital or equity capital, retained earnings etc.

(ii) Borrowed capital such as debentures, public deposits, loans etc.

3. *According to source of generation:*

(i) Internal sources e.g. retained earnings and depreciation funds etc.

(ii) External sources e.g. debentures, loans etc.

*However for the sake of convenience, the different sources of funds can also be classified into following categories.*

(i) Security financing - financing through shares and debentures.

(ii) Internal financing - financing through retained earning, depreciation.

(iii) Loans financing - this includes both short term and long term loans.

(iv) International financing.

(v) Other sources.

**3. LONG TERM SOURCES OF FINANCE**

There are different sources of funds available to meet long term financial needs of the

business. These sources may be broadly classified into share capital (both equity and preference) and debt (including debentures, long term borrowings or other debt instruments).

In recent times in India, many companies have raised long term finance by offering various instruments to public like deep discount bonds, fully convertible debentures etc. These new instruments have characteristics of both equity and debt and it is difficult to categorised these either as debt or equity.

*The different sources of long term finance can now be discussed:*

**3.1 Owners Capital or Equity Capital :** A public limited company may raise funds from promoters or from the investing public by way of owners capital or equity capital by issuing ordinary equity shares. Ordinary equity shares are a source of permanent capital. Ordinary shareholders are owners of the company and they undertake the risks of business. They are entitled to dividends after the income claims of other stakeholders are satisfied. Similarly, in the event of winding up, ordinary shareholders can exercise their claim on assets after the claims of the other suppliers of capital have been met. They elect the directors to run the company and have the optimum control over the management of the company. Since equity shares can be paid off only in the event of liquidation, this source has the least risk involved. This is more so due to the fact that equity shareholders can be paid dividends only when there are distributable profits. However, the cost of ordinary shares is usually the highest. This is due to the fact that such shareholders expect a higher rate of return on their investment as compared to other suppliers of long-term funds. Such behaviour is directly related to the risk undertaken by ordinary shareholders when compared to the providers of other forms of capital e.g. debt. Whereas, an ordinary shareholder shall take responsibility of losses incurred by the company by foregoing dividend or accepting a lesser amount, a debt holder shall be statutorily entitled to get regular payments as per the contract. Hence, when compared to those who have provided loan capital to the company, ordinary shareholders carry a higher amount of risk and so expect a higher return. Further, the dividend payable on shares is an appropriation of profits and not a charge against profits. This means that unlike debt, ordinary equity shares do not provide any tax shield to the company, thereby resulting in a higher cost.

Ordinary share capital also provides a security to other suppliers of funds. Thus, a company having substantial ordinary share capital may find it easier to raise further funds, in view of the fact that share capital provides a security to other suppliers of funds.

The Companies Act, 1956 and SEBI Guidelines for disclosure and investors' protections and the clarifications thereto lay down a number of provisions regarding the issue and management of equity shares capital.

*Advantages and disadvantages of raising funds by issue of equity shares are :*

(i) It is a permanent source of finance. Since such shares are not redeemable, the company has no liability for cash outflows associated with its redemption.

(ii) Equity capital increases the company's financial base and thus helps further the borrowing powers of the company.

(iii) The company is not obliged legally to pay dividends. Hence in times of uncertainties or when the company is not performing well, dividend payments can be reduced or even suspended.

(iv) The company can make further issue of share capital by making a right issue.

Apart from the above mentioned advantages, equity capital has some disadvantages to the company when compared with other sources of finance. These are as follows:

(i) The cost of ordinary shares is higher because dividends are not tax deductible and also the floatation costs of such issues are higher.

(ii) Investors find ordinary shares riskier because of uncertain dividend payments and capital gains.

(iii) The issue of new equity shares reduces the earning per share of the existing shareholders until and unless the profits are proportionately increased.

(iv) The issue of new equity shares can also reduce the ownership and control of the existing shareholders.

**3.2 Preference Share Capital:** These are a special kind of shares; the holders of such shares enjoy priority, both as regards to the payment of a fixed amount of dividend and repayment of capital on winding up of the company.

Long-term funds from preference shares can be raised through a public issue of shares. Such shares are normally cumulative, *i.e.*, the dividend payable in a year of loss gets carried over to the next year till there are adequate profits to pay the cumulative dividends. The rate of dividend on preference shares is normally higher than the rate of interest on debentures, loans etc. Most of preference shares these days carry a stipulation of period and the funds have to be repaid at the end of a stipulated period.

Preference share capital is a hybrid form of financing which imbibes within itself some characteristics of equity capital and some attributes of debt capital. It is similar to equity because preference dividend, like equity dividend is not a tax deductible payment. It

resembles debt capital because the rate of preference dividend is fixed. Typically, when preference dividend is skipped it is payable in future because of the cumulative feature associated with most of preference shares.

Cumulative Convertible Preference Shares (CCPs) may also be offered, under which the shares would carry a cumulative dividend of specified limit for a period of say three years after which the shares are converted into equity shares. These shares are attractive for projects with a long gestation period.

Preference share capital may be redeemed at a pre decided future date or at an earlier stage inter alia out of the profits of the company. This enables the promoters to withdraw their capital from the company which is now self-sufficient, and the withdrawn capital may be reinvested in other profitable ventures. It may be mentioned that irredeemable preference shares cannot be issued by any company.

Preference shares have gained importance after the Finance bill 1997 as dividends became tax exempted in the hands of the individual investor and are taxable in the hands of the

company as tax is imposed on distributed profits at a flat rate. At present, a domestic company paying dividend will have to pay dividend distribution tax @ 12.5% plus surcharge of 10% plus an education cess equalling 2% (total 14.025%).

*Advantages and disadvantages of raising funds by issue of preference shares are:*

(i)   No dilution in EPS on enlarged capital base - If equity is issued it reduces EPS, thus affecting the market perception about the company.

(ii)   There is leveraging advantage as it bears a fixed charge. Non payment of preference dividends does not force company into liquidity.

(iii)   There is no risk of takeover as the preference shareholders do not have voting rights except in case where dividend arrears exist.

(iv)   The preference dividends are fixed and pre decided. Hence Preference shareholders do not   participate in surplus profits as the ordinary shareholders.

(v)   Preference capital can be redeemed after a specified period.

*The following are the disadvantages of the preference shares:*

(i)    One of the major disadvantages of preference shares is that preference dividend is not tax deductible and so does not provide a tax shield to the company. Hence a preference share is costlier to the company than debt e.g. debenture.

(ii) Preference dividends are cumulative in nature. This means that although these dividends may be omitted, they shall need to be paid later. Also, if these dividends are not paid, no dividend can be paid to ordinary shareholders. The non payment of dividend to ordinary shareholders could seriously impair the reputation of the company concerned.

**3.3 Retained Earnings:** Long-term funds may also be provided by accumulating the profits of the company and by ploughing them back into business. Such funds belong to the ordinary shareholders and increase the net worth of the company. A public limited company must plough back a reasonable amount of profit every year keeping in view the legal requirements in this regard and its own expansion plans. Such funds also entail almost no risk. Further, control of present owners is also not diluted by retaining profits.

**3.4 Debentures or Bonds:** Loans can be raised from public by issuing debentures or bonds by public limited companies. Debentures are normally issued in different denominations ranging from Rs. 100 to Rs. 1,000 and carry different rates of interest. By issuing debentures, a company can raise long term loans from public. Normally, debentures are issued on the basis of a debenture trust deed which lists the terms and conditions on which the debentures are floated. Debentures are either secured or unsecured.

As compared with preference shares, debentures provide a more convenient mode of long-term funds. The cost of capital raised through debentures is quite low since the interest payable on debentures can be charged as an expense before tax. From the investors' point of view, debentures offer a more attractive prospect than the preference shares since interest on debentures is payable whether or not the company makes profits.

Debentures are thus instruments for raising long-term debt capital. Secured debentures are protected by a charge on the assets of the company. While the secured debentures of a well-established company may be attractive to investors, secured debentures of a new company do not normally evoke same interest in the investing public.

Debentures can be straight debentures or convertible debentures. A convertible debenture is the type which can be converted, either fully or partly, into shares after a specified period of time. Debentures can be divided into the following three categories:

(i) *Non convertible debentures* – These types of debentures do not have any feature of conversion and are repayable on maturity.

(ii) *Fully convertible debentures* – Such debentures are converted into equity shares as per the terms of issue in relation to price and the time of conversion. Interest rates on such debentures are generally less than the non convertible debentures because of their carrying the attractive feature of getting themselves converted into shares.

(iii) *Partly convertible debentures* – Those debentures which carry features of a convertible and a non convertible debenture belong to this category. The investor has the advantage of having both the features in one debenture.

*Advantages of raising finance by issue of debentures are:*

(i) The cost of debentures is much lower than the cost of preference or equity capital as the interest is tax-deductible. Also, investors consider debenture investment safer than equity or preferred investment and, hence, may require a lower return on debenture investment.

(ii) Debenture financing does not result in dilution of control.

(iii) In a period of rising prices, debenture issue is advantageous. The fixed monetary outgo decreases in real terms as the price level increases.

*The disadvantages of debenture financing are:*

(i) Debenture interest and capital repayment are obligatory payments.

(ii) The protective covenants associated with a debenture issue may be restrictive.

(iii) Debenture financing enhances the financial risk associated with the firm.

(iv) Since debentures need to be paid during maturity, a large amount of cash outflow is needed at that time.

These days many companies are issuing convertible debentures or bonds with a number of schemes/incentives like warrants/options etc. These bonds or debentures are exchangeable at the option of the holder for ordinary shares under specified terms and conditions. Thus for the first few years these securities remain as debentures and later they can be converted into equity shares at a pre-determined conversion price. The issue of convertible debentures has distinct advantages from the point of view of the issuing company.  Firstly, such an issue enables the management to raise equity capital indirectly without diluting the equity  holding, until the capital raised has started earning an added return to support the additional shares. Secondly, such securities can be issued even when the equity market is not very good. Thirdly, convertible bonds are normally unsecured and, therefore, their issuance may ordinarily not impair the borrowing capacity. These debentures/bonds are issued subject to the SEBI guidelines notified from time to time.

Public issue of debentures and private placement to mutual funds now require that the issue be rated by a credit rating agency like CRISIL (Credit Rating and Information Services of India Ltd.). The credit rating is given after evaluating factors like track record of the company, profitability, debt servicing capacity, credit worthiness and the perceived risk of lending.

**3.5 Loans from Financial Institutions:** In India specialised institutions provide long- term financial assistance to industry. Thus, the Industrial Finance Corporation of India, the State Financial Corporations, the Life Insurance Corporation of India, the National Small Industries Corporation Limited, the Industrial Credit and Investment Corporation, the Industrial Development Bank of India, and the Industrial Reconstruction Corporation of India provide term loans to companies. Before a term loan is sanctioned, a company has to satisfy the concerned financial institution regarding the technical, commercial, economic, financial and managerial viability of the project for which the loan is required. Such loans are available at different rates of interest under different schemes of financial institutions and are to be repaid according to a stipulated repayment schedule. The loans in many cases stipulate a number of conditions regarding the management and certain other financial policies of the company.

Term loans represent secured borrowings and at present it is the most important source of finance for new projects. They generally carry a rate of interest inclusive of interest tax, depending on the credit rating of the borrower, the perceived risk of lending and the cost of funds. These loans are generally repayable over a period of 6 to 10 years in annual, semi-annual or quarterly instalments.

Term loans are also provided by banks, State financial/development institutions and all- India term lending financial institutions. Banks and State Financial Corporations normally provide term loans to projects in the small scale sector while for the medium and large industries term loans are provided by State developmental institutions alone or in consortium with banks and State financial corporations. For large scale projects All India financial institutions provide the bulk of term finance either singly or in consortium with other All India financial institutions, State level institutions and/or banks.

After Independence, the institutional set up in India for the provision of medium and long term credit for industry has been broadened. The assistance sanctioned and disbursed by these specialised institutions has increased impressively during the years..  A number of such specialised institutions have been established all over the country.

**3.6 Loans from Commercial Banks:** The primary role of the commercial banks is to cater to the short term requirements of industry. Of late, however, banks have started taking an interest in term financing of industries in several ways, though the formal term lending is, so far, small and is confined to major banks only.

Term lending by banks has become a controversial issue these days.  It has been argued that term loans do not satisfy the canon of liquidity which is a major consideration in all bank

operations. According to the traditional values, banks should provide loans only for short periods and for operations which result in the automatic liquidation of such credits over short periods. On the other hand, it is contended that the traditional concept of liquidity requires to be modified. The proceeds of the term loan are generally used for what are broadly known as fixed assets or for expansion in plant capacity. Their repayment is usually scheduled over a long period of time. The liquidity of such loans is said to depend on the anticipated income of the borrowers.

As a matter of fact, a working capital loan is more permanent and long term than a term loan. The reason for making this statement is that a term loan is always repayable on a fixed date and ultimately, a day will come when the account will be totally adjusted. However, in the case of working capital finance, though it is payable on demand, yet in actual practice it is noticed that the account is never adjusted as such; and, if at all the payment is asked back, it is with a clear purpose and intention of refinance being provided at the beginning of the next year or half year. To illustrate this point let us presume that two loans are granted on January 1, 2006 (a) to A; term loan of Rs. 60,000/- for 3 years to be paid back in equal half yearly instalments, and (b) to B : cash-credit limit against hypothecation, etc. of Rs. 60,000.

If we make two separate graphs for the two loans, they may appear to be like the figure shown below.
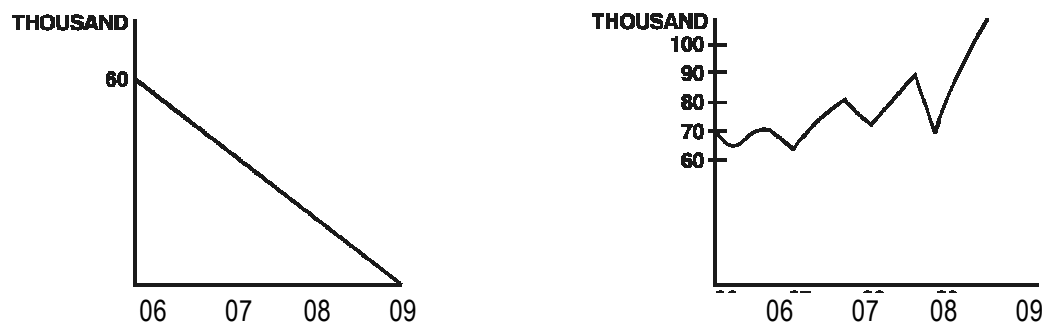


*Note :* It has been presumed that both the concerns are good. Payment of interest has been ignored. It has been presumed that cash credit limit is being enhanced gradually.

The above graphs clearly indicate that at the end of 2009 the term loan would be fully settled whereas the cash credit limit may have been enhanced to over a lakh of rupees. It really amounts to providing finances for long term.

This technique of providing long term finance can be technically called as "rolled over for periods exceeding more than one year". Therefore, instead of indulging in term financing by the rolled over method, banks can and should extend credit term after a proper appraisal of

applications for terms loans. In fact, as stated above, the degree of liquidity in the provision for regular amortisation of term loans is more than in some of these so called demand loans which are renewed from year to year. Actually, term financing disciplines both the banker and the borrower as long term planning is required to ensure that cash inflows would be adequate to meet the instruments of repayments and allow an active turnover of bank loans. The adoption of the formal term loan lending by commercial banks will not in any way hamper the criteria of liquidity and as a matter of fact, it will introduce flexibility in the operations of the banking system.

The real limitation to the scope of bank activities in this field is that all banks are not well equipped to make appraisal of such loan proposals. Term loan proposals involve an element of risk because of changes in the conditions affecting the borrower. The bank making such a loan, therefore, has to assess the situation to make a proper appraisal. The decision in such cases would depend on various factors affecting the conditions of the industry concerned and the earning potential of the borrower.

**Bridge Finance:** Bridge finance refers to loans taken by a company normally from commercial banks for a short period, pending disbursement of loans sanctioned by financial institutions. Normally, it takes time for financial institutions to disburse loans to companies. However, once the loans are approved by the term lending institutions, companies, in order not to lose further time in starting their projects, arrange short term loans from commercial banks. Bridge loans are also provided by financial institutions pending the signing of regular term loan agreement, which may be delayed due to non-compliance of conditions stipulated by the institutions while sanctioning the loan. The bridge loans are repaid/ adjusted out of the term loans as and when disbursed by the concerned institutions. Bridge loans are normally secured by hypothecating movable assets, personal guarantees and demand promissory notes. Generally, the rate of interest on bridge finance is higher as com- pared with that on term loans.

## 4.    VENTURE CAPITAL FINANCING

The venture capital financing refers to financing of new high risky venture promoted by qualified entrepreneurs who lack experience and funds to give shape to their ideas. In broad sense, under venture capital financing venture capitalist make investment to purchase equity or debt securities from inexperienced entrepreneurs who undertake highly risky ventures with a potential of success.

**4.1 Methods of Venture Capital Financing:** In India , Venture Capital financing was first the responsibility of developmental financial institutions such as the  Industrial Development Bank of India (IDBI) , the Technical Development and Information Corporation of India(now known

as ICICI) and the State Finance Corporations(SFCs). In the year 1988, the Government of India took a policy initiative and announced guidelines for Venture Capital Funds (VCFs). In the same year, a Technology Development Fund (TDF) financed by the levy on all payments for technology imports was established This fund was meant to facilitate the financing of innovative and high risk technology programmes through the IDBI.

The guidelines mentioned above restricted the setting up of Venture Capital Funds by banks and financial institutions only. Subsequently guidelines were issued in the month of September 1995, for overseas investment in Venture Capital in India.

A major development in venture capital financing in India was in the year 1996 when the Securities and Exchange Board of India (SEBI) issued guidelines for venture capital funds to follow. These guidelines described a venture capital fund as a fund established in the form of a company or trust, which raises money through loans, donations, issue of securities or units and makes or proposes to make investments in accordance with the regulations. This move was instrumental in the entry of various foreign venture capital funds to enter India.. The guidelines were further amended in April 2000 with the objective of fuelling the growth of Venture Capital activities in India. A few venture capital companies operate as both investment and fund management companies; others set up funds and function as asset management companies.

It is hoped that the changes in the guidelines for the implementation of venture capital schemes in the country would encourage more funds to be set up to give the required momentum for venture capital investment in India.

Some common methods of venture capital financing are as follows:

(i) *Equity financing :* The venture capital undertakings generally requires funds for a longer period but may not be able to provide returns to the investors during the initial stages. Therefore, the venture capital finance is generally provided by way of equity share capital. The equity contribution of venture capital firm does not exceed 49% of the total equity capital of venture capital undertakings so that the effective control and ownership remains with the entrepreneur.

(ii) *Conditional loan:* A conditional loan is repayable in the form of a royalty after the venture is able to generate sales. No interest is paid on such loans. In India venture capital financiers charge royalty ranging between 2 and 15 per cent; actual rate depends on other factors of the venture such as gestation period, cash flow patterns, risk and other factors of the enterprise. Some Venture capital financiers give a choice to the enterprise of paying a high rate of interest (which could be well above 20 per cent) instead of royalty on sales once it becomes commercially sounds.

(iii) *Income note:* It is a hybrid security which combines the features of both conventional loan and conditional loan. The entrepreneur has to pay both interest and royalty on sales but at substantially low rates. IDBI's VCF provides funding equal to 80 – 87.50% of the projects cost for commercial application of indigenous technology.

(iv) *Participating debenture:* Such security carries charges in three phases — in the start up phase no interest is charged, next stage a low rate of interest is charged up to a particular level of operation, after that, a high rate of interest is required to be paid.

Factors that a venture capitalist should consider before financing any risky project are as follows:

**(i)  Level of expertise of company's management:** Most of venture capitalist believes that the success of a new project is highly dependent on the quality of its management team. They expect that entrepreneur should have a skilled team of managers. Managements also be required to show a high level of commitments to the project.

**(ii)  Level of expertise in production:** Venture capital should ensure that entrepreneur and his team should have necessary technical ability to be able to develop and produce new product / service.

**(iii) Nature of new product / service:** The venture capitalist should consider whether the development and production of new product / service should be technically feasible. They should employ experts in their respective fields to examine idea proposed by the entrepreneur.

**(iv) Future Prospects:** Since the degree of risk involved in investing in the company is quite fairly high, venture capitalists should seek to ensure that the prospects for future profits compensate for the risk. Therefore, they should see a detailed business plan setting out the future business strategy.

**(v)  Competition:** The venture capitalist should seek assurance that there is actually a market for a new product. Further venture capitalists should see the research carried on by the entrepreneur.

**(vi) Risk borne by entrepreneur:** The venture capitalist is expected to see that the entrepreneur bears a high degree of risk. This will assure them that the entrepreneur have the sufficient level of the commitments to project as they themselves will have a lot of loss, should the project fail.

**(vii) Exit Route:** The venture capitalist should try to establish a number of exist routes. These may include a sale of shares to the public, sale of shares to another business, or sale of shares to original owners.

**(viii) Board membership:** In case of companies, to ensure proper protection of their investment, venture capitalist should require a place on the Board of Directors.  This will enable them to have their say on all significant matters affecting the business.

## 5.    DEBT SECURITISATION

*Securitisation* is a financial transaction in which assets are pooled and securities representing interests in the pool are issued.  The following example illustrates the process in a conceptual manner:

A finance company has issued a large number of car loans. It desires to raise further cash so as to be in a position to issue more loans. One way to achieve this goal is by selling all the existing loans, however, in the absence of a liquid secondary market for individual car loans, this may not be feasible. Instead, the company pools a large number of these loans and sells interest in the pool to investors. This process helps the company to raise finances and get the loans off its Balance Sheet. .These finances shall help the company disburse further loans. Similarly, the process is beneficial to the investors as it creates a liquid investment in a diversified pool of auto loans, which may be an attractive option to other fixed income instruments. The whole process is carried out in such a way, that the ultimate debtors- the car owners – may not be aware of the transaction. They shall continue making payments the way they were doing before, however, these payments shall reach the new investors instead of the company they (the car owners) had financed their car from.

The example provided above illustrates the general concept of securitisation as understood in common spoken English. Securitisation can take the form of 'debt securitisation' in which the underlying pool of assets (debt) is sold to a company or a trust for an immediate cash payment.  The company which buys these pool of assets issues securities and utilises the regular cash flows arising out of the underlying pool of assets for servicing such issued securities. Thus securitisation follows a two way process, (1) the sale of an asset or a pool of assets to a company for immediate cash payment and (2) the repackaging and selling the security interests representing claims on incoming cash flows from the asset or pool of assets to third party investors by issuance of tradable securities.

The company to which the underlying pool of assets or asset is sold is known as a 'Special Purpose Vehicle' (SPV) and the company which sells the underlying pool of assets or asset is known as the originator.

The process of securitisation is generally without recourse i.e. the investor bears the credit risk or risk of default and the issuer is under an obligation to pay to investors only if the cash flows are received by him from the collateral. The issuer however, has a right to legal recourse

in the event of default. The risk run by the investor can be further reduced through credit enhancement facilities like insurance, letters of credit and guarantees.

In a simple pass through structure, the investor owns a proportionate share of the asset pool and cash flows when generated are passed on directly to the investor. This is done by issuing pass through certificates. In mortgage or asset backed bonds, the investor has a lien on the underlying asset pool. The SPV accumulates payments from the original borrowers from time to time and makes payments to investors at regular predetermined intervals. The SPV can invest the funds received in short term instruments and improve yield when there is time lag between receipt and payment.

In India, the Reserve Bank of India had issued draft guidelines on securitisation of standard assets in April 2005. These guidelines were applicable to banks, financial institutions and non banking financial companies. The guidelines were suitably modified and brought into effect from February 2006.

### 5.1 Benefits to the Originator

(i)    The assets are shifted off the balance sheet, thus giving the originator recourse to off balance sheet funding.

(ii)   It converts illiquid assets to liquid portfolio.

(iii)  It facilitates better balance sheet management as assets are transferred off balance sheet facilitating satisfaction of capital adequacy norms.

(iv)   The originator's credit rating enhances.

For the investor securitisation opens up new investment avenues. Though the investor bears the credit risk, the securities are tied up to definite assets.

As compared to factoring or bill discounting which largely solve the problems of short term trade financing, securitisation helps to convert a stream of cash receivables into a source of long term finance.

### 6.    LEASE FINANCING

Leasing is a general contract between the owner and user of the asset over a specified period of time. The asset is purchased initially by the lessor (leasing company) and thereafter leased to the user (lessee company) which pays a specified rent at periodical intervals. Thus, leasing is an alternative to the purchase of an asset out of own or borrowed funds. Moreover, lease finance can be arranged much faster as compared to term loans from financial institutions.

**Types of lease contracts**

Broadly lease contracts can be divided into following two categories:

(a) Operating Lease (b) Finance Lease.

**(a)   Operating Lease:** A lease is classified as an operating lease if it does not secure for the lessor the recovery of capital outlay plus a return on the funds invested during the lease term. Normally these are callable lease and is cancelable with proper notice.

The term of this type of lease is shorter than the asset's economic life.  The leasee is obliged to make payment until the lease expiration, which approaches useful life of the asset.

An operating lease is particularly attractive to companies that continually update or replace equipment and want to use equipment without ownership, but also want to return equipment at lease end and avoid technological obsolescence.

**(b)   Finance Lease:** In contrast to an operating lease, a financial lease is longer term in nature and non-cancelable. In general term, a finance lease can be regarded as any leasing arrangement who is to finance the use of equipment for the major parts of its useful life. The leasee has the right to use the equipment while the lessor retains legal title. It is also called capital lease, at it is nothing but a loan in disguise.

Thus it can be said, a contract involving payments over an obligatory period of specified sums sufficient in total to amortise the capital outlay of the lessor and give some profit.

**Comparison between Financial Lease and Operating Lease**

| | Finance Lease | Operating Lease |
|---|---|---|
| 1. | The risk and reward incident to ownership are passed on to the lessee. The lessor only remains the legal owner of the asset. | The lessee is only provided the use of the asset for a certain time. Risk incident to ownership belong wholly to the lessor. |
| 2. | The lessee bears the risk of obsolescence. | The lessee is only provided the use of asset for a certain time.  Risks incidental to ownership belong wholly to the lessor. |
| 3. | The lessor is interested in his rentals and not in the asset.  He must get his principal back along with interest. Therefore, the lease is non-cancellable by either party. | As the lessor does not have difficulty in leasing the same asset to other willing lessor, the lease is kept cancelable by the lessor. |
| 4. | The lessor enters into the transaction only as financier.  He does not bear the cost of repairs, maintenance or operations. | Usually, the lessor bears cost of repairs, maintenance or operations. |

| 5. | The lease is usually full pay out, that is, the single lease repays the cost of the asset together with the interest. | The lease is usually non-payout, since the lessor expects to lease the same asset over and over again to several users. |
|---|---|---|

**Other types of Leases**

**(1) Sales and Lease Back**

Under this type of lease, the owner of an asset sells the asset to a party (the buyer), who in turn leases back the same asset to the owner in consideration of a lease rentals. Under this arrangement, the asset are not physically exchanged but it all happen in records only. The main advantage of this method is that the lessee can satisfy himself completely regarding the quality of an asset and after possession of the asset convert the sale into a lease agreement.

Under this transaction, the seller assumes the role of lessee and the buyer assumes the role of a lessor. The seller gets the agreed selling price and the buyer gets the lease rentals.

**(2) Leveraged Lease**

Under this lease, a third party is involved beside lessor and lessee. The lessor borrows a part of the purchase cost (say 80%) of the asset from the third party i.e., lender and asset so purchased is held as security against the loan. The lender is paid off from the lease rentals directly by the lessee and the surplus after meeting the claims of the lender goes to the lessor. The lessor is entitled to claim depreciation allowance.

**(3) Sales-aid Lease**

Under this lease contract, the lessor enters into a tie up with a manufacturer for marketing the latter's product through his own leasing operations, it is called a sales-aid-lease. In consideration of the aid in sales, the manufacturers may grant either credit, or a commission to the lessor. Thus, the lessor earns from both sources i.e. from lessee as well as the manufacturer.

**(4) Close-ended and open-ended Leases**

In the close-ended lease, the assets get transferred to the lessor at the end of lease, the risk of obsolescence, residual value etc., remain with the lessor being the legal owner of the asset. In the open-ended lease, the lessee has the option of purchasing the asset at the end of the lease period.

In recent years, leasing has become a popular source of financing in India. From the lessee's point of view, leasing has the attraction of eliminating immediate cash outflow, and the lease rentals can be deducted for computing the total income under the Income tax Act. As against this, buying has the advantages of depreciation allowance (including additional depreciation) and interest on borrowed capital being tax-deductible. Thus, an evaluation of the two

alternatives is to be made in order to take a decision. Practical problems for lease financing are covered at Final level in paper of Strategic Financial Management.

## 7.    SHORT TERM SOURCES OF FINANCE

There are various sources available to meet short term needs of finance. The different sources are discussed below:

**7.1   Trade Credit:** It represents credit granted by suppliers of goods, etc., as an incident of sale. The usual duration of such credit is 15 to 90 days. It generates automatically in the course of business and is common to almost all business operations. It can be in the form of an 'open account' or 'bills payable'. Trade credit is preferred as a source of finance because it is without any explicit cost and till a business is a going concern it keeps on rotating. Another very important characteristic of trade credit is that it enhances automatically with the increase in the volume of business.

**7.2.  Accrued Expenses and Deferred Income:** Accrued expenses represent liabilities which a company has to pay for the services which it has already received.  Such expenses arise out of the day to day activities of the company and hence represent a spontaneous source of finance.

Deferred income, on the other hand, reflects the amount of funds received by a company in lieu of goods and services to be provided in the future.  Since these receipts increase a company's liquidity, they are also considered to be an important source of spontaneous finance.

**7.3   Advances from Customers:** Manufacturers and contractors engaged in producing or constructing costly goods involving considerable length of manufacturing or construction time usually demand advance money from their customers at the time of accepting their orders for executing their contracts or supplying the goods. This is a cost free source of finance and really useful.

**7.4.  Commercial Paper:** A Commercial Paper is an unsecured money market instrument issued in the form of a promissory note. The Reserve Bank of India introduced the commercial paper scheme in the year 1989 with a view to enabling highly rated corporate borrowers to diversify their sources of short term borrowings and to provide an additional instrument to investors. Subsequently, in addition to the Corporate, Primary Dealers and All India Financial Institutions have also been allowed to issue Commercial Papers. Commercial Papers can be issued for maturities between 15 days and a maximum up to one year from the date of issue. These can be issued in denominations of Rs 5 lakh or multiples thereof. All eligible issuers are

required to get the credit rating from Credit Rating Information Services of India Ltd,(CRISIL), or the Investment Information and Credit Rating Agency of India Ltd (ICRA) or the Credit Analysis and Research Ltd (CARE) or the FITCH Ratings India Pvt Ltd or any such other credit rating agency as is specified by the Reserve Bank of India .Individuals, banking companies, corporate bodies incorporated in India, Non Resident Indians, Foreign Institutional Investors etc are allowed to invest in Commercial Paper, the minimum amount of such investment being Rs 5 lakhs.

**7.5   Bank Advances:** Banks receive deposits from public for different periods at varying rates of interest. These funds are invested and lent in such a manner that when required, they may be called back. Lending results in gross revenues out of which costs, such as interest on deposits, administrative costs, etc., are met and a reasonable profit is made. A bank's lending policy is not merely profit motivated but has to also keep in mind the socio- economic development of the country.

Bank advances are in the form of loan, overdraft, cash credit and bills purchased/discounted etc. Banks do not sanction advances on a long term basis beyond a small proportion of their demand and time liabilities. Advances are granted against tangible securities such as goods, shares, government promissory notes, Bills etc. In very rare cases, clean advances may also be allowed.

*(i)   Loans :* In a loan account, the entire advance is disbursed at one time either in cash or by transfer to the current account of the borrower. It is a single advance. Except by way of interest and other charges no further adjustments are made in this account. Loan accounts are not running accounts like overdraft and cash credit accounts, repayment under the loan account may be the full amounts or by way of schedule of repayments agreed upon as in case of term loans.  The securities may be shares, government securities, life insurance policies and fixed deposit receipts, etc.

*(ii)   Overdraft:* Under this facility, customers are allowed to withdraw in excess of credit balance standing in their Current Deposit Account. A fixed limit is therefore granted to the borrower within which the borrower is allowed to overdraw his account. Opening of an overdraft account requires that a current account will have to be formally opened. Though overdrafts are repayable on demand, they generally continue for long periods by annual renewals of the limits. This is a convenient arrangement for the borrower as he is in a position to avail of the limit sanctioned, according to his requirements.  Interest is charged on daily balances. Since these accounts are operative like cash credit and current accounts, cheque books are provided. As in the case of a loan account the security in an overdraft account may be shares, debentures and Government securities. In special cases, life insurance policies

and fixed deposit receipts are also accepted.

*(iii) Clean Overdrafts:* Request for clean advances are entertained only from parties which are financially sound and reputed for their integrity. The bank has to rely upon the personal security of the borrowers. Therefore, while entertaining proposals for clean advances; banks exercise a good deal of restraint since they have no backing of any tangible security. If the parties are already enjoying secured advance facilities, this may be a point in favour and may be taken into account while screening such proposals. The turnover in the account, satisfactory dealings for considerable period and reputation in the market are some of the factors which the bank will normally see. As a safeguard, banks take guarantees from other persons who are credit worthy before granting this facility. A clean advance is generally granted for a short period and must not be continued for long.

*(iv)  Cash Credits:* Cash Credit is an arrangement under which a customer is allowed an advance up to certain limit against credit granted by bank. Under this arrangement, a customer need not borrow the entire amount of advance at one time; he can only draw to the extent of his requirements and deposit his surplus funds in his account. Interest is not charged on the full amount of the advance but on the amount actually availed of by him. Generally cash credit limits are sanctioned against the security of goods by way of pledge or hypothecation. The borrower can also provide alternative security of goods by way of pledge or hypothecation. Though these accounts are repayable on demand, banks usually do not recall such advances, unless they are compelled to do so by adverse factors. Hypothecation is an equitable charge on movable goods for an amount of debt where neither possession nor ownership is passed on to the creditor. In case of pledge, the borrower delivers the goods to the creditor as security for repayment of debt. Since the banker, as creditor, is in possession of the goods, he is fully secured and in case of emergency he can fall back on the goods for realisation of his advance under proper notice to the borrower.

*(v)  Advances against goods :* Advances against goods occupy an important place in total bank credit. Goods are security have certain distinct advantages. They provide a reliable source of repayment. Advances against them are safe and liquid. Also, there is a quick turnover in goods, as they are in constant demand. So a banker accepts them as security. Generally goods are charged to the bank either by way of pledge or by way of hypothecation. The term 'goods' includes all forms of movables which are offered to the bank as security. They may be agricultural commodities or industrial raw materials or partly finished goods.

For the purpose of calculation of the drawing limits, valuation of the goods is made from time to time. In case of hypothecation advance, an undertaking is obtained from the borrower that the goods are not charged to some other bank. The bank also takes periodical statements of

stocks regarding quantity valuation etc.

The Reserve Bank of India issues directives from time to time imposing restrictions on advances against certain commodities. It is obligatory on banks to follow these directives in letter and spirit. The directives also sometimes stipulate changes in the margin.

*(vi)   Bills Purchased/Discounted :* These advances are allowed against the security of bills which may be clean or documentary. Bills are sometimes purchased from approved customers in whose favour limits are sanctioned. Before granting a limit the banker satisfies himself as to the credit worthiness of the drawer. Although the term 'bills purchased' gives the impression that the bank becomes the owner or purchaser of such bills, in actual practice the bank holds the bills only as security for the advance. The bank, in addition to the rights against the parties liable on the bills, can also exercise a pledge's rights over the goods covered by the documents.

Usance bills maturing at a future date or sight are discounted by the banks for approved parties. When a bill is discounted, the borrower is paid the present worth. The bankers, however, collect the full amounts on maturity. The difference between these two amounts represents earnings of the bankers for the period. This item of income is called 'discount'.

Sometimes, overdraft or cash credit limits are allowed against the security of bills. A suitable margin is usually maintained. Here the bill is not a primary security but only a collateral security. The banker in the case, does not become a party to the bill, but merely collects it as an agent for its customer.

When a banker purchases or discounts a bill, he advances against the bill; he has therefore to be very cautious and grant such facilities only to those customers who are creditworthy and have established a steady relationship with the bank. Credit reports are also compiled on the drawees.

*(vii) Advance against documents of title to goods:* A document becomes a document of title to goods when its possession is recognised by law or business custom as possession of the goods. These documents include a bill of lading, dock warehouse keeper's certificate, railway receipt, etc. A person in possession of a document to goods can by endorsement or delivery (or both) of document, enable another person to take delivery of the goods in his right. An advance against the pledge of such documents is equivalent to an advance against the pledge of goods themselves.

*(viii) Advance against supply of bills:* Advances against bills for supply of goods to government or semi-government departments against firm orders after acceptance of tender fall under this category. The other type of bills which also come under this category are bills from contractors

for work executed either wholly or partially under firm contracts entered into with the above mentioned Government agencies.

These bills are clean bills without being accompanied by any document of title of goods. But they evidence supply of goods directly to Governmental agencies. Sometimes these bills may be accompanied by inspection notes from representatives of government agencies for having inspected the goods before they are despatched. If bills are without the inspection report, banks like to examine them with the accepted tender or contract for verifying that the goods supplied under the bills strictly conform to the terms and conditions in the acceptance tender.

These supply bills represent debt in favour of suppliers/contractors, for the goods supplied to the government bodies or work executed under contract from the Government bodies. It is this debt that is assigned to the bank by endorsement of supply bills and executing irrevocable power of attorney in favour of the banks for receiving the amount of supply bills from the Government departments. The power of attorney has got to be registered with the Government department concerned. The banks also take separate letter from the suppliers / contractors instructing the Government body to pay the amount of bills direct to the bank.

Supply bills do not enjoy the legal status of negotiable instruments because they are not bills of exchange. The security available to a banker is by way of assignment of debts represented by the supply bills.

*(ix) Term Loans by banks:* Term loans are an instalment credit repayable over a period of time in monthly/quarterly/half-yearly or yearly instalment. Banks grant term loans for small projects falling under priority sector, small scale sector and big units. Banks have now been permitted to sanction term loan for projects as well without association of financial institutions. The banks grant loans for periods which normally range from 3 to 7 years and some- times even more. These loans are granted on the security of fixed assets.

**7.6  Financing of Export Trade by Banks:**  Exports play an important role in accelerating the economic growth of developing countries like India. Of the several factors influencing export growth, credit is a very important factor which enables exporters in efficiently executing their export orders. The commercial banks provide short term export finance mainly by way of pre and post-shipment credit. Export finance is granted in Rupees as well as in foreign currency.

In view of the importance of export credit in maintaining the pace of export growth, RBI has initiated several measures in the recent years to ensure timely and hassle free flow of credit to the export sector. These measures, inter alia, include rationalization and liberalization of

export credit interest rates, flexibility in repayment/prepayment of pre-shipment credit, special financial package for large value exporters, export finance for agricultural exports, Gold Card Scheme for exporters etc. Further, banks have been granted freedom by RBI to source funds from abroad without any limit for exclusively for the purpose of granting export credit in foreign currency, which has enabled banks to increase their lending's under export credit in foreign currency substantially during the last few years.

The advances by commercial banks for export financing are in the form of:

(i)    Pre-shipment finance i.e., before shipment of goods.

(ii)   Post-shipment finance i.e., after shipment of goods.

**7.6.1 Pre-Shipment Finance:** This generally takes the form of packing credit facility; packing credit is an advance extended by banks to an exporter for the purpose of buying, manufacturing, processing, packing, shipping goods to overseas buyers. Any exporter, having at hand a firm export order placed with him by his foreign buyer or an irrevocable letter of credit opened in his favour, can approach a bank for availing of packing credit. An advance so taken by an exporter is required to be liquidated within 180 days from the date of its commencement by negotiation of export bills or receipt of export proceeds in an approved manner. Thus packing credit is essentially a short term advance.

Normally, banks insist upon their customers to lodge with them irrevocable letters of credit opened in favour of the customers by the overseas buyers. The letter of credit and firm sale contracts not only serve as evidence of a definite arrangement for realisation of the export proceeds but also indicate the amount of finance required by the exporter. Packing credit, in the case of customers of long standing, may also be granted against firm contracts entered into by them with overseas buyers.

### 7.6.1.1  Types of Packing Credit

*(a) Clean packing credit :* This is an advance made available to an exporter only on production of a firm export order or a letter of credit without exercising any charge or control over raw material or finished goods. It is a clean type of export advance. Each proposal is weighed according to particular requirements of the trade and credit worthiness of the exporter. A suitable margin has to be maintained. Also, Export Credit Guarantee Corporation (ECGC) cover should be obtained by the bank.

*(b) Packing credit against hypothecation of goods:* Export finance is made available on certain terms and conditions where the exporter has pledge able interest and the goods are hypothecated to the bank as security with stipulated margin. At the time of utilising the

advance, the exporter is required to submit, along with the firm export order or letter of credit relative stock statements and thereafter continue submitting them every fortnight and/or whenever there is any movement in stocks.

*(c) Packing credit against pledge of goods:* Export finance is made available on certain terms and conditions where the exportable finished goods are pledged to the banks with approved clearing agents who will ship the same from time to time as required by the exporter. The possession of the goods so pledged lies with the bank and is kept under its lock and key.

*(d) E.C.G.C. guarantee:* Any loan given to an exporter for the manufacture, processing, purchasing, or packing of goods meant for export against a firm order qualifies for the packing. credit guarantee issued by Export Credit Guarantee Corporation (ECGC).

*(e) Forward exchange contract:* Another requirement of packing credit facility is that if the export bill is to be drawn in a foreign currency, the exporter should enter into a forward exchange contact with the bank, thereby avoiding risk involved in a possible change in the rate of exchange.

*Documents required :* In case of partnership firms, banks usually require the following documents:

(i)    Joint and several demand promote signed on behalf of the firm as well as by the partners individually.

(ii)   Letter of continuity (signed on behalf of the firm and partners individually).

(iii)  Letter of Pledge to secure demand cash credit against goods (in case of pledge) OR Agreement of Hypothecation to secure demand cash credit (in case of hypothecation).

(iv)   Letter of Authority to operate the account.

(v)    Declaration of Partnership.

(In case of sole traders, sole proprietorship declaration).

(vi)   Agreement to utilise the monies drawn in terms of contract.

(vii)  Letter of Hypothecation (for bills).

In case of limited companies banks usually require the following documents :

(i)    Demand Pro-note

(ii)   Letter of continuity.

(iii)  Agreement of hypothecation or Letter of pledge signed on behalf of the company.

(iv) General guarantee of the directors of the company in their joint and several personal capacities.

(v) Certified copy of the board of directors' resolution.

(vi) Agreement to utilise the monies drawn in terms of contract should bear the seal of the company.

(vii) Letter of Hypothecation (for bills).

**7.6.2 Post-shipment Finance:** It takes the following forms:

*(a) Purchase/discounting of documentary export bills :* Finance is provided to exporters by purchasing export bills drawn payable at sight or by discounting usance export bills covering confirmed sales and backed by documents including documents of the title of goods such as bill of lading, post parcel receipts, or air consignment notes.

*Documents to be obtained:*

(i) Letter of hypothecation covering the goods; and

(ii) General guarantee of directors or partners of the firm as the case may be.

(b) *E.C.G.C. Guarantee:* Post-shipment finance, given to an exporter by a bank through purchase, negotiation or discount of an export bill against an order, qualifies for post-shipment export credit guarantee. It is necessary, however, that exporters should obtain a shipment or contracts risk policy of E.C.G.C. Banks insist on the exporters to take a contracts shipments (comprehensive risks) policy covering both political and commercial risks. The Corporation, on acceptance of the policy, will fix credit limits for individual exporters and the Corporation's liability will be limited to the extent of the limit so fixed for the exporter concerned irrespective of the amount of the policy.

(c) *Advance against export bills sent for collection :* Finance is provided by banks to exporters by way of advance against export bills forwarded through them for collection, taking into account the creditworthiness of the party, nature of goods exported, usance, standing of drawee, etc. appropriate margin is kept.

*Documents to be obtained :*

(i) Demand promissory note.

(ii) Letter of continuity.

(iii) Letter of hypothecation covering bills.

(iv)   General Guarantee of directors or partners of the firm (as the case may be).

(d) *Advance against duty draw backs, cash subsidy, etc.:* To finance export losses sustained by exporters, bank advance against duty draw-back, cash subsidy, etc., receivable by them against export performance. Such advances are of clean nature; hence necessary precaution should be exercised.

*Conditions :* Bank providing finance in this manner see that the relative export bills are either negotiated or forwarded for collection through it so that it is in a position to verify the exporter's claims for duty draw-backs, cash subsidy, etc. 'An advance so availed of by an exporter is required to be liquidated within 180 days from the date of shipment of relative goods.

*Documents to be obtained:*

(i)   Demand promissory note.

(ii)   Letter of continuity.

(iii)   General Guarantee of directors of partners of the firm as the case may be.

(iv)   Undertaking from the borrowers that they will deposit the cheques/payments received from the appropriate authorities immediately with the bank and will not utilise such amounts in any other way.

*Other facilities extended to exporters:*

(i)   On behalf of approved exporters, banks establish letters of credit on their overseas or up country suppliers.

(ii)   Guarantees for waiver of excise duty, etc. due performance of contracts, bond in lieu of cash security deposit, guarantees for advance payments etc., are also issued by banks to approved clients.

(iii)   To approved clients undertaking exports on deferred payment terms, banks also provide finance.

(iv)   Banks also endeavour to secure for their exporter-customers status reports of their buyers and trade information on various commodities through their correspondents.

(v)   Economic intelligence on various countries is also provided by banks to their ex- porter clients.

**7.7  Inter Corporate Deposits:** The companies can borrow funds for a short period say 6 months from other companies which have surplus liquidity. The rate of interest on inter

corporate deposits varies depending upon the amount involved and time period.

**7.8  Certificate of Deposit (CD):** The certificate of deposit is a document of title similar to a time deposit receipt issued by a bank except that there is no prescribed interest rate on such funds.

The main advantage of CD is that banker is not required to encash the deposit before maturity period and the investor is assured of liquidity because he can sell the CD in secondary market.

**7.9  Public Deposits:** Public deposits are very important source of short-term and medium term finances particularly due to credit squeeze by the Reserve Bank of India. A company can accept public deposits subject to the stipulations of Reserve Bank of India from time to time maximum up to 35 per cent of its paid up capital and reserves, from the public and shareholders. These deposits may be accepted for a period of six months to three years. Public deposits are unsecured loans; they should not be used for acquiring fixed assets since they are to be repaid within a period of 3 years. These are mainly used to finance working capital requirements.

## 8.    OTHER SOURCES OF FINANCING

**8.1  Seed Capital Assistance:** The Seed capital assistance scheme is designed by IDBI for professionally or technically qualified entrepreneurs and/or persons possessing relevant experience, skills and entrepreneurial traits. All the projects eligible for financial assistance from IDBI, directly or indirectly through refinance are eligible under the scheme. The project cost should not exceed Rs. 2 crores and the maximum assistance under the project will be restricted to 50% of the required promoter's contribution or Rs. 15 lacs whichever is lower.

The Seed Capital Assistance is interest free but carries a service charge of one per cent per annum for the first five years and at increasing rate thereafter.  However, IDBI will have the option to charge interest at such rate as may be determined by IDBI on the loan if the financial position and profitability of the company so permits during the currency of the loan. The repayment schedule is fixed depending upon the repaying capacity of the unit with an initial moratorium upto five years.

For projects with a project cost exceeding Rs. 200 lacs, seed capital may be obtained from the Risk Capital and Technology Corporation Ltd. (RCTC) For small projects costing upto Rs. 5 lacs, assistance under the National Equity Fund of the SIDBI may be availed.

**8.2 Risk Capital Foundation Scheme:** The Risk Capital Foundation Scheme is an autonomous foundation set up and funded by IFCI. It assists promoters of projects costing between Rs 2 crores and Rs 15 crore. The ceiling on the assistance varies between Rs 15 lakhs and Rs 40 lakhs depending on the number of applicant promoters.

**8.3 Internal Cash Accruals:** Existing profit making companies which undertake an expansion/ diversification programme may be permitted to invest a part of their accumulated reserves or cash profits for creation of capital assets. In such cases, past performance of the company permits the capital expenditure from within the company by way of disinvestment of working/invested funds. In other words, the surplus generated from operations, after meeting all the contractual, statutory and working requirement of funds, is available for further capital expenditure.

**8.4 Unsecured Loans:** Unsecured loans are typically provided by promoters to meet the promoters' contribution norm. These loans are subordinate to institutional loans. The rate of interest chargeable on these loans should be less than or equal to the rate of interest on institutional loans and interest can be paid only after payment of institutional dues. These loans cannot be repaid without the prior approval of financial institutions. Unsecured loans are considered as part of the equity for the purpose of calculating of debt equity ratio.

**8.5 Deferred Payment Guarantee:** Many a time suppliers of machinery provide deferred credit facility under which payment for the purchase of machinery can be made over a period of time. The entire cost of the machinery is financed and the company is not required to contribute any amount initially towards acquisition of the machinery. Normally, the supplier of machinery insists that bank guarantee should be furnished by the buyer. Such a facility does not have a moratorium period for repayment. Hence, it is advisable only for an existing profit making company.

**8.6 Capital Incentives:** The backward area development incentives available often determine the location of a new industrial unit. These incentives usually consist of a lump sum subsidy and exemption from or deferment of sales tax and octroi duty. The quantum of incentives is determined by the degree of backwardness of the location.

The special capital incentive in the form of a lump sum subsidy is a quantum sanctioned by the implementing agency as a percentage of the fixed capital investment subject to an overall ceiling. This amount forms a part of the long-term means of finance for the project. However, it may be mentioned that the viability of the project must not be dependent on the quantum and availability of incentives. Institutions, while appraising the project, assess the viability of the project per se, without considering the impact of incentives on the cash flows and profitability

of the project.

Special capital incentives are sanctioned and released to the units only after they have complied with the requirements of the relevant scheme. The requirements may be classified into initial effective steps and final effective steps. The initial effective steps include formation of the firm/company, acquisition of land in the backward area and registration for manufacture of the products. The final effective steps include obtaining clearances under FEMA, capital goods clearance/import licence, conversion of Letter of Intent to Industrial License, tie up of the means of finance, all clearances required for the setting up of the unit, aggregate expenditure incurred for the project should exceed 25% of the project cost and at least 10% of the fixed assets should have been created/acquired site.

The release of special capital incentives by the concerned State Government generally takes one to two years. The promoters therefore find it convenient to avail bridge finance against the capital incentives. Provision for the same should be made in the pre-operative expenses considered in the project cost. Further, as the bridge finance may be available to the extent of 85%, the balance 15% may have to be brought in by the promoters from their own resources.

## 9.    NEW INSTRUMENTS

The new instruments that have been introduced since early 90's as a source of finance is staggering in their nature and diversity. These new instruments are as follows:

**9.1  Deep Discount Bonds:** Deep Discount Bonds is a form of zero-interest bonds. These bonds are sold at a discounted value and on maturity face value is paid to the investors. In such bonds, there is no interest payout during lock in period.

IDBI was the first to issue a deep discount bond in India in January, 1992. The bond of a face value of Rs. 1 lakh was sold for Rs. 2,700 with a maturity period of 25 years. The investor could hold the bond for 25 years or seek redemption at the end of every five years with a specified maturity value as shown below.

| Holding Period (years) | 5 | 10 | 15 | 20 | 25 |
|---|---|---|---|---|---|
| Maturity value (Rs.) | 5,700 | 12,000 | 25,000 | 50,000 | 1,00,000 |
| Annual rate of interest (%) | 16.12 | 16.09 | 15.99 | 15.71 | 15.54 |

The investor can sell the bonds in stock market and realise the difference between face value (Rs. 2,700) and market price as capital gain.

**9.2  Secured Premium Notes:** Secured Premium Notes is issued along with a detachable warrant and is redeemable after a notified period of say 4 to 7 years. The conversion of

detachable warrant into equity shares will have to be done within time period notified by the company.

**9.3 Zero interest fully convertible debentures:** These are fully convertible debentures which do not carry any interest. The debentures are compulsorily and automatically converted after a specified period of time and holders thereof are entitled to new equity shares of the company at predetermined price. From the point of view of company this kind of instrument is beneficial in the sense that no interest is to be paid on it, if the share price of the company in the market is very high than the investors tends to get equity shares of the company at the lower rate.

**9.4 Zero Coupon Bonds:** A Zero Coupon Bonds does not carry any interest but it is sold by the issuing company at a discount. The difference between the discounted value and maturing or face value represents the interest to be earned by the investor on such bonds.

**9.5 Double Option Bonds:** These have also been recently issued by the IDBI. The face value of each bond is Rs. 5,000. The bond carries interest at 15% per annum compounded half yearly from the date of allotment. The bond has maturity period of 10 years. Each bond has two parts in the form of two separate certificates, one for principal of Rs. 5,000 and other for interest (including redemption premium) of Rs. 16,500. Both these certificates are listed on all major stock exchanges. The investor has the facility of selling either one or both parts anytime he likes.

**9.6 Option Bonds:** These are cumulative and non-cumulative bonds where interest is payable on maturity or periodically. Redemption premium is also offered to attract investors. These were recently issued by IDBI, ICICI etc.

**9.7 Inflation Bonds:** Inflation Bonds are the bonds in which interest rate is adjusted for inflation. Thus, the investor gets interest which is free from the effects of inflation. For example, if the interest rate is 11 per cent and the inflation is 5 per cent, the investor will earn 16 per cent meaning thereby that the investor is protected against inflation.

**9.8 Floating Rate Bonds:** This as the name suggests is bond where the interest rate is not fixed and is allowed to float depending upon the market conditions. This is an ideal instrument which can be resorted to by the issuer to hedge themselves against the volatility in the interest rates. This has become more popular as a money market instrument and has been successfully issued by financial institutions like IDBI, ICICI etc.

## 10.    INTERNATIONAL FINANCING

The essence of financial management is to raise and utilise the funds raised effectively. There are various avenues for organisations to raise funds either through internal or external sources. The sources of external sources include:

**10.1 Commercial Banks:** Like domestic loans, commercial banks all over the world extend Foreign Currency (FC) loans also for international operations. These banks also provide to overdraw over and above the loan amount.

**10.2 Development Banks:** Development banks offer long & medium term loans including FC loans. Many agencies at the national level offer a number of concessions to foreign companies to invest within their country and to finance exports from their countries. E.g.  EXIM Bank of USA.

**10.3 Discounting of Trade Bills:** This is used as a short term financing method. It is used widely in Europe and Asian countries to finance both domestic and international business.

**10.4 International Agencies:** A number of international agencies have emerged over the years to finance international trade & business. The more notable among them include The Inter- national Finance Corporation (IFC), The International Bank for Reconstruction and Development (IBRD), The Asian Development Bank (ADB), The International Monetary Fund (IMF), etc.

**10.5 International Capital Markets:** Today, modern organisations including MNC's depend upon sizeable borrowings in Rupees as well as Foreign Currency. In order to cater to the needs of such organisations, international capital markets have sprung all over the globe such as in London.

In international capital market, the availability of FC is assured under the four main systems viz:

*    Euro-currency market

*    Export credit facilities

*    Bonds issues

*    Financial Institutions.

The origin of the Euro-currency market was with the dollar denominated bank deposits & loans in Europe particularly in London. Euro-dollar deposits are dollar denominated time deposits available at foreign branches of US banks & at some foreign banks. Banks based in Europe

accept dollar denominated deposits & make dollar denominated deposits to the clients. This forms the backbone of the Euro-currency market all over the globe. In this market, funds are made available as loans through syndicated Euro-credit of instruments such as FRN's. FR certificates of deposits.

**10.6 Financial Instruments:** Some of the various financial instruments dealt with in the international market are briefly described below:

**(a) External Commercial Borrowings(ECB) :** ECBs refer to commercial loans (in the form of bank loans , buyers credit, suppliers credit, securitised instruments ( e.g. floating rate notes and fixed rate bonds) availed from non resident lenders with minimum average maturity of 3 years. Borrowers can raise ECBs through internationally recognised sources like (i) international banks, (ii) international capital markets, (iii) multilateral financial institutions such as the IFC, ADB etc, (iv) export credit agencies, (v) suppliers of equipment, (vi) foreign collaborators and (vii) foreign equity holders.

External Commercial Borrowings can be accessed under two routes viz (i) Automatic route and (ii) Approval route. Under the Automatic route there is no need to take the RBI/Government approval whereas such approval is necessary under the Approval route. Company's registered under the Companies Act and NGOs engaged in micro finance activities are eligible for the Automatic Route where as Financial Institutions and Banks dealing exclusively in infrastructure or export finance and the ones which had participated in the textile and steel sector restructuring packages as approved by the government are required to take the Approval Route.

**(b) Euro Bonds:** Euro bonds are debt instruments which are not denominated in the currency of the country in which they are issued. E.g. a Yen note floated in Germany. Such bonds are generally issued in a bearer form rather than as registered bonds and in such cases they do not contain the investor's names or the country of their origin. These bonds are an attractive proposition to investors seeking privacy.

**(c) Foreign Bonds:** These are debt instruments issued by foreign corporations or foreign governments. Such bonds are exposed to default risk, especially the corporate bonds. These bonds are denominated in the currency of the country where they are issued, however, in case these bonds are issued in a currency other than the investors home currency, they are exposed to exchange rate risks. An example of a foreign bond 'A British firm placing Dollar denominated bonds in USA'.

**(d) Fully Hedged Bonds:** As mentioned above, in foreign bonds, the risk of currency fluctuations exists. Fully hedged bonds eliminate the risk by selling in forward markets the

entire stream of principal and interest payments.

**(e)  Medium Term Notes:** Certain issuers need frequent financing through the Bond route including that of the Euro bond. However it may be costly and ineffective to go in for frequent issues. Instead, investors can follow the MTN programme. Under this programme, several lots of bonds can be issued, all having different features e.g. different coupon rates, different currencies etc. The timing of each lot can be decided keeping in mind the future market opportunities. The entire documentation and various regulatory approvals can be taken at one point of time

**(f)  Floating Rate Notes:** These are issued up to seven years maturity. Interest rates are adjusted to reflect the prevailing exchange rates. They provide cheaper money than foreign loans.

**(g)  Euro Commercial Papers (ECP):** ECPs are short term money market instruments. They are for maturities less than one year. They are usually designated in US Dollars.

**(h)  Foreign Currency Option:** A FC Option is the right to buy or sell, spot, future or forward, a specified foreign currency. It provides a hedge against financial and economic risks.

**(i)  Foreign Currency Futures:** FC Futures are obligations to buy or sell a specified currency in the present for settlement at a future date.

**10.7 Euro Issues by Indian Companies :** Indian companies are permitted to raise foreign currency resources through issue of ordinary equity shares through Global Depository Receipts(GDRs)/ American Depository Receipts (ADRs) and / or issue of Foreign Currency Convertible Bonds (FCCB) to foreign investors i.e. institutional investors or individuals (including NRIs) residing abroad . Such investment is treated as Foreign Direct Investment. The government guidelines on these issues are covered under the Foreign Currency Convertible Bonds and Ordinary Shares (Through depositary receipt mechanism) Scheme, 1993 and notifications issued after the implementation of the said scheme.

**(a)  American Depository Deposits (ADR) :** These are securities offered by non-US companies who want to list on any of the US exchange. Each ADR represents a certain number of a company's regular shares. ADRs allow US investors to buy shares of these companies without the costs of investing directly in a foreign stock exchange. ADRs are issued by an approved New York bank or trust company against the deposit of the original shares. These are deposited in a custodial account in the US. Such receipts have to be issued in accordance with the provisions stipulated by the SEC. USA which are very stringent.

ADRs can be traded either by trading existing ADRs or purchasing the shares in the issuer's home market and having new ADRs created, based upon availability and market conditions. When trading in existing ADRs, the trade is executed on the secondary market on the New

York Stock Exchange (NYSE) through Depository Trust Company (DTC) without involvement from foreign brokers or custodians. The process of buying new, issued ADRs goes through US brokers, Helsinki Exchanges and DTC as well as Deutsche Bank. When transactions are made, the ADRs change hands, not the certificates. This eliminates the actual transfer of stock certificates between the US and foreign countries.

In a bid to bypass the stringent disclosure norms mandated by the SEC for equity shares, the Indian companies have however, chosen the indirect route to tap the vast American financial market through private debt placement of GDRs listed in London and Luxemberg Stock Exchanges.

The Indian companies have preferred the GDRs to ADRs because the US market exposes them to a higher level or responsibility than a European listing in the areas of disclosure, costs, liabilities and timing. The SECs regulations set up to protect the retail investor base are some what more stringent and onerous, even for companies already listed and held by retail investors in their home country. The most onerous aspect of a US listing for the companies is to provide full, half yearly and quarterly accounts in accordance with, or at least reconciled with US GAAPs.

**(b)   Global Depository Receipt (GDRs):** These are negotiable certificate held in the bank of one country representing a specific number of shares of a stock traded on the exchange of another country. These financial instruments are used by companies to raise capital in either dollars or Euros. These are mainly traded in European countries and particularly in London.

**ADRs/GDRs and the Indian Scenario :** Indian companies are shedding their reluctance to tap the US markets. Infosys Technologies was the first Indian company to be listed on Nasdaq in 1999. However, the first Indian firm to issue sponsored GDR or ADR was Reliance industries Limited. Beside, these two companies there are several other Indian firms are also listed in the overseas bourses. These are Satyam Computer, Wipro, MTNL, VSNL, State Bank of India, Tata Motors, Dr Reddy's Lab, Ranbaxy, Larsen & Toubro, ITC, ICICI Bank, Hindalco, HDFC Bank and Bajaj Auto.

**(c)   Indian Depository Receipts (IDRs):** The concept of the depository receipt mechanism which is used to raise funds in foreign currency has been applied in the Indian Capital Market through the issue of Indian Depository Receipts (IDRs). IDRs are similar to ADRs/GDRs in the sense that foreign companies can issue IDRs to raise funds from the Indian Capital Market in the same lines as an Indian company uses ADRs/GDRs to raise foreign capital. The IDRs are listed and traded in India in the same way as other Indian securities are traded.

**10.8 Other Types of International Issues**

**(a)   Foreign Euro Bonds:** In domestic capital markets of various countries the Bonds issues referred to above are known by different names such as Yankee Bonds in the US, Swiss

Frances in Switzerland, Samurai Bonds in Tokyo and Bulldogs in UK.

**(b) Euro Convertible Bonds:** A convertible bond is a debt instrument which gives the holders of the bond an option to convert the bonds into a pre-determined number of equity shares of the company. Usually the price of the equity shares at the time of conversion will have a premium element. These bonds carry a fixed rate of interest and if the issuer company so desires may also include a Call Option (where the issuer company has the option of calling/ buying the bonds for redemption prior to the maturity date) or a Put Option (which gives the holder the option to put/sell his bonds to the issuer company at a pre-determined date and price).

**(c) Euro Bonds:** Plain Euro Bonds are nothing but debt Instruments. These are not very at-attractive for an investor who desires to have valuable additions to his investments.

**(d) Euro Convertible Zero Bonds:** These bonds are structured as a convertible bond. No interest is payable on the bonds. But conversion of bonds takes place on maturity at a pre-determined price. Usually there is a five years maturity period and they are treated as a deferred equity issue.

**(e) Euro Bonds with Equity Warrants:** These bonds carry a coupon rate determined by market rates. The warrants are detachable. Pure bonds are traded at a discount. Fixed Income Funds Management may like to invest for the purposes of regular income.

**Self Examination Questions**

**A.    Objective Type Questions**

1.    The largest provider of short-term credit for a business is:

    (a)    Banks

    (b)    Suppliers to the firm

    (c)    Commercial paper

    (d)    None of the above.

2.    The number of days until the firm is past due to a supplier is called the:

    (a)    Discount period

    (b)    Term to credit

    (c)    Payment period

    (d)    None of the above.

3.  The principal value of a bond is called the:

    (a)  The coupon rate

    (b)  The par value

    (c)  The maturity value

    (d)  None of the above.

4.  An advantage of debt financing is:

    (a)  Interest payments are tax deductible

    (b)  The use of debt, up to a point, lowers the firm's cost of capital

    (c) Does not dilute owner's earnings

    (d)  All of the above.

5.   Zero coupon bonds:

    (a)  Are sold at par

    (b)  Pay no interest payment

    (c)  Are sold at a deep discount

    (d)  b and c above.

6.  Commercial paper can be issued by:

    (a)  Corporate

    (b)  Primary Dealers

    (c)  All India Financial Institutions

    (d)  All of the above.

7.  Commercial paper can be issued in the following denominations:

    (a)  Rs 5 Lakhs

    (b)  Rs 10 Lakhs

    (c)  Rs 5 Lakhs and multiples there of

    (d)  Rs 1 Lakh and multiples there of.

8.  Commercial paper is a:

    (a)  Short term source of Finance

    (b)  Medium term source of Finance

    (c)  Long term source of Finance

(d) None of the above.

9. Which amongst the following are short term sources of finance?

   (a) Accrued expenses

   (b) Deferred income

   (c) Equity shares

   (d) Debentures.

10. In a tax environment, the cost of debenture to the issuing company:

   (a) Lower than the cost of equity shares

   (b) Higher than the cost of equity shares

   (c) Higher than the cost of preference shares

   (d) None of the above.

**Answers to Objective Type Questions**

**1.** (b); **2.** (c); **3.** (b); **4.** (d); **5.** (d); **6.** (d); **7.** (c); **8.** (a); **9.** (a) & (b); **10.** (a)

**B. Short Answer Type Questions**

1. Briefly discuss the different sources of long term finance.

2. Write short notes on:

   (a) Zero interest fully convertible debentures

   (b) Deep discount bonds

   (c) Inflation bonds

   (d) Debt securitization.

3. Why are debentures considered cheaper than equity as a source of finance? Discuss briefly.

4. What do you understand by the term 'ploughing back of profits'?

5. Discuss briefly the concept of 'Seed Capital Assistance'.

**C. Long Answer Type Questions**

1. Explain the advantages of equity financing.

2. What are the advantages of debt financing from the point of company and investors?

3. What do you mean by venture capital financing and what are the methods of this type of financing?

4. What are the advantages of lease financing?

5. Discuss the various ways in which Indian companies can raise foreign currency.

# CHAPTER 6

## INVESTMENT DECISIONS

**Learning objectives**

After studying this chapter, you will be able to

♦ Describe capital budgeting decisions;

♦ Understand the purpose and process of Capital Budgeting;

♦ Appreciate the importance of cash flows and understand the basic principles for measuring the same;

♦ Evaluate projects using various capital budgeting techniques like PB (Pay Back ), NPV (Net Present Value), PI (Profitability Index) , IRR (Internal Rate of Return), MIRR (Modified Internal Rate of Return) and ARR (Accounting Rate of Return); and

♦ Understand the advantages and disadvantages of the above mentioned techniques.

### 1. INTRODUCTION

Financing and investment of funds are two crucial financial functions. The investment of funds also termed as capital budgeting requires a number of decisions to be taken in a situation in which funds are invested and benefits are expected over a long period. The term capital budgeting means planning for capital assets. It involves proper project planning and commercial evaluation of projects to know in advance technical feasibility and financial viability of the project.

The capital budgeting decision means a decision as to whether or not money should be invested in long-term projects such as the setting up of a factory or installing a machinery or creating additional capacities to manufacture a part which at present may be purchased from outside. It includes a financial analysis of the various proposals regarding capital expenditure to evaluate their impact on the financial condition of the company and to choose the best out of the various alternatives.

In any business the commitment of funds in land, buildings, equipment, stock and other types of assets must be carefully made. Once the decision to acquire a fixed asset is taken, it becomes very difficult to reverse that decision. The expenditure on plant and machinery and other long term assets affects operations over a period of years. It becomes a commitment that influences long term prospects and the future earning capacity of the firm.

However, Capital Budgeting excludes certain investment decisions, wherein, the benefits of investment proposals cannot be directly quantified. For example, management may be considering a proposal to build a recreation room for employees. The decision in this case will be based on qualitative factors, such as management – employee relations, with less consideration on direct financial returns. However, most investment proposals considered by management will require quantitative estimates of the benefits to be derived from accepting the project. A bad decision can be detrimental to the value of the organisation over a long period of time.

## 2.    PURPOSE OF CAPITAL BUDGETING

The capital budgeting decisions are important, crucial and critical business decisions due to following reasons:

(i)    **Substantial expenditure:** Capital budgeting decisions involves the investment of substantial amount of funds. It is therefore necessary for a firm to make such decisions after a thoughtful consideration so as to result in the profitable use of its scarce resources.

The hasty and incorrect decisions would not only result into huge losses but may also account for the failure of the firm.

(ii)    **Long time period:** The capital budgeting decision has its effect over a long period of time. These decisions not only affect the future benefits and costs of the firm but also influence the rate and      direction of growth of the firm.

(iii)    **Irreversibility:** Most of the investment decisions are irreversible. Once they are taken, the firm may not be in a position to reverse them back. This is because, as it is difficult to find a buyer for the second-hand capital items.

(iv)    **Complex decision:** The capital investment decision involves an assessment of future events, which in fact is difficult to predict. Further it is quite difficult to estimate in quantitative terms all the benefits or the costs relating to a particular investment decision.

## 3.    CAPITAL BUDGETING PROCESS

The extent to which the capital budgeting process needs to be formalised and systematic procedures established depends on the size of the organisation; number of projects to be considered; direct financial benefit of each project considered by itself; the composition of the firm's existing assets and management's desire to change that composition; timing of expenditures associated with the projects that are finally accepted.

(i)    **Planning:** The capital budgeting process begins with the identification of potential investment opportunities. The opportunity then enters the planning phase when the potential effect on the firm's fortunes is assessed and the ability of the management of the firm to exploit the opportunity is determined. Opportunities having little merit are rejected and

promising opportunities are advanced in the form of a proposal to enter the evaluation phase.

(ii) **Evaluation:** This phase involves the determination of proposal and its investments, inflows and outflows. Investment appraisal techniques, ranging from the simple payback method and accounting rate of return to the more sophisticated discounted cash flow techniques, are used to appraise the proposals. The technique selected should be the one that enables the manager to make the best decision in the light of prevailing circumstances.

(iii) **Selection:** Considering the returns and risks associated with the individual projects as well as the cost of capital to the organisation, the organisation will choose among projects so as to maximise shareholders' wealth.

(iv) **Implementation:** When the final selection has been made, the firm must acquire the necessary funds, purchase the assets, and begin the implementation of the project.

(v) **Control:** The progress of the project is monitored with the aid of feedback reports. These reports will include capital expenditure progress reports, performance reports comparing actual performance against plans set and post completion audits.

(vi) **Review:** When a project terminates, or even before, the organisation should review the entire project to explain its success or failure. This phase may have implication for firms planning and evaluation procedures. Further, the review may produce ideas for new proposals to be undertaken in the future.

## 4. TYPES OF CAPITAL INVESTMENT DECISIONS

There are many ways to classify the capital budgeting decision. Generally capital investment decisions are classified in two ways. One way is to classify them on the basis of firm's existence. Another way is to classify them on the basis of decision situation.

**4.1 On the basis of firm's existence:** The capital budgeting decisions are taken by both newly incorporated firms as well as by existing firms. The new firms may be required to take decision in respect of selection of a plant to be installed. The existing firm may be required to take decisions to meet the requirement of new environment or to face the challenges of competition. These decisions may be classified as follows:

(*i*) **Replacement and Modernisation decisions:** The replacement and modernisation decisions aim at to improve operating efficiency and to reduce cost. Generally all types of plant and machinery require replacement either because of the economic life of the plant or machinery is over or because it has become technologically outdated. The former decision is known as replacement decisions and later one is known as modernisation decisions. Both replacement and modernisation decisions are called cost reduction decisions.

(*ii*) **Expansion decisions:** Existing successful firms may experience growth in demand of their product line. If such firms experience shortage or delay in the delivery of their products

due to inadequate production facilities, they may consider proposal to add capacity to existing product line.

(*iii*) **Diversification decisions:** These decisions require evaluation of proposals to diversify into new product lines, new markets etc. for reducing the risk of failure by dealing in different products or by operating in several markets.

Both expansion and diversification decisions are called revenue expansion decisions.

**4.2 On the basis of decision situation:** The capital budgeting decisions on the basis of decision situation are classified as follows:

(*i*) **Mutually exclusive decisions:** The decisions are said to be mutually exclusive if two or more alternative proposals are such that the acceptance of one proposal will exclude the acceptance of the other alternative proposals. For instance, a firm may be considering proposal to install a semi-automatic or highly automatic machine. If the firm install a semi-automatic machine it exclude the acceptance of proposal to install highly automatic machine.

(*ii*) **Accept-reject decisions:** The accept-reject decisions occur when proposals are independent and do not compete with each other. The firm may accept or reject a proposal on the basis of a minimum return on the required investment. All those proposals which give a higher return than certain desired rate of return are accepted and the rest are rejected.

(*iii*) **Contingent decisions:** The contingent decisions are dependable proposals. The investment in one proposal requires investment in one or more other proposals. For example if a company accepts a proposal to set up a factory in remote area it may have to invest in infrastructure also e.g. building of roads, houses for employees etc.

## 5. PROJECT CASH FLOWS

Project cash flows are defined as the financial costs and benefits associated with a project. The estimation of costs and benefits are made with the help of inputs provided by marketing, production, engineering, costing, purchase, taxation, and other departments. The project cash flow stream consists of cash outflows and cash inflows. The costs are denoted as cash outflows whereas the benefits are denoted as cash inflows. The future costs and benefits associated with each project are as follows:

(i) Capital costs

(ii) Operating costs

(iii) Revenue

(iv) Depreciation

(v) Residual value

An investment decision implies the choice of an objective, an appraisal technique and the

project's life. The objective and technique must be related to definite period of time. The life of the project may be determined by taking into consideration the following factors:

(i)   Technological obsolescence

(ii)  Physical deterioration

(iii) A decline in demand for the output of the project.

No matter how good a company's maintenance policy, its technological forecasting ability or its demand forecasting ability, uncertainty will always be present because of the difficulty in predicting the duration of a project life.

To allow realistic appraisal, the value of cash payment or receipt must be related to the time when the transfer takes place. In particular, it must be recognised that Re. 1 received today is worth more than Re. 1 received at some future date because Re. 1 received today could be earning interest in the intervening period. This is the concept of *'Time Value of Money'* (for a detailed understanding of the Time Value of Money please refer to Chapter 2). The process of converting future sums into their present equivalent is known as discounting, which is used to determine the present value of future cash flows.

## 6.   BASIC PRINCIPLES FOR MEASURING PROJECT CASH FLOWS

For developing the project cash flows the following principles must be kept in mind:

1.   *Incremental Principle*: The cash flows of a project must be measured in incremental terms. To ascertain a project's incremental cash flows, one has to look at what happens to the cash flows of the firm *'with the project and without the project'*, and not before the project and after the project as is sometimes done. The difference between the two reflects the incremental cash flows attributable to the project.

Project cash flows for year t  = Cash flow for the firm with the project for year t

− Cash flow for the firm without the project for year t.

2.   *Long Term Funds Principle*: A project may be evaluated from various points of view: total funds point of view, long-term funds point of view, and equity point of view. The measurement of cash flows as well as the determination of the discount rate for evaluating the cash flows depends on the point of view adopted. It is generally recommended that a project may be evaluated from the point of view of long-term funds (which are provided by equity stockholders, preference stock holders, debenture holders, and term lending institutions) because the principal focus of such evaluation is normally on the profitability of long-term funds.

3.   *Exclusion of Financing Costs Principle*: When cash flows relating to long-term funds are being defined, financing costs of long-term funds (interest on long-term debt and equity

dividend) should be excluded from the analysis. The question arises why? The weighted average cost of capital used for evaluating the cash flows takes into account the cost of long-term funds. Put differently, the interest and dividend payments are reflected in the weighted average cost of capital. Hence, if interest on long-term debt and dividend on equity capital are deducted in defining the cash flows, the cost of long-term funds will be counted twice.

The exclusion of financing costs principle means that:

(i) The interest on long-term debt (or interest) is ignored while computing profits and taxes and;

(ii) The expected dividends are deemed irrelevant in cash flow analysis.

While dividends pose no difficulty as they come only from profit after taxes, interest needs to be handled properly. Since interest is usually deducted in the process of arriving at profit after tax, an amount equal to interest $(1 - \text{tax rate})$ should be added back to the figure of profit after tax.

That is,

Profit before interest and tax $(1 - \text{tax rate})$

$$= (\text{Profit before tax} + \text{interest}) (1 - \text{tax rate})$$

$$= (\text{Profit before tax}) (1 - \text{tax rate}) + (\text{interest}) (1 - \text{tax rate})$$

$$= \text{Profit after tax} + \text{interest} (1 - \text{tax rate})$$

Thus, whether the tax rate is applied directly to the profit before interest and tax figure or whether the tax $-$ adjusted interest, which is simply interest $(1 - \text{tax rate})$, is added to profit after tax, we get the same result.

4. *Post–tax Principle:* Tax payments like other payments must be properly deducted in deriving the cash flows. That is, cash flows must be defined in post-tax terms.

### Illustration 1

ABC Ltd is evaluating the purchase of a new project with a depreciable base of Rs. 1,00,000; expected economic life of 4 years and change in earnings before taxes and depreciation of Rs. 45,000 in year 1, Rs. 30,000 in year 2, Rs. 25,000 in year 3 and Rs. 35,000 in year 4. Assume straight-line depreciation and a 20% tax rate. You are required to compute relevant cash flows.

**Solution**

|  | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Earnings before tax and depreciation | 45,000 | 30,000 | 25,000 | 35,000 |
| *Less:* Depreciation | 25,000 | 25,000 | 25,000 | 25,000 |
| Earnings before tax | 20,000 | 5,000 | 0 | 10,000 |
| *Less*: Tax [@20%] | 4,000 | 1,000 | 0 | 2,000 |
|  | 16,000 | 4,000 | 0 | 8,000 |
| *Add:* Depreciation | 25,000 | 25,000 | 25,000 | 25,000 |
| Net Cash flow | 41,000 | 29,000 | 25,000 | 33,000 |

*Rs.*

*Years*

**Working Note:**

Depreciation = Rs. 1, 00,000÷4

= Rs. 25,000

**Illustration 2**

XYZ Ltd is considering a new investment project about which the following information is available.

(i) The total outlay on the project will be Rs. 100 lacks. This consists of Rs.60 lacks on plant and equipment and Rs.40 lacks on gross working capital. The entire outlay will be incurred at the beginning of the project.

(ii) The project will be financed with Rs.40 lacks of equity capital; Rs.30 lacks of long term debt (in the form of debentures); Rs. 20 lacks of short-term bank borrowings, and Rs. 10 lacks of trade credit. This means that Rs.70 lacks of long term finds (equity + long term debt) will be applied towards plant and equipment (Rs. 60 lacks) and working capital margin (Rs.10 lacks) – working capital margin is defined as the contribution of long term funds towards working capital. The interest rate on debentures will be 15 percent and the interest rate on short-term borrowings will be 18 percent.

(iii) The life of the project is expected to be 5 years and the plant and equipment would fetch a salvage value of Rs. 20 lacks. The liquidation value of working capital will be equal to Rs.10 lacks.

(iv) The project will increase the revenues of the firm by Rs. 80 lacks per year. The increase in operating expenses on account of the project will be Rs.35.0 lacks per year. (This

includes all items of expenses other than depreciation, interest, and taxes). The effective tax rate will be 50 percent.

(v) Plant and equipment will be depreciated at the rate of $33^1/_3$ percent per year as per the written down value method. So, the depreciation charges will be :

|  | Rs. (in lacs) |
|---|---|
| First year | 20.0 |
| Second year | 13.3 |
| Third year | 8.9 |
| Fourth year | 5.9 |
| Fifth year | 4.0 |

Given the above details, you are required to work out the post-tax, incremental cash flows relating to long-term funds.

**Solution**

### Cash Flows for the New Project

Rs. (in lacs)

Years

|  |  | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| (a) | Plant and equipment | (60.0) |  |  |  |  |  |
| (b) | Working capital margin | (10.0) |  |  |  |  |  |
| (c) | Revenues |  | 80.0 | 80.0 | 80.0 | 80.0 | 80.0 |
| (d) | Operating Costs |  | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 |
| (e) | Depreciation |  | 20.0 | 13.33 | 8.89 | 5.93 | 3.95 |
| (f) | Interest on short-term bank borrowings |  | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 |
| (g) | Interest on debentures |  | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 |
| (h) | Profit before tax |  | 16.90 | 23.57 | 28.01 | 30.97 | 32.95 |
| (i) | Tax |  | 8.45 | 11.79 | 14.01 | 15.49 | 16.48 |
| (j) | Profit after tax |  | 8.45 | 11.78 | 14.00 | 15.48 | 16.47 |
| (k) | Net salvage value of plant and equipment |  |  |  |  |  | 20.0 |
| (l) | Net recovery working capital margin |  |  |  |  |  | 10.0 |
| (m) | Initial Investment [(a) + (b)] | (70.0) |  |  |  |  |  |

| (n) | Operating cash inflows | | | | | | |
|---|---|---|---|---|---|---|---|
| | [(j) +(e) + (g) (1–T)] | | 30.70 | 27.36 | 25.14 | 23.66 | 22.67 |
| (o) | Terminal cash flow | | | | | | |
| | [(k) + (l) ] | | 30.00 | | | | |
| (p) | Net cash flow. | | | | | | |
| | [(m) + (n) + (o) ] | (70.0) | 30.70 | 27.36 | 25.14 | 23.66 | 52.67 |

**Working Notes (with explanations):**

(i)   The initial investment, occurring at the end of year 0, is Rs. 70 lacs. This represents the commitment of long-term funds to the project. The operating cash inflow, relating to long-term funds, at the end of year 1 is Rs. 30.7 lacs.

That is,

Profit after tax + Depreciation + Interest on debentures (1 – tax )

Rs. 8.45 lacs +  Rs.20 lacs + Rs. 4.5 lacs (1 – 0.50)

The operating cash inflows for the subsequent years have been calculated similarly.

(ii)   The terminal cash flow relating to long-term funds is equal to :

Net Salvage value of plant and equipment + Net recovery of working capital margin

When the project is terminated, its liquidation value will be equal to:

Net Salvage value of plant and equipment + Net recovery of working capital

The first component belongs to the suppliers of long-term funds.  The second component is applied to repay the current liabilities and recover the working capital margin.

## 7.   CAPITAL BUDGETING TECHNIQUES

In order to maximise the return to the shareholders of a company, it is important that the best or most profitable investment projects are selected.  Because the results for making a bad long-term investment decision can be both financially and strategically devastating, particular care needs to be taken with investment project selection and evaluation.

There are a number of techniques available for appraisal of investment proposals and can be classified as presented below:

```
┌─────────────────────────────────────────┐
│       CAPITAL BUDGETING TECHNIQUES        │
└─────────────────────────────────────────┘
```

```
┌──────────────────────┐          ┌──────────────────────┐
│     Traditional      │          │    Time-adjusted     │
│         or           │          │         or           │
│   Non-Discounting    │          │ Discounted Cash Flows│
└──────────────────────┘          └──────────────────────┘
```

- Payback Period
- Accounting Rate of Return

- Net Present Value
- Profitability Index
- Internal Rate of Return
- Modified Internal Rate of Return
- Discounted Payback
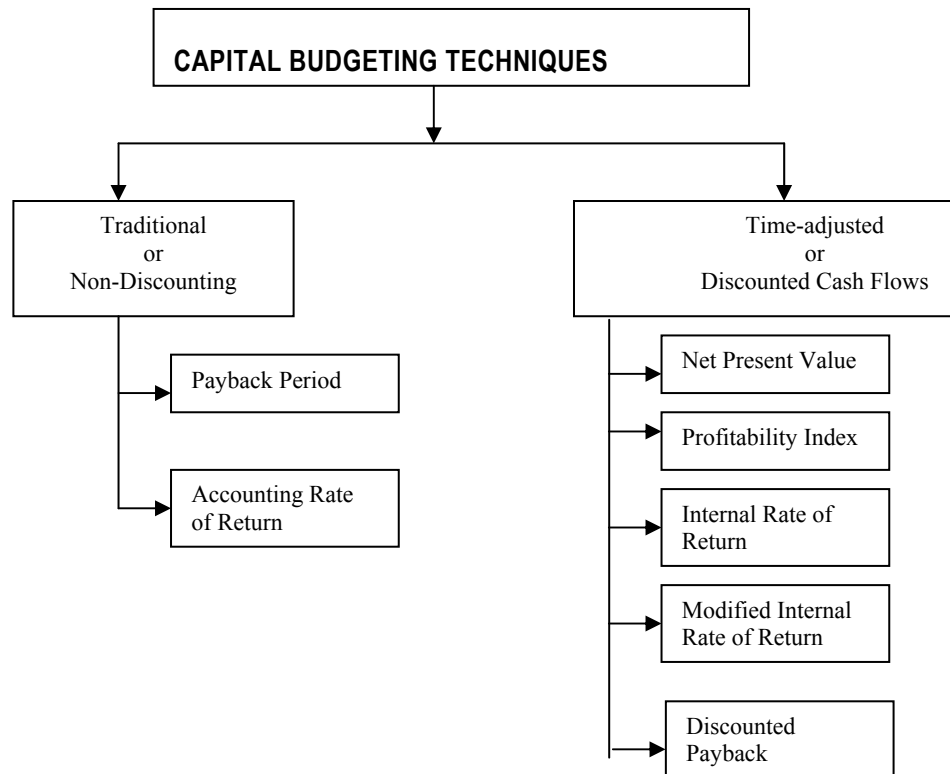
Organizations may use any or more of capital investment evaluation techniques; some organizations use different methods for different types of projects while others may use multiple methods for evaluating each project. These techniques have been discussed below – net present value, profitability index, internal rate of return, modified internal rate of return, payback period, and accounting (book) rate of return.

**Payback Period:** The payback period of an investment is the length of time required for the cumulative total net cash flows from the investment to equal the total initial cash outlays. At that point in time, the investor has recovered the money invested in the project.

As with other methods discussed, the first steps in calculating the payback period are determining the total initial capital investment and the annual expected after-tax net cash flows over the useful life of the investment. When the net cash flows are uniform over the useful life of the project, the number of years in the payback period can be calculated using the following

equation:

$$\text{Payback period} = \frac{\text{Total initial capital investment}}{\text{Annual expected after - tax net cash flow}}$$

When the annual expected after-tax net cash flows are not uniform, the cumulative cash inflow from operations must be calculated for each year by subtracting cash outlays for operations and taxes from cash inflows and summing the results until the total is equal to the initial capital investment.

*Advantages*: A major advantage of the payback period technique is that it is easy to compute and to understand as it provides a quick estimate of the time needed for the organization to recoup the cash invested. The length of the payback period can also serve as an estimate of a project's risk; the longer the payback period, the riskier the project as long-term predictions are less reliable. The payback period technique focuses on quick payoffs. In some industries with high obsolescence risk or in situations where an organization is short on cash, short payback periods often become the determining factor for investments.

*Limitations*: The major limitation of the payback period technique is that it ignores the time value of money. As long as the payback periods for two projects are the same, the payback period technique considers them equal as investments, even if one project generates most of its net cash inflows in the early years of the project while the other project generates most of its net cash inflows in the latter years of the payback period. A second limitation of this technique is its failure to consider an investment's total profitability; it only considers cash flows from the initiation of the project until its payback period and ignores cash flows after the payback period. Lastly, use of the payback period technique may cause organizations to place too much emphasis on short payback periods thereby ignoring the need to invest in long-term projects that would enhance its competitive position.

**Illustration 3**

Suppose a project costs Rs. 20,00,000 and yields annually a profit of Rs. 3,00,000 after depreciation @ 12½% (straight line method) but before tax 50%. The first step would be to calculate the cash inflow from this project. The cash inflow is Rs. 4,00,000 calculated as follows :

|  | Rs. |
|---|---|
| Profit before tax | 3,00,000 |
| *Less :* Tax @ 50% | 1,50,000 |
| Profit after tax | 1,50,000 |
| *Add :* Depreciation written off | 2,50,000 |
| Total cash inflow | 4,00,000 |

While calculating cash inflow, depreciation is added back to profit after tax since it does not result in cash outflow. The cash generated from a project therefore is equal to profit after tax plus depreciation.

$$\text{Payback period} = \frac{\text{Rs.}20,00,000}{4,00,000} = 5 \text{ Years}$$

*Some Accountants calculate payback period after discounting the cash flows by a predetermined rate and the payback period so calculated is called, 'Discounted payback period'.*

*Payback Reciprocal* : As the name indicates it is the reciprocal of payback period. A major drawback of the payback period method of capital budgeting is that it does not indicate any cut off period for the purpose of investment decision. It is, however, argued that the reciprocal of the payback would be a close approximation of the internal rate of return if the life of the project is at least twice the payback period and the project generates equal amount of the annual cash inflows. In practice, the payback reciprocal is a helpful tool for quickly estimating the rate of return of a project provided its life is at least twice the payback period. The payback reciprocal can be calculated as follows:

$$\frac{\text{Average annual cash in flow}}{\text{Initial investment}}$$

**Illustration 4**

Suppose a project requires an initial investment of Rs. 20,000 and it would give annual cash inflow of Rs. 4,000. The useful life of the project is estimated to be 5 years. In this example payback reciprocal will be :

$$\frac{\text{Rs}4,000\times100}{\text{Rs}20,000} = 20\%$$

The above payback reciprocal provides a reasonable approximation of the internal rate of return, i.e. 19% discussed later in this chapter.

**Accounting (Book) Rate of Return:** The accounting rate of return of an investment measures the average annual net income of the project (incremental income) as a percentage of the investment.

$$\text{Accounting rate of return} = \frac{\text{Average annual net income}}{\text{Investment}}$$

The numerator is the average annual net income generated by the project over its useful life. The denominator can be either the initial investment or the average investment over the useful life of the project. Some organizations prefer the initial investment because it is objectively

determined and is not influenced by either the choice of the depreciation method or the estimation of the salvage value. Either of these amounts is used in practice but it is important that the same method be used for all investments under consideration.

*Advantages*: The accounting rate of return technique uses readily available data that is routinely generated for financial reports and does not require any special procedures to generate data. This method may also mirror the method used to evaluate performance on the operating results of an investment and management performance. Using the same procedure in both decision-making and performance evaluation ensures consistency. Lastly, the calculation of the accounting rate of return method considers all net incomes over the entire life of the project and provides a measure of the investment's profitability.

*Limitations*: The accounting rate of return technique, like the payback period technique, ignores the time value of money and considers the value of all cash flows to be equal. Additionally, the technique uses accounting numbers that are dependent on the organization's choice of accounting procedures, and different accounting procedures, e.g., depreciation methods, can lead to substantially different amounts for an investment's net income and book values. The method uses net income rather than cash flows; while net income is a useful measure of profitability, the net cash flow is a better measure of an investment's performance. Furthermore, inclusion of only the book value of the invested asset ignores the fact that a project can require commitments of working capital and other outlays that are not included in the book value of the project.

### Illustration 5

Suppose a project requiring an investment of Rs. 10,00,000 yields profit after tax and depreciation as follows:

| Years | Profit after tax and depreciation |
|:---:|:---:|
| | Rs. |
| 1. | 50,000 |
| 2. | 75,000 |
| 3. | 1,25,000 |
| 4. | 1,30,000 |
| 5. | 80,000 |
| Total | 4,60,000 |

Suppose further that at the end of 5 years, the plant and machinery of the project can be sold for Rs. 80,000. In this case the rate of return can be calculated as follows.

$$\frac{\text{Total Profit} \times 100}{\text{Net investment in the project} \times \text{No. of years of profit}}$$

$$\frac{Rs\,4,60,000 \times 100}{Rs\,9,20,000 \times 5\,years} = 10\%$$

This rate is compared with the rate expected on other projects, had the same funds been invested alternatively in those projects. Sometimes, the management compares this rate with the minimum rate (called-cut off rate) they may have in mind. For example, management may decide that they will not undertake any project which has an average annual yield after tax less than 15%. Any capital expenditure proposal which has an average annual yield of less than 15% will be automatically rejected.

**Net Present Value Technique:** The net present value technique is a discounted cash flow method that considers the time value of money in evaluating capital investments. An investment has cash flows throughout its life, and it is assumed that a rupee of cash flow in the early years of an investment is worth more than a rupee of cash flow in a later year. The net present value method uses a specified discount rate to bring all subsequent net cash inflows after the initial investment to their present values (the time of the initial investment or year 0).

Theoretically, the discount rate or desired rate of return on an investment is the rate of return the firm would have earned by investing the same funds in the best available alternative investment that has the same risk. Determining the best alternative opportunity available is difficult in practical terms so rather that using the true opportunity cost, organizations often use an alternative measure for the desired rate of return. An organization may establish a minimum rate of return that all capital projects must meet; this minimum could be based on an industry average or the cost of other investment opportunities. Many organizations choose to use the cost of capital as the desired rate of return; the cost of capital is the cost that an organization has incurred in raising funds or expects to incur in raising the funds needed for an investment.

The overall cost of capital of a firm is a proportionate average of the costs of the various components of the firm's financing. A firm obtains funds by issuing preferred or common stock; borrowing money using various forms of debt such a notes, loans, or bonds; or retaining earnings. The costs to the firm are the returns demanded by debt and equity investors through which the firm raises the funds.

The net present value of a project is the amount, in current rupees, the investment earns after yielding the desired rate of return in each period.

Net present value = Present value of net cash flow - Total net initial investment

The steps to calculating net present value are (1) determine the net cash inflow in each year of the investment, (2) select the desired rate of return, (3) find the discount factor for each year based on the desired rate of return selected, (4) determine the present values of the net

cash flows by multiplying the cash flows by the discount factors, (5) total the amounts for all years in the life of the project, and (6) subtract the total net initial investment.

**Illustration 6**

Compute the net present value for a project with a net investment of Rs. 1, 00,000 and the following cash flows if the company's cost of capital is 10%? Net cash flows for year one is Rs. 55,000; for year two is Rs. 80,000 and for year three is Rs. 15,000.

[PVIF @ 10% for three years are 0.909, 0.826 and 0.751]

**Solution**

| Year | Net Cash Flows | PVIF @ 10% | Discounted Cash Flows |
|:---:|:---:|:---:|:---:|
| 1 | 55,000 | 0.909 | 49,995 |
| 2 | 80,000 | 0.826 | 66,080 |
| 3 | 15,000 | 0.751 | 11,265 |
| | | | 1,27,340 |

Total Discounted Cash Flows        1,27,340

*Less*:        Net Investment        1,00,000

Net Present Value        27,340

*Recommendation:* Since the net present value of the project is positive, the company should accept the project.

**Illustration 7**

ABC Ltd is a small company that is currently analyzing capital expenditure proposals for the purchase of equipment; the company uses the net present value technique to evaluate projects. The capital budget is limited to 500,000 which ABC Ltd believes is the maximum capital it can raise. The initial investment and projected net cash flows for each project are shown below. The cost of capital of ABC Ltd is 12%. You are required to compute the NPV of the different projects.

| | Project A | Project B | Project C | Project D |
|:---|:---:|:---:|:---:|:---:|
| Initial Investment | 200,000 | 190,000 | 250,000 | 210,000 |
| Project Cash Inflows | | | | |
| Year 1 | 50,000 | 40,000 | 75,000 | 75,000 |
| 2 | 50,000 | 50,000 | 75,000 | 75,000 |
| 3 | 50,000 | 70,000 | 60,000 | 60,000 |
| 4 | 50,000 | 75,000 | 80,000 | 40,000 |
| 5 | 50,000 | 75,000 | 100,000 | 20,000 |

**Solution**

**Calculation of net present value:**

Present

| Period | value factor | Project A | Project B | Project C | Project D |
|--------|--------------|-----------|-----------|-----------|-----------|
| 1 | 0.893 | 44,650 | 35,720 | 66,975 | 66,975 |
| 2 | 0.797 | 39,850 | 39,850 | 59,775 | 59,775 |
| 3 | 0.712 | 35,600 | 49,840 | 42,720 | 42,720 |
| 4 | 0.636 | 31,800 | 47,700 | 50,880 | 25,440 |
| 5 | 0.567 | 28,350 | 42,525 | 56,700 | 11,340 |
| Present value of cash inflows | | 180,250 | 215,635 | 277,050 | 206,250 |
| *Less:* Initial investment | | 200,000 | 190,000 | 250,000 | 210,000 |
| Net present value | | (19,750) | 25,635 | 27,050 | (3,750) |

*Advantages*

(*i*)   NPV method takes into account the time value of money.

(*ii*)   The whole stream of cash flows is considered.

(*iii*)   The net present value can be seen as the addition to the wealth of share holders. The criterion of NPV is thus in conformity with basic financial objectives.

(*iv*)   The NPV uses the discounted cash flows i.e., expresses cash flows in terms of current rupees. The NPVs of different projects therefore can be compared. It implies that each project can be evaluated independent of others on its own merit.

*Limitations*

(*i*)   It involves difficult calculations.

(*ii*)   The application of this method necessitates forecasting cash flows and the discount rate. Thus accuracy of NPV depends on accurate estimation of these two factors which may be quite difficult in practice.

(*iii*)   The ranking of projects depends on the discount rate. Let us consider two projects involving an initial outlay of Rs. 25 lakhs each with following inflow :

*(Rs in lakhs)*

| | 1st year | 2nd year |
|--------|----------|----------|
| Project A | 50.0 | 12.5 |
| Project B | 12.5 | 50.0 |

At discounted rate of 5% and 10% the NPV of Projects and their rankings at 5% and 10% are as follows:

|  | *NPV @ 5%* | *Rank* | *NPV @ 10%* | *Rank* |
|---|---|---|---|---|
| Project A | 33.94 | I | 30.78 | I |
| Project B | 32.25 | II | 27.66 | II |

The project ranking is same when the discount rate is changed from 5% to 10%. However, the impact of the discounting becomes more severe for the later cash flows. Naturally, higher the discount rate, higher would be the impact. In the case of project B the larger cash flows come later in the project life, thus decreasing the present value to a larger extent.

(iv) The decision under NPV method is based on absolute measure. It ignores the difference in initial outflows, size of different proposals etc. while evaluating mutually exclusive projects.

**Desirability Factor/Profitability Index:** In above Illustration the students may have seen how with the help of discounted cash flow technique, the two alternative proposals for capital expenditure can be compared. In certain cases we have to compare a number of proposals each involving different amounts of cash inflows. One of the methods of comparing such proposals is to workout what is known as the 'Desirability factor', or 'Profitability index'. In general terms a project is acceptable if its profitability index value is greater than 1.

*Mathematically :*

The desirability factor is calculated as below :

$$\frac{\text{Sum of discounted cash in flows}}{\text{Initial cash outlay/Total discounted cash outflow (as the case may)}}$$

### Illustration 8

Suppose we have three projects involving discounted cash outflow of Rs.5,50,000, Rs75,000 and Rs.1,00,20,000 respectively. Suppose further that the sum of discounted cash inflows for these projects are Rs. 6,50,000, Rs. 95,000 and Rs 1,00,30,000 respectively. Calculate the desirability factors for the three projects.

### Solution

The desirability factors for the three projects would be as follows:

1. $\dfrac{\text{Rs.6,50,000}}{\text{Rs.5,50,000}} = 1.18$

2.  $\dfrac{\text{Rs.}95,000}{\text{Rs.}75,000} = 1.27$

3.  $\dfrac{\text{Rs.}1,00,30,000}{\text{Rs.}1,00,20,000} = 1.001$

It would be seen that in absolute terms project 3 gives the highest cash inflows yet its desirability factor is low. This is because the outflow is also very high. The Desirability/ Profitability Index factor helps us in ranking various projects.

*Advantages*

The method also uses the concept of time value of money and is a better project evaluation technique than NPV.

*Limitations*

Profitability index fails as a guide in resolving *capital rationing* (discussed later in this chapter) where projects are indivisible. Once a single large project with high NPV is selected, possibility of accepting several small projects which together may have higher NPV than the single project is excluded. Also situations may arise where a project with a lower profitability index selected may generate cash flows in such a way that another project can be taken up one or two years later, the total NPV in such case being more than the one with a project with highest Profitability Index.

The Profitability Index approach thus cannot be used indiscriminately but all other type of alternatives of projects will have to be worked out.

## 8. CAPITAL RATIONING

Generally, firms fix up maximum amount that can be invested in capital projects, during a given period of time, say a year. The firm then attempts to select a combination of investment proposals that will be within the specific limits providing maximum profitability and rank them in descending order according to their rate of return; such a situation is of capital rationing.

A firm should accept all investment projects with positive NPV, with an objective to maximise the wealth of shareholders. However, there may be resource constraints due to which a firm may have to select from among various projects. Thus there may arise a situation of capital rationing where there may be internal or external constraints on procurement of necessary funds to invest in all investment proposals with positive NPVs.

Capital rationing can be experienced due to external factors, mainly imperfections in capital markets which can be attributed to non-availability of market information, investor attitude etc. Internal capital rationing is due to the self-imposed restrictions imposed by management like not to raise additional debt or laying down a specified minimum rate of return on each project.

There are various ways of resorting to capital rationing. For instance, a firm may effect capital rationing through budgets. It may also put up a ceiling when it has been financing investment proposals only by way of retained earnings (ploughing back of profits). Since the amount of capital expenditure in that situation cannot exceed the amount of retained earnings, it is said to be an example of capital rationing.

Capital rationing may also be introduced by following the concept of 'Responsibility Accounting', whereby management may introduce capital rationing by authorising a particular department to make investment only up to a specified limit, beyond which the investment decisions are to be taken by higher-ups.

The selection of project under capital rationing involves two steps:

(*i*)    To identify the projects which can be accepted by using the technique of evaluation discussed above.

(*ii*)    To select the combination of projects.

In capital rationing it may also be more desirable to accept several small investment proposals than a few large investment proposals so that there may be full utilisation of budgeted amount. This may result in accepting relatively less profitable investment proposals if full utilisation of budget is a primary consideration. Similarly, capital rationing may also mean that the firm foregoes the next most profitable investment following after the budget ceiling even though it is estimated to yield a rate of return much higher than the required rate of return. Thus capital rationing does not always lead to optimum results.

The following illustration shows how a firm may resort to capital rationing under situation of resource constraints.

**Illustration 9**

Alpha Limited is considering five capital projects for the years 2000,2001,2002 and 2003. The company is financed by equity entirely and its cost of capital is 12%. The expected cash flows of the projects are as follows :

**Year and Cash flows (Rs. '000)**

| Project | 2000 | 2001 | 2002 | 2003 |
|---------|------|------|------|------|
| A | (70) | 35 | 35 | 20 |
| B | (40) | (30) | 45 | 55 |
| C | (50) | (60) | 70 | 80 |
| D | — | (90) | 55 | 65 |
| E | (60) | 20 | 40 | 50 |

**Note :** Figures in brackets represent cash outflows.

All projects are divisible i.e. size of investment can be reduced, if necessary in relation to availability of funds. None of the projects can be delayed or undertaken more than once.

Calculate which project Alpha Limited should undertake if the capital available for investment is limited to Rs. 1,10,000 in year 2000 and with no limitation in subsequent years. For your analysis, use the following present value factors:

| Year | 2000 | 2001 | 2002 | 2003 |
|------|------|------|------|------|
| Discounting factor | 1.00 | 0.89 | 0.80 | 0.71 |

**Solution**

**Computation of Net Present Value (NPV) & Profitability Index (PI)**

*(Rs. '000)*

| Project | Discounted | Cash Flows | | (Refer to working note) | | |
|---------|------------|------------|------|------|------|------|
| | 2000 | 2001 | 2002 | 2003 | NPV | PI |
| A | (70) | 31.15 | 28 | 14.20 | 3.35 | 1.048 |
| B | (40) | (26.70) | 36 | 39.05 | 8.35 | 1.125 |
| C | (50) | (53.40) | 56 | 56.80 | 9.40 | 1.091 |
| D | — | (80.10) | 44 | 46.15 | 10.05 | 1.125 |
| E | (60) | 17.80 | 32 | 35.50 | 25.30 | 1.422 |

**Ranking of Projects in descending order of profitability index**

| Rank | 1 | 2 | 3 | 4 | 5 |
|------|---|---|---|---|---|
| Projects | E | D | B | C | A |

**Selection and Analysis:** For Project 'D' there is no capital rationing but it satisfies the criterion of required rate of return. Hence Project D may be undertaken.

For other projects the requirement is Rs. 2,20,000 in year 2000 whereas the capital available for investment is only Rs. 1,10,000. Based on the ranking, the final selection from other projects which will yield maximum NPV will be:

| Project and Rank | Amount of Initial Investment |
|---|---|
| | Rs. |
| E(1) | 60,000 |
| B(2) | 40,000 |
| C(3) | 10,000 (Restriction) |

Ranking of Projects excluding 'D' which is to start in 2001 when there is no limitation on capital availability :

| Projects | E | B | C | A |
|---|---|---|---|---|
| Rank | 1 | 2 | 3 | 4 |

**Working Note :**

**Computation of Discounted Cash flows**                                 (Rs. '000)

| Year | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|
| *Present value factor* | *1.00* | *0.89* | *0.80* | *0.71* |
| *Project* | | | | |
| A  Cash flows | (70) | 35 | 35 | 20 |
|     Discounted cash flows | (70) | 31.15 | 28 | 14.20 |
| B  Cash flows | (40) | (30) | 45 | 55 |
|     Discounted cash flows | (40) | (26.70) | 36 | 39.05 |
| C  Cash flows | (50) | (60) | 70 | 80 |
|     Discounted cash flows | (50) | (53.40) | 56 | 56.80 |
| D  Cash flows | — | (90) | 55 | 65 |
|     Discounted cash flows | — | (80.10) | 44 | 46.15 |
| E  Cash flows | (60) | 20 | 40 | 50 |
|     Discounted cash flows | (60) | 17.80 | 32 | 35.50 |

**Note :** Figures in brackets represent cash outflows.

**Illustration 10**

Venture Ltd. has Rs. 30 lakhs available for investment in capital projects. It has the option of making investment in projects 1,2,3 and 4. Each project is entirely independent and has a useful life of 5 years. The expected present value of cash flows from the projects is as follows:

| Projects | Initial outlay | Present value of cash flowsf |
|---|---|---|
| | Rs. | Rs. |
| 1 | 8,00,000 | 10,00,000 |
| 2 | 15,00,000 | 19,00,000 |
| 3 | 7,00,000 | 11,40,000 |
| 4 | 13,00,000 | 20,00,000 |

Which of the above investment should be undertaken? Assume that the cost of capital is 12% and risk free interest rate is 10% per annum. Given compounded sum of Re. 1 at 10% in 5 years is Rs. 1.611 and discount factor of Re. 1 at 12% rate for 5 years is 0.567.

**Solution**

This is a problem on capital rationing. The fund available with the company is Rs. 30 lakhs. The company will adopt those projects which will maximise the NPV.

**Statement showing NPV of projects**

| Project | Initial outlay | Present value of future cash flow | NPV |
|---|---|---|---|
| | | Rs | Rs |
| | (i) | (ii) | (iii)=(ii) – (i) |
| 1 | 8,00,000 | 10,00,000 | 2,00,000 |
| 2 | 15,00,000 | 19,00,000 | 4,00,000 |
| 3 | 7,00,000 | 11,40,000 | 4,40,000 |
| 4 | 13,00,000 | 20,00,000 | 7,00,000 |

The NPV of the projects 1,2,3 is Rs. 10,40,000 (with full available amount utilised). The NPV of the projects 1, 3 and 4 is Rs. 40,000 (with Rs. 28 lakhs utilised, leaving Rs. 2,00,000 to be invested elsewhere). Now, Rs. 2,00,000 can be invested for a period of 5 years @ 10%. It is given in the question that the compounded value of Re. 1 @ 10% per annum for 5 years is Rs. 1.611. Therefore for Rs. 2,00,000 invested now for 5 years @ 10% the amount to be received after 5 years will be Rs. 3,22,200 (Rs. 2,00,000 × 1.611).

The amount to be received at the end of 5th years would be Rs. 1,82,687.40 (Rs. 3,22,200 × 0.567).

Since, the amount to be received 15,22,687 after 5 years by making investment in projects 1, 3 and 4 & investing balance amount available @ 10% is greater than the amount to be received of Rs. 10,40,000 by investing in projects 1, 2 and 3. It is advisable that the venture Ltd. should make investment in projects 1, 3 and 4.

**Illustration No. 11**

Happy Singh Taxiwala is a long established tour operator providing high quality transport to their clients. It currently owns and runs 250 cars and has turnover of Rs. 100 lakhs p.a.

The current system for allocating jobs to drivers is very inefficient. Happy Singh is considering the implementation of a new computerized tracking system called 'Banta'. This will make the allocation of jobs far more efficient.

You are as accounting technician, for an accounting firm, has been appointed to advice Happy Singh to decide whether 'Banta' should be implemented. The project is being appraised over five years.

The costs and benefits of the new system are as follows:

(i) The Central Tracking System costs Rs. 21,00,000 to implement. This amount will be payable in three equal instalments. One immediately, the second in one year's time, and the third in two year's time.

(ii) Depreciation on the new system will be provided at Rs. 4,20,000 p.a.

(iii) Staff will need to be trained how to use the new system. This will cost Happy Singh Rs. 4,25,000 in the first year.

(iv) If 'Banta' is implemented, revenues will rise to an estimated Rs. 110 lakhs this year, thereafter increasing by 5% per annum (Compounded). Even if Banta is not implemented, revenue will increase by an estimated Rs. 2,00,000 per annum, from their current level of Rs. 100 lakhs per annum.

(v) Despite increased revenues, 'Banta will still make overall savings in terms of vehicle running costs. These costs are estimated at 1% of the post 'Banta' revenues each year (i.e. the Rs. 110 lakhs revenue rising by 5% thereafter, as referred to in (iv) above.

(vi) Six new staff operatives will be recruited to manage the 'Banta' system. Their wages will cost the company Rs. 1,20,000 per annum in the first year, Rs. 2,00,000 in the second year, thereafter increasing by 5% per annum (i.e. compounded).

(vii) Happy Singh will have to take out an annual maintenance contract for 'Banta' system. This will cost Rs. 75,000 per annum.

(viii) Interest on money borrowed to finance the project will cost Rs. 1,50,000 per annum.

(ix) Happy Singh Taxiwala's cost of capital is 10% per annum.

**Required:**

(a) Calculate the net present value (NPV) of the new 'Banta' system nearest to Rs. '000.

(b) Calculate the simple pay back period of the project and interpret the result.

(c) Calculate the discounted payback period for the project and interpret the result.

**Solution:**

**Working Notes:**

(Rs. '000)

|     |                                                      | 1 year   | 2 years  | 3 years  | 4 year   | 5 year   |
| --- | ---------------------------------------------------- | -------- | -------- | -------- | -------- | -------- |
| 1.  | **Increased Revenue**                                |          |          |          |          |          |
|     | Revenue (5% increase every year                      | 11,000   | 11,550   | 12,128   | 12,734   | 13,371   |
|     | Without Banta                                        | (10,200) | (10,400) | (10,600) | (10,800) | (11,000) |
|     |                                                      | 800      | 1,150    | 1,528    | 1,934    | 2,371    |
| 2.  | **Saving in Cost**                                   |          |          |          |          |          |
|     | Annual Revenues                                      | 11,000   | 11,550   | 12,128   | 12,734   | 13,371   |
|     | Saving @ 1 %                                         | 110      | 116      | 121      | 127      | 134      |
| 3.  | **Operative Cost**                                   |          |          |          |          |          |
|     | Additional Cost (with 5% increase from 3 year)       | 120      | 200      | 210      | 221      | 232      |
| 4.  | **Annual Cash inflows**                              |          |          |          |          |          |
|     | Increased Revenue (1)                                | 800      | 1,150    | 1,528    | 1,934    | 2,371    |
|     | Cost Saving (2)                                      | 110      | 116      | 121      | 127      | 134      |
|     | Operative Cost (3)                                   | (120)    | (200)    | (210)    | (221)    | (232)    |
|     | Maintenance Cost                                     | (75)     | (75)     | (75)     | (75)     | (75)     |
|     |                                                      | **715**  | **991**  | **1,364**| **1,765**| **2,198**|

**5.    Calculation Net Cash Flow**

| | | | | | |
|---|---|---|---|---|---|
| Implementation Cost | (700) | (700) | - | - | - |
| Training Cost | (425) | - | - | - | - |
| Annual Cash Inflows (4) | <u>715</u> | <u>991</u> | <u>1,364</u> | <u>1,765</u> | <u>2,198</u> |
| | **<u>(410)</u>** | **<u>291</u>** | **<u>1,364</u>** | **<u>1,765</u>** | **<u>2,198</u>** |

**(a)    Net Present Value**

| | Period | Present Value Flow at 10% | Cash Flow (Rs.'000) | Present Value (Rs.'000) |
|---|---|---|---|---|
| Implementation Cost | 0 | 1.00 | -700 | -700 |
| Cash Flows | 1 | 0.909 | -410 | -373 |
| | 2 | 0.826 | 291 | 240 |
| | 3 | 0.751 | 1364 | 1024 |
| | 4 | 0.683 | 1765 | 1205 |
| | 5 | 0.621 | 2198 | <u>1365</u> |
| **Net Present Value** | | | | **<u>2761</u>** |

NPV = Rs.2761000 (App.)

**(b)    Simple Pay Back**

| Time | Annual Cash Flow (Rs. '000) | Cumulative Cash Inflows (Rs.'000) |
|---|---|---|
| 0 | -700 | -700 |
| 1 | -410 | -1110 |
| 2 | 291 | -819 |
| 3 | 1364 | 545 ⟵ |
| 4 | 1765 | 2310 |
| 5 | 2198 | 4508 |

Pay back period shall

2 Year + 819/1364 Year = 2.60 years.

c.  **Discounted Pay back Period**

| Time | Annual Cash Flows (Rs.'000) | Cumulative Cash Flow (Rs.'000) |
|------|------|------|
| 0 | -700 | -700 |
| 1 | -373 | -1073 |
| 2 | 240 | -833 |
| 3 | 1024 | 191 ← |
| 4 | 1205 | 1396 |
| 5 | 1365 | 2761 |

The discounted pay back period shall be

2 years + 833/1024 years = 2.81 years.

**Internal Rate of Return Method:** Like the net present value method, the internal rate of return method considers the time value of money, the initial cash investment, and all cash flows from the investment. Unlike the net present value method, the internal rate of return method does not use the desired rate of return but estimates the discount rate that makes the present value of subsequent net cash flows equal to the initial investment. Using this estimated rate of return, the net present value of the investment will be zero. This estimated rate of return is then compared to a criterion rate of return that can be the organization's desired rate of return, the rate of return from the best alternative investment, or another rate the organization chooses to use for evaluating capital investments.

The procedures for computing the internal rate of return vary with the pattern of net cash flows over the useful life of an investment. The first step is to determine the investment's total net initial cash disbursements and commitments and its net cash inflows in each year of the investment. For an investment with uniform cash flows over its life, the following equation is used:

Total initial investment =Annual net cash flow x Annuity discount factor of the discount rate for the number of periods of the investment's useful life

If A is the annuity discount factor, then

$$A = \frac{\text{Total initial cash disbursements and commitments for the investment}}{\text{Annual (equal) net cash flows from the investment}}$$

Once A has been calculated, the discount rate is the interest rate that has the same discount factor as A in the annuity table along the row for the number of periods of the useful life of the investment. This computed discount rate or the internal rate of return will be compared to the

criterion rate the organization has selected to assess the investment's desirability.

When the net cash flows are not uniform over the life of the investment, the determination of the discount rate can involve trial and error and interpolation between interest rates. It should be noted that there are several spreadsheet programs available for computing both net present value and internal rate of return that facilitate the capital budgeting process.

**Illustration 12**

Calculate the internal rate of return of an investment of Rs. 1, 36,000 which yields the following cash inflows:

| Year | Cash Inflows (in Rs.) |
|------|----------------------|
| 1 | 30,000 |
| 2 | 40,000 |
| 3 | 60,000 |
| 4 | 30,000 |
| 5 | 20,000 |

**Solution**

*Calculation of IRR*

Since the cash inflow is not uniform, the internal rate of return will have to be calculated by the trial and error method. In order to have an approximate idea about such rate, the 'Factor' must be found out. *'The factor reflects the same relationship of investment and cash inflows as in case of payback calculations':*

$$F = \frac{I}{C}$$

Where,

$\quad$ F $\quad$ = $\quad$ Factor to be located

$\quad$ I $\quad$ = $\quad$ Original Investment

$\quad$ C $\quad$ = $\quad$ Average Cash inflow per year

For the project,

$$\text{Factor} = \frac{1,36,000}{36,000}$$

$$= 3.78$$

The factor thus calculated will be located in the present value of Re.1 received annually for N

year's table corresponding to the estimated useful life of the asset. This would give the expected rate of return to be applied for discounting the cash inflows.

In case of the project, the rate comes to 10%.

| Year | Cash Inflows (Rs.) | Discounting factor at 10% | Present Value (Rs.) |
|------|------|------|------|
| 1 | 30,000 | 0.909 | 27,270 |
| 2 | 40,000 | 0.826 | 33,040 |
| 3 | 60,000 | 0.751 | 45,060 |
| 4 | 30,000 | 0.683 | 20,490 |
| 5 | 20,000 | 0.621 | 12,420 |
| | | Total present value | 1,38,280 |

The present value at 10% comes to Rs. 1,38,280, which is more than the initial investment. Therefore, a higher discount rate is suggested, say, 12%.

| Year | Cash Inflows (Rs.) | Discounting factor at 10% | Present Value (Rs.) |
|------|------|------|------|
| 1 | 30,000 | 0.893 | 26,790 |
| 2 | 40,000 | 0.797 | 31,880 |
| 3 | 60,000 | 0.712 | 42,720 |
| 4 | 30,000 | 0.636 | 19,080 |
| 5 | 20,000 | 0.567 | 11,340 |
| | | Total present value | 1,31,810 |

The internal rate of return is, thus, more than 10% but less than 12%. The exact rate can be obtained by interpolation:

$$\text{IRR} = \left[ 10 + \left( \frac{\text{Rs.}1,38,280 - \text{Rs.}1,36,000}{\text{Rs.}1,38,280 - \text{Rs.}1,31,810} \right) \right] \times 2$$

$$= \quad 10 + \left( \frac{2280}{6470} \times 2 \right)$$

$$= \quad 10 + 0.7$$

$$\text{IRR} = 10.7\%$$

### Acceptance Rule

The use of IRR, as a criterion to accept capital investment decision involves a comparison of IRR with the required rate of return known as cut off rate . The project should the accepted if IRR is greater than cut-off rate. If IRR is equal to cut off rate the firm is indifferent. If IRR less than cut off rate the project is rejected.

### Internal rate of return and mutually exclusive projects

Projects are called mutually exclusive, when the selection of one precludes the selection of others e.g. in case a company owns a piece of land which can be put to use for either of the two different projects S or L, then such projects are mutually exclusive to each other i.e. the selection of one project necessarily means the rejection of the other. Refer to the figure below:
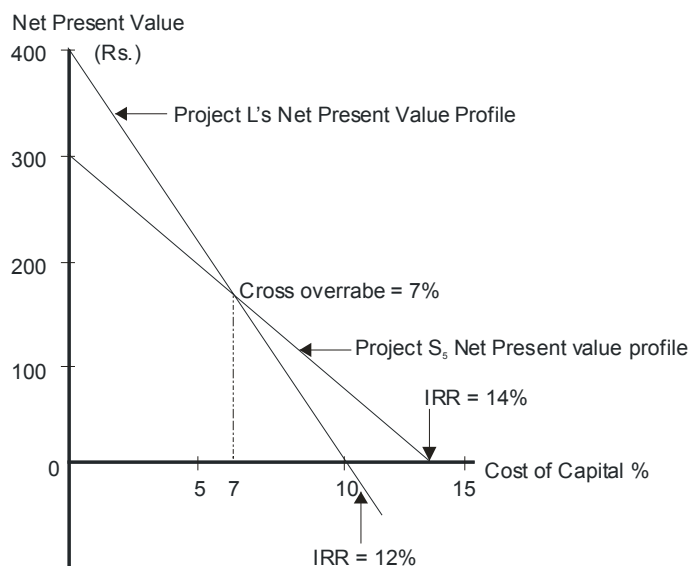


As long as the cost of capital is greater than the crossover rate of 7 % , then (1) $NPV^S$ is larger than $NPV^L$ and (2) $IRR^S$ exceeds $IRR^L$ . Hence , if the cut off rate or the cost of capital is greater than 7% , both the methods shall lead to selection of project S. However, if the cost of capital is less than 7% , the NPV method ranks Project L higher , but the IRR method indicates that the Project S is better.

As can be seen from the above discussion, mutually exclusive projects can create problems with the IRR technique because IRR is expressed as a percentage and does not take into account the scale of investment or the quantum of money earned. Let us consider another example of two mutually exclusive projects A and B with the following details,

| | Cash flows | | | |
|---|---|---|---|---|
| | Year 0 | Year 1 | IRR | NPV(10%) |
| Project A | (Rs 1,00,000) | Rs 1,50,000 | 50% | Rs 36,360 |
| Project B | (Rs 5,00,000) | Rs 6,25,000 | 25% | Rs 68,180 |

Project A earns a return of 50% which is more than what Project B earns; however the NPV of Project B is greater than that of Project A . Acceptance of Project A means that Project B must be rejected since the two Projects are mutually exclusive. Acceptance of Project A also implies that the total investment will be Rs 4,00,000 less than if Project B had been accepted, Rs 4,00,000 being the difference between the initial investment of the two projects. Assuming that the funds are freely available at 10% , the total capital expenditure of the company should be ideally equal to the sum total of all outflows provided they earn more than 10% along with the chosen project from amongst the mutually exclusive. Hence, in case the smaller of the two Projects i.e. Project A is selected, the implication will be of rejecting the investment of additional funds required by the larger investment. This shall lead to a reduction in the shareholders wealth and thus, such an action shall be against the very basic tenets of Financial Management.

In the above mentioned example the larger of the two projects had the lower IRR , but never the less provided for the wealth maximising choice. However, it is not safe to assume that a choice can be made between mutually exclusive projects using IRR in cases where the larger project also happens to have the higher IRR . Consider the following two Projects A and B with their relevant cash flows;

| Year | A | B |
|---|---|---|
| | Rs | Rs |
| 0 | (9,00,000) | (8,00,000) |
| 1 | 7,00,000 | 62,500 |
| 2 | 6,00,000 | 6,00,000 |
| 3 | 4,00,000 | 6,00,000 |
| 4 | 50,000 | 6,00,000 |

In this case Project A is the larger investment and also has t a higher IRR as shown below,

| Year | (Rs) | r=46% | PV(Rs) | (Rs) | R=35% | PV(Rs) |
|---|---|---|---|---|---|---|
| 0 | (9,00,000) | 1.0 | (9,00,000) | (8,00,000) | 1.0 | (8,00,000) |
| 1 | 7,00,000 | 0.6849 | 4,79, 430 | 62,500 | 0.7407 | 46,294 |
| 2 | 6,00,000 | 0.4691 | 2,81,460 | 6,00,000 | 0.5487 | 3,29,220 |
| 3 | 4,00,000 | 0.3213 | 1,28,520 | 6,00,000 | 0.4064 | 2,43,840 |
| 4 | 50,000 | 0.2201 | 11,005 | 6,00,000 | 0.3011 | 1,80,660 |
| | | | (415) | | | 14 |

IRR A = 46%

IRR B = 35%

However, in case the relevant discounting factor is taken as 5% , the NPV of the two projects provides a different picture as follows;

| | Project A | | | | Project B | |
|---|---|---|---|---|---|---|
| Year | (Rs) | r= 5% | PV(Rs) | (Rs) | r= 5% | PV(Rs) |
| 0 | (9,00,000) | 1.0 | (9,00,000) | (8,00,000) | 1.0 | (8,00,000) |
| 1 | 7,00,000 | 0.9524 | 6,66,680 | 62,500 | 0.9524 | 59,525 |
| 2 | 6,00,000 | 0.9070 | 5,44,200 | 6,00,000 | 0.9070 | 5,44,200 |
| 3 | 4,00,000 | 0.8638 | 3,45,520 | 6,00,000 | 0.8638 | 5,18,280 |
| 4 | 50,000 | 0.8227 | 41,135 | 6,00,000 | 0.8227 | 4,93,630 |
| | | NPV | 6,97,535 | | | 8,15,635 |

As may be seen from the above, Project B should be the one to be selected even though its IRR is lower than that of Project A. This decision shall need to be taken in spite of the fact that Project A has a larger investment coupled with a higher IRR as compared with Project B. This type of an anomalous situation arises because of the reinvestment assumptions implicit in the two evaluation methods of NPV and IRR.

**The Reinvestment assumption**

The Net Present Value technique assumes that all cash flows can be reinvested at the discount rate used for calculating the NPV. This is a logical assumption since the use of the NPV technique implies that all projects which provide a higher return than the discounting factor are accepted. In contrast, IRR technique assumes that all cash flows are reinvested at the projects IRR. This assumption means that projects with heavy cash flows in the early

years will be favoured by this method vis-à-vis projects which have got heavy cash flows in the later years. This implicit reinvestment assumption means that Projects like A , with cash flows concentrated in the earlier years of life will be preferred by the method relative to Projects such as B.

**Projects with unequal lives**

Let us consider two mutually exclusive projects 'A' and 'B' with the following cash flows,

| Year | 0 | 1 | 2 |
|---|---|---|---|
| | Rs | Rs | Rs |
| Project A | (30,000) | 20,000 | 20,000 |
| Project B | (30,000) | 37,500 | |

The calculation of NPV and IRR could help us evaluate the two projects; however, it is also possible to equate the life span of the two for decision making purposes. The two projects can be equated in terms of time span by assuming that the company can reinvest in Project 'B' at the end of year 1. In such a case the cash flows of Project B will appear to be as follows;

| Year | 0 | 1 | 2 |
|---|---|---|---|
| | Rs | Rs | Rs |
| Project 'B' | (30,000) | 37,500 | |
| Project B reinvested | | (30,000) | 37,500 |
| Total cash flows | (30,000) | 7,500 | 37,500 |

The NPVs and IRRs of both these projects under both the alternatives are shown below

| | NPV (r=10%) | IRR |
|---|---|---|
| | Rs | |
| Cash flows (Project A 2Years) | NPV $_A$ = 4,711 | 22% |
| Cash flows (Project B 1 Year) | NPV $_B$ = 4,090 | 25% |
| Adjusted cash flows (Project A 2 Years) | NPV $_A$ = 4,711 | 22% |
| Adjusted cash flow (Project B 2 years) | NPV $_B$ = 7,810 | 25% |

As may be seen from the above analysis, the ranking as per IRR makes Project B superior to Project A, irrespective of the period over which the assumption is made. However, when we consider NPV, the decision shall be favouring Project B; in case the re investment assumption is taken into account. This is diametrically opposite to the decision on the basis of NPV when re investment is not assumed. In that case the NPV of Project A makes it the preferred project.

Hence, in case it is possible to re invest as shown in the example above, it is advisable to compare and analyse alternative projects by considering equal lives, however, this process cannot be generalised to be the best practice, as every case shall need to be judged on its own distinctive merits. Comparisons over differing lives are perfectly fine if there is no presumption that the company will be required or shall decide to re invest in similar assets.

**Multiple Internal Rate of Return:** In cases where project cash flows change signs or reverse during the life of a project e.g. an initial cash outflow is followed by cash inflows and subsequently followed by a major cash outflow , there may be more than one IRR. The following graph of discount rate versus NPV may be used as an illustration;
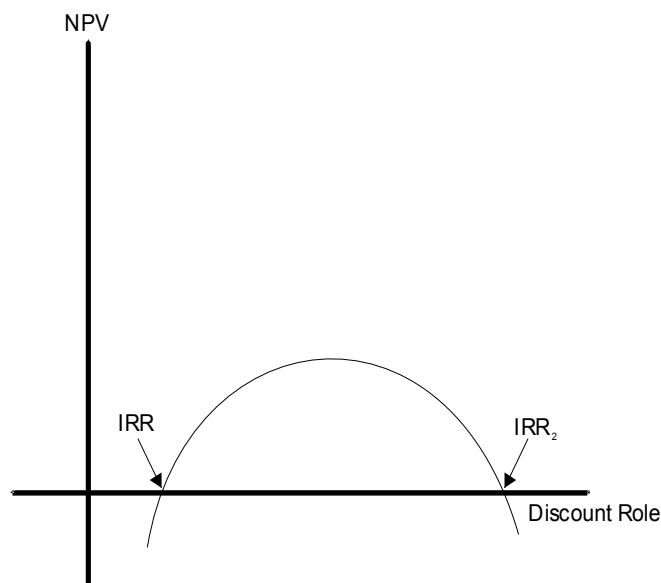


In such situations if the cost of capital is less than the two IRRs , a decision can be made easily , however otherwise the IRR decision rule may turn out to be misleading as the project should only be invested if the cost of capital is between IRR[1] and IRR[2]. To understand the concept of multiple IRRs it is necessary to understand the implicit re investment assumption in both NPV and IRR techniques.

*Advantages*

(*i*)   This method makes use of the concept of time value of money.

(*ii*)   All the cash flows in the project are considered.

(*iii*)  IRR is easier to use as instantaneous understanding of desirability can be determined by comparing it with the cost of capital

(*iv*)  IRR technique helps in achieving the objective of minimisation of shareholders wealth.

*Limitations*

(*i*)   The calculation process is tedious if there are more than one cash outflows interspersed between the cash inflows, there can be multiple IRRs, the interpretation of which is difficult.

(*ii*)   The IRR approach creates a peculiar situation if we compare two projects with different inflow/outflow patterns.

(*iii*)  It is assumed that under this method all the future cash inflows of a proposal are reinvested at a rate equal to the IRR. It is ridiculous to imagine that the same firm has a ability to reinvest the cash flows at a rate equal to IRR.

(*iv*)  If mutually exclusive projects are considered as investment options which have considerably different cash outlays. A project with a larger fund commitment but lower IRR contributes more in terms of absolute NPV and increases the shareholders' wealth. In such situation decisions based only on IRR criterion may not be correct.

**Modified Internal Rate of Return (MIRR):** As mentioned earlier, there are several limitations attached with the concept of the conventional Internal Rate of Return. The MIRR addresses some of these deficiencies e.g, it eliminates multiple IRR rates; it addresses the reinvestment rate issue and produces results which are consistent with the Net Present Value method.

Under this method , all cash flows , apart from the initial investment , are brought to the terminal value using an appropriate discount rate(usually the Cost of Capital). This results in a single stream of cash inflow in the terminal year. The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash in flow as mentioned above. The discount rate which equates the present value of the terminal cash in flow to the zeroth year outflow is called the MIRR.

**Illustration 13**

Using details given in illustration 11, calculate MIRR considering a 8% Cost of Capital .

**Solution**

| Year | Cash flow |
|------|-----------|
| | Rs |
| 0 | 1,36,000 |

The net cash flows from the investment shall be compounded to the terminal year at 8% as follows,

| Year | Cash flow | @8% reinvestment rate factor | Rs. |
|------|-----------|------------------------------|------|
| 1 | 30,000 | 1.3605 | 40,815 |
| 2 | 40,000 | 1.2597 | 50,388 |
| 3 | 60,000 | 1.1664 | 69,984 |
| 4 | 30,000 | 1.0800 | 32,400 |
| 5 | 20,000 | 1.0000 | 20,000 |

MIRR of the investment based on a single cash in flow of Rs 2,13,587 and a zeroth year cash out flow of Rs 1,36,000 is 9.4% (approximately)

*Comparison of Net Present Value and Internal Rate of Return Methods*

Both the net present value and the internal rate of return methods are discounted cash flow methods which mean that they consider the time value of money. The time value of money takes into account that cash received today is worth more than cash received at any future time because cash received today can be invested at a specified interest rate. The time value of money is the opportunity cost (forgone interest) from not having the cash today. Additionally, both these techniques consider all cash flows over the expected useful life of the investment. Because of these two characteristics, discounted cash flow techniques are considered to be the most theoretically sound methods for evaluating capital investments.

There are circumstances under which the net present value method and the internal rate of return methods will reach different conclusions. Results may vary significantly when capital investment projects differ in (1) amount of initial investments, (2) net cash flow patterns, or (3) length of useful lives. In addition, these two methods can yield different conclusions in situations with (4) varying costs of capital over the life of a project and (5) multiple investments. To use capital budgeting techniques properly, these situations must be understood.

(1) The net present value method will favour a project with a large initial investment because the project is more likely to generate large net cash inflows. Because the internal rate of return method uses percentages to evaluate the relative profitability of an investment, the

amount of the initial investment has no effect on the outcome. Therefore, the internal rate of return method is more appropriate for assessing investments requiring significantly different initial investments.

(2) Differences in the timing and amount of net cash inflows affect a project's internal rate of return. This results from the fact that the internal rate of return method assumes that all net cash inflows from a project earn the same rate of return as the project's internal rate of return. In contrast, the net present value method assumes that all net cash inflows from an investment earn the desired rate of return used in the calculation. The desired rate of return used by the net present value method is usually the organization's weighted-average cost of capital, a more conservative and more realistic expectation in most cases.

(3) Both methods favour projects with long useful lives as long as a project earns positive net cash inflow during the extended years. As long as the net cash inflow in a year is positive, no matter how small, the net present value increases, and the projects desirability improves. Likewise, the internal rate of return method considers each additional useful year of a project another year that its cumulative net cash inflow will earn a return equal to the project's internal rate of return. A problem arises when an organization is forgoing more beneficial opportunities to continue a project. For example, there might be uses of space or talent where the organization would earn a higher return than the return from the continuation of the project.

(4) As an organization's financial condition or operating environment changes, its cost of capital could also change. A proper capital budgeting procedure should incorporate changes in the organization's cost of capital or desired rate of return in evaluating capital investments. The net present value method can accommodate different rates of return over the years by using the appropriate discount rates for the net cash inflow of different periods. The internal rate of return method calculates a single rate that reflects the return of the project under consideration and cannot easily handle situations with varying desired rates of return.

(5) The net present value method evaluates investment projects in cash amounts while the internal rate of return method evaluates investment projects in percentages or rates. The net present values from multiple projects can be added to arrive at a single total net present value for all investments while the percentages or rates of return on multiple projects cannot be added to determine an overall rate of return. A combination of projects requires a recalculation of the internal rate of return.

**Illustration 14**

CXC Company is preparing the capital budget for the next fiscal year and has identified the following capital investment projects:

Project A: Redesign and modification of an existing product that is current scheduled to be terminated. The enhanced model would be sold for six more years.

Project B:  Expansion of a product that has been produced on an experimental basis for the past year.  The expected life of the product line is eight years.

Project C:  Reorganization of the plant's distribution centre, including the installation of computerized equipment for tracking inventory.

Project D:  Addition of a new product.  In addition to new manufacturing equipment, a significant amount of introductory advertising would be required.  If this project is implemented, Project A would not be feasible due to limited capacity.

Project E:  Automation of the Packaging Department that would result in cost savings over the next six years.

Project F:  Construction of a building wing to accommodate offices presently located in an area that could be used for manufacturing.  This change would not add capacity for new lines but would alleviate crowded conditions that currently exist, making it possible to improve the productivity of two existing product lines that have been unable to meet market demand.

The cost of capital for CXC Company is 12%, and it is assumed that any funds not invested in capital projects and any funds released at the end of a project can be invested at this rate.  As a benchmark for the accounting (book) rate of return, CXC has traditionally used 10%.  Further information about the projects is shown below.

|  | Project A | Project B | Project C | Project D | Project E | Project F |
|---|---|---|---|---|---|---|
| Capital Investment | 106,000 | 200,000 | 140,000 | 160,000 | 144,000 | 130,000 |
| Net Present Value @12% | 69,683 | 23,773 | (10,228) | 74,374 | 6,027 | 69,513 |
| Internal Rate of Return | 35% | 15% | 9% | 27% | 14% | 26% |
| Payback Period | 2.2 years | 4.5 years | 3.9 years | 4.3 years | 2.9 years | 3.3 years |
| Accounting Rate of Return | 18% | 9% | 6% | 21% | 12% | 18% |

If CXC Company has no budget restrictions for capital expenditures and wishes to maximize stakeholder value, the company would choose, based on the given information, to proceed with Projects A or D (mutually exclusive projects), B, E, and F.  All of these projects have a positive net present value and an internal rate of return that is greater that the hurdle rate or cost of capital.  Consequently, any one of these projects will enhance stakeholder value.  Project C is omitted because it has a negative net present value and the internal rate of return is below the 12% cost of capital.

With regard to the mutually exclusive projects, the selection of Project A or Project D is dependent on the valuation technique used for selection.  If net present value is the only technique used, CXC Company would select Projects B, D, E, and F with a combined net present value of 173,687, the maximum total available.  If either the payback method or the

internal rate of return is used for selection, Projects A, B, E, and F would be chosen as Project A has a considerably shorter payback period than Project D, and Project A also has a higher internal rate of return that Project D. The accounting rate of return for these two projects is quite similar and does not provide much additional information to inform the company's decision. The deciding factor for CXC Company between Projects A and D could very well be the payback period and the size of the initial investment; with Project A, the company would be putting fewer funds at risk for a shorter period of time.

If CXC Company were to use the accounting rate of return as the sole measurement criteria for selecting projects, Project B would not be selected. It is clear from the other measures that Project B will increase stakeholder value and should be implemented if CXC has no budget restrictions; this clearly illustrates the necessity that multiple measures be used when selecting capital investment projects.

Rather than an unrestricted budget, let us assume that the CXC capital budget is limited to 4,50,000. In cases where there are budget limitations (referred to as capital rationing), the use of the net present value technique is generally recommended as the highest total net present value of the group of projects that fits within the budget limitation will provide the greatest increase in stakeholder value. The combination of Projects A, B, and F will yield the highest net present value to CXC Company for an investment of 436,000.

**Discounted Pay back period Method**

Some accountants prefers to calculate payback period after discounting the cash flow by a predetermined rate and the payback period so calculated is called, 'Discounted payback period'. One of the most popular economic criteria for evaluating capital projects also is the payback period. Payback period is the time required for cumulative cash inflows to recover the cash outflows of the project.

For example, a Rs. 30,000 cash outlay for a project with annual cash inflows of Rs. 6,000 would have a payback of 5 years ( Rs. 30,000 / Rs. 6,000).

The problem with the Payback Period is that it ignores the time value of money. In order to correct this, we can use discounted cash flows in calculating the payback period. Referring back to our example, if we discount the cash inflows at 15% required rate of return we have:

Year 1 - Rs. 6,000 x 0.870 = Rs. 5,220    Year 6 - Rs. 6,000 x 0.432 = Rs. 2,592

Year 2 - Rs. 6,000 x 0.756 = Rs. 4,536    Year 7 - Rs. 6,000 x 0.376 = Rs. 2,256

Year 3 - Rs. 6,000 x 0.658 = Rs. 3,948    Year 8 - Rs. 6,000 x 0.327 = Rs. 1,962

Year 4 - Rs. 6,000 x 0.572 = Rs. 3,432    Year 9 - Rs. 6,000 x 0.284 = Rs. 1,704

Year 5 - Rs. 6,000 x 0.497 = Rs. 2,982    Year 10 - Rs. 6,000 x 0.247 = Rs. 1,482

The cumulative total of discounted cash flows after ten years is Rs. 30,114. Therefore, our discounted payback is approximately 10 years as opposed to 5 years under simple payback. It should be noted that as the required rate of return increases, the distortion between simple payback and discounted payback grows. Discounted Payback is more appropriate way of measuring the payback period since it considers the time value of money.

**Self Examination Questions**

**A.    Objective Type Questions**

1.    A capital budgeting technique which does not require the computation of cost of capital for decision making purposes is,

   (a)    Net Present Value method

   (b)    Internal Rate of Return method

   (c)    Modified Internal Rate of Return method

   (d)    Pay back

2.    If two alternative proposals are such that the acceptance of one shall exclude the possibility of the acceptance of another then such decision making will lead to,

   (a)    Mutually exclusive decisions

   (b)    Accept reject decisions

   (c)    Contingent decisions

   (d)    None of the above

3.    In case a company considers a discounting factor higher than the cost of capital for arriving at present values, the present values of cash inflows will be

   (a)    Less than those computed on the basis of cost of capital

   (b)    More than those computed on the basis of cost of capital

   (c)    Equal to those computed on the basis of the cost of capital

   (d)    None of the above

4.    The pay back technique is specially useful during times

   (a)    When the value of money is turbulent

   (b)    When there is no inflation

   (c)    When the economy is growing at a steady rate coupled with minimal inflation.

(d) None of the above

5. While evaluating capital investment proposals, time value of money is used in which of the following techniques,

   (a) Payback method

   (b) Accounting rate of return

   (c) Net present value

   (d) None of the above

6. IRR would favour project proposals which have,

   (a) Heavy cash inflows in the early stages of the project.

   (b) Evenly distributed cash inflows throughout the project.

   (c) Heavy cash inflows at the later stages of the project

   (d) None of the above.

7. The re investment assumption in the case of the IRR technique assumes that,

   (a) Cash flows can be re invested at the projects IRR

   (b) Cash flows can be re invested at the weighted cost of capital

   (c) Cash flows can be re invested at the marginal cost of capital

   (d) None of the above

8. Multiple IRRs are obtained when,

   (a) Cash flows in the early stages of the project exceed cash flows during the later stages.

   (b) Cash flows reverse their signs during the project

   (c) Cash flows are un even

   (d) None of the above.

9. Depreciation is included as a cost in which of the following techniques,

   (a) Accounting rate of return

   (b) Net present value

   (c) Internal rate of return

   (d) None of the above

10. Management is considering a Rs 1,00,000 investment in a project with a 5 year life and no residual value . If the total income from the project is expected to be Rs 60,000 and recognition is given to the effect of straight line depreciation on the investment, the average rate of return is :

    (a) 12%

    (b) 24%

    (c) 60%

    (d) 75%

11. Assume cash outflow equals Rs 1,20,000 followed by cash inflows of Rs 25,000 per year for 8 years and a cost of capital of 11%. What is the Net present value?

    (a) (Rs 38,214)

    (b) Rs 9,653

    (c) Rs 8,653

    (d) Rs 38,214

12. What is the Internal rate of return for a project having cash flows of Rs 40,000 per year for 10 years and a cost of Rs 2,26,009?

    (a) 8%

    (b) 9%

    (c) 10%

    (c) 12%

13. While evaluating investments, the release of working capital at the end of the projects life should be considered as,

    (a) Cash in flow

    (b) Cash out flow

    (c) Having no effect upon the capital budgeting decision

    (d) None of the above.

14. Capital rationing refers to a situation where,

    (a) Funds are restricted and the management has to choose from amongst available alternative investments.

(b) Funds are unlimited and the management has to decide how to allocate them to suitable projects.

(c) Very few feasible investment proposals are available with the management.

(d) None of the above

15. Capital budgeting is done for

(a) Evaluating short term investment decisions.

(b) Evaluating medium term investment decisions.

(c) Evaluating long term investment decisions.

(d) None of the above

**Answers to Objective Type Questions**

**1.** (d); **2.** (a); **3.** (a) ; **4.** (a); **5.** (c) ; **6.** (a); **7.** (a); **8.** (b); **9.** (a);

**10.** (b); **11.** (c); **12.** (d); **13.** (a); **14.** (a); **15.** (c).

**B. Short Answer Type Questions**

1. Define the following terms:

(a) Capital Budgeting

(b) Regular payback period and discounted payback period

(c) Independent projects and mutually exclusive projects.

(d) Internal rate of return method and modified rate of return method.

(e) Net Present Value method.

(f) Capital rationing.

2. Why is discounted cash flow a superior method for capital budgeting?

3. "The higher the cut off rate, the more will be the company willing to pay for cost saving equipment". Discuss.

4. Does the IRR model make significantly different decisions than the NPV method? Discuss.

5. Two projects have an identical Net Present Value of Rs 50,000. Are both projects equal in desirability.

6. What are the basic objections to the use of Average Rate of Return concept for evaluating projects?

7. Discuss the principal limitations of the cash payback period for evaluating capital investment proposals.

8. Your boss has suggested that a one year payback means 100 % average returns. Do you agree?

**C. Long Answer Type Questions**

1. Explain why, if two mutually exclusive projects are being compared, the short term project might have the higher ranking under NPV criteria if the cost of capital is high, but the long term project will be deemed better if the cost of capital is low. Would changes in the cost of capital ever cause a change in the IRR ranking of two such projects?

2. In what sense is a reinvestment rate assumption embodied in the NPV , IRR and MIRR methods? What is the assumed reinvestment rate of each method?

3. Discuss in detail the 'Capital Budgeting Process'

4. What are the various types of Capital Investment decisions known to you?

5. Discuss the basic principles for measuring project cash flows.

**D. Practical Problems**

1. (*a*) You are required to calculate the total present value of inflow at rate of discount of 12% of following data.

| Year end | Cash inflows |
|---|---|
|  | Rs. |
| 1 | 2,30,000 |
| 2 | 2,28,000 |
| 3 | 2,78,000 |
| 4 | 2,83,000 |
| 5 | 2,73,000 |
| 6 | 80,000 (Scrap Value) |

(b) Considering the data given in the above. Calculate the total present value of inflows and outflows if the rate of discount is 10% assuming that Rs. 10,00,000 of outflows would be spent as follows:

| | |
|---|---|
| Beginning of year 1 | Rs. 2,50,000 |
| Beginning of year 2 | Rs. 2,50,000 |
| Beginning of year 3 | Rs. 2,50,000 |
| Beginning of year 4 | Rs. 2,50,000 |

2. Consider the following example of cash flows from two projects.

| No. of years | Project A | Project B |
|---|---|---|
| 1 | Nil | 40,000 |
| 2 | Nil | 50,000 |
| 3 | 5,000 | 1,20,000 |
| 4 | 20,000 | 10,000 |
| 5 | 50,000 | 10,000 |
| 6 | 1,50,000 | Nil |
| 7 | 50,000 | Nil |
| 8 | 40,000 | Nil |
| Total | 3,15,000 | 2,30,000 |

Both projects cost Rs. 1,50,000 each . You are required to compute the payback period for both projects. Which project will you prefer?

3. A company wants to replace its old machine with a new automatic machine. Two models A and B are available at the same cost of Rs. 5 lakhs each. Salvage value of the old machine is Rs. 1 lakh. The utilities of the existing machine can be used if the company purchases model A. Additional cost of utilities to be purchased in that case are Rs. 1 lakh. If the company purchases model B then all the existing utilities will have to be replaced with new utilities costing Rs. 2 lakhs.  The salvage value of the old utilities will be Rs. 0.20 lakhs. The earnings after taxation are expected to be as follows :

| Year/Model | A | B | P.V. Factor |
|---|---|---|---|
| | *(Cash inflows)* | | |
| | Rs. | Rs. | @ 15% |
| 1. | 1,00,000 | 2,00,000 | 0.87 |
| 2. | 1,50,000 | 2,10,000 | 0.76 |
| 3. | 1,80,000 | 1,80,000 | 0.66 |
| 4. | 2,00,000 | 1,70,000 | 0.57 |
| 5. | 1,70,000 | 40,000 | 0.50 |
| Salvage value at the end of Year 5 | 50,000 | 60,000 | |

The targeted return on capital is 15% you are required to :

(*i*) Compute, for the two machines separately, net present value, discounted payback period and desirability factor and

(*ii*) Advice which of the machines is to be selected ?

4. Suppose the management of a concern is considering two projects both involving Rs. 10,00,000 each and having profits after tax and depreciation as follows:

| Year | A | B |
|---|---|---|
| | Rs | Rs |
| 1 | 50,000 | Nil |
| 2 | 75,000 | Nil |
| 3 | 1,25,000 | Nil |
| 4 | 1,30,000 | 2,30,000 |
| 5 | 80,000 | 2,30,000 |
| Total | 4,60,000 | 4,60,000 |

Suppose further that both projects can be sold for Rs. 80,000 each after 5 years. You are required to compute the annual rate of return of both the projects. Will you consider both projects to be equal?

5. A product is currently manufactured on a plant which is not fully depreciated for tax purposes and has a book value of Rs., 60,000 (it was bought for Rs. 1,20,000 six years ago). The cost of the product is as under:

|  | Unit cost |
|---|---|
|  | Rs. |
| Direct costs | 24.00 |
| Indirect labour | 8.00 |
| Other variable overheads | 16.00 |
| Fixed overheads | 16.00 |
|  | Rs. 64.00 |

10,000 units are normally produced. It is expected that the old machine can be used, indefinitely into the future, after suitable repairs, estimated to cost Rs. 40,000 annually, are carried out. A manufacturer of machinery is offering a new machine with the latest technology at Rs.3,00,000 after trading off the old plant for Rs. 30,000. The projected cost of the product will then be :

|  | Per unit |
|---|---|
|  | Rs. |
| Direct costs | 14.00 |
| Indirect labour | 12.00 |
| Other variable overheads | 12.00 |
| Fixed overheads | 20.00 |
|  | 58.00 |

The fixed overheads are allocations from other departments pls the depreciation of plant and machinery. The old machine can be sold for Rs. 40,000 in the open market. The new machine is expected to last for 10 years at the end of which, its salvage value will be Rs. 20,000. Rate of corporate taxation is 50%. For tax purposes, the cost of the new machine and that of the old one may be depreciated in 10 years. The minimum rate of return expected is 10%.

It is also anticipated that in future the demand for the products will stay to 10,000 units. Advise whether the new machine can be purchased ignore capital gains taxes.

Present value of Re. 1 at 10% for years 1-10 are :

.909, .826, .751, .683, .621, .564, .513, .467, .424 and .383 respectively.

6. Modern Enterprises Ltd. is considering the purchase of a new computer system for its Research and Development Division, which would cost Rs. 35 lakhs. The operation and maintenance costs (excluding depreciation) are expected to be Rs. 7 lakhs per annum. It is estimated that the useful life of the system would be 6 years, at the end of which the disposal value is expected to be Rs. 1 lakh.

   The tangible benefits expected from the system in the form of reduction in design and drafts-menship costs would be Rs. 12 lakhs per annum. Besides, the disposal of used drawing, office equipment and furniture, initially, is anticipated to net Rs. 9 lakhs.

   Capital expenditure in research and development would attract 100% write-off for tax purpose. The gains arising from disposal of used assets may be considered tax-free. The company's effective tax rate is 50%.

   The average cost of capital to the company is 12%. The present value factors at 12% discount rate are :

   | Year | PVF |
   |:---:|:---:|
   | 1 | 0.892 |
   | 2 | 0.797 |
   | 3 | 0.711 |
   | 4 | 0.635 |
   | 5 | 0.567 |
   | 6 | 0.506 |

   After appropriate analysis of cash flows, please advise the company of the financial viability of the proposal.

7. A sole trader installs plant and machinery in rented premises for the production of luxury article, the demand for which is expected to last only 5 years. The total capital put in by the sole trader is as under:

   | | |
   |---|---|
   | Plant and Machinery | Rs. 2,70,500 |
   | Working Capital | Rs. 40,000 |
   | | Rs. 3,10,500 |

   The working capital will be fully realised at the end of the 5th year. The scrap value of the plant expected to be realised at the end of the 5th year is only Rs. 5,500. The trader's earnings are expected to be as under :

| Years | Cash profits after depreciation and tax | Tax payable |
|---|---|---|
| | *Rs.* | *Rs.* |
| 1 | 90,000 | 20,000 |
| 2 | 1,30,000 | 30,000 |
| 3 | 1,70,000 | 40,000 |
| 4 | 1,16,000 | 26,000 |
| 5 | 19,500 | 5,000 |

**Present value factors of various rates of interest are given below :**

| Years | 11% | 12% | 13% | 14% | 15% |
|---|---|---|---|---|---|
| | 0.9009 | 0.8929 | 0.8850 | 0.8770 | 0.8696 |
| 2 | 0.8116 | 0.7972 | 0.7831 | 0.7695 | 0.7561 |
| 3 | 0.7312 | 0.7118 | 0.6931 | 0.6750 | 0.6575 |
| 4 | 0.6587 | 0.6355 | 0.6133 | 0.5921 | 0.5718 |
| 5 | 0.5935 | 0.5674 | 0.5428 | 0.5194 | 0.4972 |

You are required to compute the present value of cash flows discounted at the various rates of interests given above and state the return from the project. (3,34,172; 3,25,996; 3,18,128; 3,10,543; 3,03,251 : Yield 14%)

8. The Alpha Co. Ltd, is considering the purchase of a new machine. Two alternative machines (A & B) have been suggested, each costing Rs. 4,00,000. Earnings after taxation but before depreciation are expected to be as follows :

| Year | Cash Flows | |
|------|------------|------------|
| | Machine A<br>Rs. | Machine B<br>Rs. |
| 1 | 40,000 | 1,20,000 |
| 2 | 1,20,000 | 1,60,000 |
| 3 | 1,60,000 | 2,00,000 |
| 4 | 2,40,000 | 1,20,000 |
| 5 | 1,60,000 | 80,000 |
| Total | 7,20,000 | 6,80,000 |

The company has a target rate return on capital @ 10 percent and on this basis, you are required :

(a) Compare profitability of the machines and state which alternative you consider financially preferable,

(b) Compute the pay back period for each project and,

(c) Compute annual rate of return for each project.

(Present value of machine B is higher than that of machine A; Payback period machine A – 3 years 4 months, machine B 2 years 7.2 months ; Annual return machine A – 16%, machine B – 14%)

9. Company X is forced to choose between two machines A and B. The two machines are designed differently, but have identical capacity and do exactly the same job. Machine A costs Rs. 1,50,000 and will last for 3 years. It costs Rs. 40,000 per year to run. Machine B is an 'economy' model costing only Rs. 1,00,000, but will last only for 2 years, and costs Rs. 60,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10 percent. Which machine company X should buy ?

10. S Engineering Company is considering replacing or repairing a particular machine, which has just broken down. Last year this machine costed Rs. 20,000 to run and maintain. These costs have been increasing in real terms in recent years with the age of the machine. A further useful life of 5 years is expected, if immediate repairs of Rs. 19,000 are carried out. If the machine is not repaired it can be sold immediately to realise about Rs. 5,000 (Ignore loss/gain on such disposal)

Alternatively, the company can buy a new machine for Rs. 49,000 with an expected life of 10 years with no salvage value after providing depreciation on straight line basis. In this case, running and maintenance costs will reduce to Rs. 14,000 each year and are not expected to increase much in real terms for a few years at least. S Engineering Company regard a normal return of 10% p.a. after tax as a minimum requirement on   any   new investment. Considering capital budgeting techniques, which alternative will you choose? Take corporate tax rate of 50% and assume that depreciation on straight line basis will be accepted for tax purposes also.

Given cumulative present value of Re. 1 p.a. at 10% for 5 years Rs. 3.791 and for 10 years Rs. 6.145.

# CHAPTER 7

## MANAGEMENT OF WORKING CAPITAL

### UNIT – I : MEANING, CONCEPT AND POLICIES OF WORKING CAPITAL

**Learning Objectives**

After studying this chapter, you will be able to understand

- The  meaning and the significance of working capital management;
- The concept of operating cycle and the estimation of working capital needs;
- The need for investing in current assets;
- The need for managing current assets and current liabilities; and
- Financing of working capital.

### 1.1    INTRODUCTION

Decisions relating to working capital and short term financing are referred to as Working Capital Management.  These involve managing the relationship between a firm's short-term assets and its short-term liabilities.  The goal of working capital management is to ensure that the firm is able to continue its operations and that it has sufficient cash flow to satisfy both maturing short-term debt and upcoming operational expenses.

### 1.2    MEANING AND CONCEPT OF WORKING CAPITAL

There are two concepts of working capital - gross and net.  Gross working capital refers to the firm's investment in current assets.  Current assets are those assets which can be converted into cash within an accounting year.  Net working capital refers to the difference between current assets and current liabilities. Current liabilities are those claims of outsiders which are expected to mature for payment within an accounting year.

*Current Assets include*:  Stocks of raw materials, Work-in-progress, Finished goods, Trade debtors, Prepayments, Cash balances etc.

*Current Liabilities include*:  Trade creditors, Accruals, Taxation payable, Bills Payables, Outstanding expenses, Dividends payable, short term loans.

Working capital is also known as operating capital. A most important value, it represents the amount of day-to-day operating liquidity available to a business. A company can be endowed with assets and profitability, but short of liquidity if these assets cannot readily be converted into cash.

A positive working capital means that the company is able to payoff its short-term liabilities. A negative working capital means that the company currently is unable to meet its short-term liabilities.

From the point of view of time, the term working capital can be divided into two categories viz., Permanent and temporary. Permanent working capital refers to the hard core working capital. It is that minimum level of investment in the current assets that is carried by the business at all times to carry out minimum level of its activities.

Temporary working capital refers to that part of total working capital, which is required by a business over and above permanent working capital. It is also called variable working capital. Since the volume of temporary working capital keeps on fluctuating from time to time according to the business activities it may be financed from short-term sources.

The following diagrams shows Permanent and Temporary or Fluctuating or variable working capital
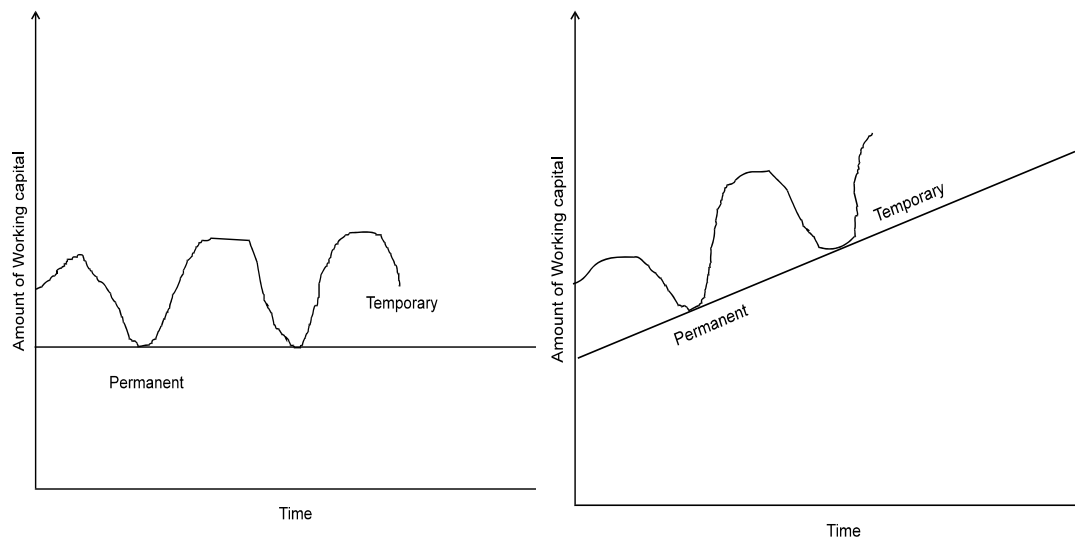
Both kinds of working capital i.e. permanent and fluctuating (temporary) are necessary to facilitate production and sales through the operating cycle.

**1.2.1 Importance of Adequate Working Capital:** The importance of adequate working capital in commercial undertakings can be judged from the fact that a concern needs funds for its day-to-day running. Adequacy or inadequacy of these funds would determine the efficiency with which the daily business may be carried on. Management of working capital is an essential task of the finance manager. He has to ensure that the amount of working capital available with his concern is neither too large nor too small for its requirements. A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds. The various studies conducted by the Bureau of Public Enterprises have shown that one of the reason for the poor performance of public sector undertakings in our country has been the large amount of funds locked up in working capital This results in over capitalization. Over capitalization implies that a company has too large funds for its requirements, resulting in a low rate of return a situation which implies a less than optimal use of resources. A firm has, therefore, to be very careful in estimating its working capital requirements.

If the firm has inadequate working capital, it is said to be under-capitalised. Such a firm runs the risk of insolvency. This is because, paucity of working capital may lead to a situation where the firm may not be able to meet its liabilities. It is interesting to note that many firms which are otherwise prosperous (having good demand for their products and enjoying profitable marketing conditions) may fail because of lack of liquid resources.

If a firm has insufficient working capital and tries to increase sales, it can easily over-stretch the financial resources of the business. This is called overtrading. Early warning signs of over trading include:

♦ Pressure on existing cash.

♦ Exceptional cash generating activities e.g., offering high discounts for early cash payment.

♦ Bank overdraft exceeds authorized limit.

♦ Seeking greater overdrafts or lines of credit.

♦ Part-paying suppliers or other creditors.

♦ Paying bills in cash to secure additional supplies.

♦ Management pre-occupation with surviving rather than managing.

♦ Frequent short-term emergency requests to the bank (to help pay wages, pending receipt of a cheque).

Every business needs adequate liquid resources in order to maintain day-to-day cash flow. It needs enough cash to pay wages and salaries as they fall due and to pay creditors if it is to keep its workforce engaged and ensure its supplies.

Maintaining adequate working capital is not just important in the short-term. Sufficient liquidity must be maintained in order to ensure the survival of the business in the long-term as well. Even a profitable business may fail if it does not have adequate cash flow to meet its liabilities as they fall due. Therefore, when business make investment decisions they must not only consider the financial outlay involved with acquiring the new machine or the new building, etc., but must also take account of the additional current assets that are usually required with any expansion of activity.

Increased production leads to hold additional stocks of raw materials and work in progress. Increased sales usually means that the level of debtors will increase. A general increase in the firm's scale of operations tends to imply a need for greater levels of working capital.

A question then arises what is an optimum amount of working capital for a firm? We can say that a firm should neither have too high an amount of working capital nor should the same be too low. It is the job of the finance manager to estimate the requirements of working capital carefully and determine the optimum level of investment in working capital.

**1.2.2 Optimum Working Capital:** If a company's current assets do not exceed its current liabilities, then it may run into trouble with creditors that want their money quickly. The working capital ratio, which measures this ability to pay back can be calculated as current assets divided by current liabilities.

Current ratio (current assets/current liabilities) (along with acid test ratio to supplement it) has traditionally been considered the best indicator of the working capital situation. It is understood that a current ratio of 2 (two) for a manufacturing firm implies that the firm has an optimum amount of working capital. This is supplemented by Acid Test Ratio (Quick assets/Current liabilities) which should be at least 1 (one). Thus it is considered that there is a comfortable liquidity position if liquid current assets are equal to current liabilities. Bankers, financial institutions, financial analysts, investors and other people interested in financial statements have, for years, considered the current ratio at, 'two' and the acid test ratio at, 'one' as indicators of a good working capital situation. As a thumb rule, this may be quite adequate. However, it should be remembered that optimum working capital can be determined only with reference to the particular circumstances of a specific situation. Thus, in a company where the inventories are easily saleable and the sundry debtors are as good as liquid cash, the current ratio may be lower than 2 and yet firm may be sound. An optimum working capital ratio is dependent upon the business situation as such and the nature and composition of various current assets. A company having short conversion cycle (from cash to cash) my have a lower current ratio.

In nutshell, a firm needs to maintain a sound working capital position. It should have adequate working capital to run its business operations. Both excessive as well as inadequate working capital positions are dangerous. Excessive working capital means holding costs and idle funds which earn no profits for the firm. Paucity of working capital not only impairs the firm's profitability but also results in production interruptions, inefficiencies and sales disruptions. The management should therefore maintain the right amount of working capital continuously.

## 1.3 MANAGEMENT OF WORKING CAPITAL

Working capital management is the functional area of finance that covers all the current accounts of its firm. It is concerned with management of the level of individual current assets and the current liabilities or in other words the management of total working capital.

Managing Working Capital is a matter of balance. A firm must have sufficient cash on hand to meet its immediate needs while ensuring that idle cash is invested to the organizations best possible advantage. To avoid the difficulties, it is necessary to have clear and accurate reports on each of the components of working capital and an awareness of the potential impact of likely influences.

Sound financial and statistical techniques, supported by judgement should be used to predict the quantum of working capital required at different times. Adequate provisions of working capital mitigates risk. Working capital management entails short-term decisions generally, relating to its next one year period which are "reversible".

Management will use a combination of policies and techniques for the management of working capital. These require managing the current assets – generally cash and cash equivalents, inventories and debtors. There are also a variety of short term financing options which are considered. The various steps in the management of working capital involve:

♦ *Cash management* – Identify the cash balance which allows for the business to meet day to day expenses, but reduces cash holding costs.

♦ *Inventory management* – Identify the level of inventory which allows for uninterrupted production but reduces the investment in raw materials and hence increases cash flow; The techniques like Just In Time (JIT) and Economic order quantity (EOQ) are used for this.

♦ *Debtors management* – Identify the appropriate credit policy, i.e., credit terms which will attract customers, such that any impact on cash flows and the cash conversion cycle will be offset by increased revenue and hence Return on Capital (or vice versa). The tools like Discounts and allowances are used for this.

♦ *Short term financing* – Inventory is ideally financed by credit granted by the supplier; dependent on the cash conversion cycle, it may however, be necessary to utilize a bank loan (or overdraft), or to "convert debtors to cash" through "factoring" in order to finance

working capital requirements.

There are, however, certain constraints in the management of working capital such as:

(i)     Non-realisation of the importance of working capital.

(ii)    Continuous inflation in the economy.

(iii)   The existence of seller's market or monopoly conditions; and

(iv)    High profitability.

**1.3.1  Determinants of Working Capital:**  The following factors will generally influence the working capital requirements of the firm:

(i)     Nature of Business.

(ii)    Market and demand conditions.

(iii)   Technology and manufacturing Policies.

(iv)    Credit Policy of the firm.

(v)     Availability of credit from suppliers.

(vi)    Operating efficiency.

(vii)   Price Level Changes.

## 1.4    ISSUES IN THE WORKING CAPITAL MANAGEMENT

Working capital management entails the control and monitoring of all components of working capital i.e. cash, marketable securities, debtors (receivables) and stocks (inventories) and creditors (payables).  The finance manager has to determine the levels and composition of current assets.  He has to ensure a right mix of different current assets and that current liabilities are paid in time.

There are many aspects of working capital management which makes it important function of financial management.

♦   *Time:*  Working capital management requires much of the finance manager's time.

♦   *Investment:*  Working capital represents a large portion of the total investment in assets.

♦   *Credibility:*  Working capital management has great significance for all firms but it is very critical for small firms.

♦   *Growth:*  The need for working capital is directly related to the firm's growth.

It is advisable that the finance manager should take precautionary measures for effective and efficient management of working capital.  He has to pay particular attention to the levels of

current assets and their financing. To decide the levels and financing of current assets, the risk return trade off must be taken into account.

**1.4.1 Current Assets to Fixed Assets Ratio:** The finance manager is required to determine the optimum level of current assets so that the shareholders value is maximized. A firm needs fixed and current assets to support a particular level of output. However, to support the same level of output, the firm can have different levels of current assets. As the firm's output and sales increases, the need for current assets also increases. Generally, current assets do not increase in direct proportion to output, current assets may increase at a decreasing rate with output. This relationship is based upon the notion that it takes a greater proportional investment in current assets when only a few units of output are produced than it does later on when the firm can use its current assets more efficiently.

The level of the current assets can be measured by creating a relationship between current assets and fixed assets. Dividing current assets by fixed assets gives current assets/fixed assets ratio. Assuming a constant level of fixed assets, a higher current assets/fixed assets ratio indicates a conservative current assets policy and a lower current assets/fixed assets ratio means an aggressive current assets policy assuming all factors to be constant. A conservative policy implies greater liquidity and lower risk whereas an aggressive policy indicates higher risk and poor liquidity. Moderate current assets policy will fall in the middle of conservative and aggressive policies. The current assets policy of most of the firms may fall between these two extreme policies.

The following diagram shows alternative current assets policies:
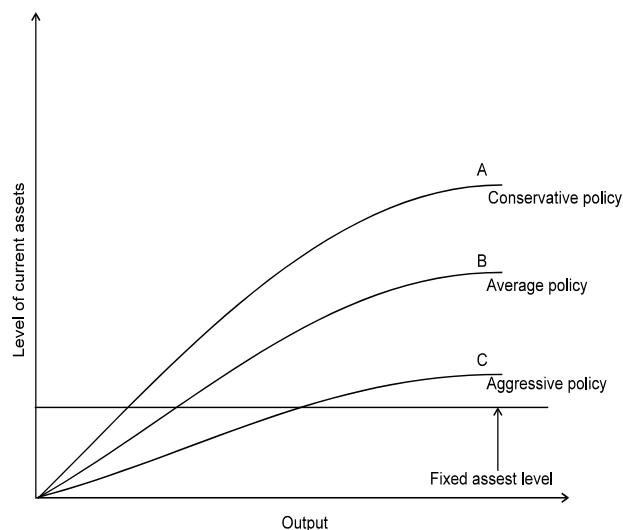
**1.4.2 Liquidity versus Profitability:** Risk return trade off – A firm may follow a conservative, aggressive or moderate policy as discussed above.  However, these policies involve risk, return trade off.  A conservative policy means lower return and risk.  While an aggressive policy produces higher return and risk.

The two important aims of the working capital management are profitability and solvency.  A liquid firm has less risk of insolvency that is, it will hardly experience a cash shortage or a stock out situation.  However, there is a cost associated with maintaining a sound liquidity position.  However, to have higher profitability the firm may have to sacrifice solvency and maintain a relatively low level of current assets.  This will improve firm's profitability as fewer funds will be tied up in idle current assets, but its solvency would be threatened and exposed to greater risk of cash shortage and stock outs.

The following illustration explains the risk-return trade off of various working capital management policies, viz., conservative, aggressive and moderate etc.

**Illustration 1**

A firm has the following data for the year ending 31st March, 2006:

|  | Rs. |
|---|---|
| Sales (1,00,000 @ Rs.20/-) | 20,00,000 |
| Earning before Interest and Taxes | 2,00,000 |
| Fixed Assets | 5,00,000 |

The three possible current assets holdings of the firm are Rs.5,00,000/-, Rs.4,00,000/- and Rs. 3,00,000.  It is assumed that fixed assets level is constant and profits do not vary with current assets levels.  The effect of the three alternative current assets policies is as follows:

**Effect of alternative Working Capital Policies**

**(Amount in Rs.)**

| Working Capital Policy | Conservative | Moderate | Aggressive |
|---|---|---|---|
| Sales | 20,00,000 | 20,00,000 | 20,00,000 |
| Earnings before Interest and Taxes (EBIT) | 2,00,000 | 2,00,000 | 2,00,000 |
| Current Assets | 5,00,000 | 4,00,000 | 3,00,000 |
| Fixed Assets | 5,00,000 | 5,00,000 | 5,00,000 |
| Total Assets | 10,00,000 | 9,00,000 | 8,00,000 |
| Return on Total Assets (EBIT/Total Assets) | 20% | 22.22% | 25% |
| Current Assets/Fixed Assets | 1.00 | 0.80 | 0.60 |

The aforesaid calculations shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than Aggressive policy but more risky than conservative policy.

In determining the optimum level of current assets, the firm should balance the profitability – Solvency tangle by minimizing total costs. Cost of liquidity and cost of illiquidity.

## 1.5 ESTIMATING WORKING CAPITAL NEEDS

Operating cycle is one of the most reliable method of Computation of Working Capital. However, other methods like ratio of sales and ratio of fixed investment may also be used to determine the Working Capital requirements. These methods are briefly explained as follows:

**(i)** **Current assets holding period:** To estimate working capital needs based on the average holding period of current assets and relating them to costs based on the company's experience in the previous year. This method is essentially based on the Operating Cycle Concept.

**(ii)** **Ratio of sales:** To estimate working capital needs as a ratio of sales on the assumption that current assets change with changes in sales.

**(iii)** **Ratio of fixed investments:** To estimate Working Capital requirements as a percentage of fixed investments.

A number of factors will, however, be impacting the choice of method of estimating Working Capital. Factors such as seasonal fluctuations, accurate sales forecast, investment cost and variability in sales price would generally be considered. The production cycle and credit and collection policies of the firm will have an impact on Working Capital requirements. Therefore, they should be given due weightage in projecting Working Capital requirements.

## 1.6 OPERATING OR WORKING CAPITAL CYCLE

A useful tool for managing working capital is the operating cycle. The operating cycle analyzes the accounts receivable, inventory and accounts payable cycles in terms of number of days. In other words, accounts receivable are analyzed by the average number of days it takes to collect an account. Inventory is analyzed by the average number of days it takes to turn over the sale of a product (from the point it comes in the store to the point it is converted to cash or an account receivable). Accounts payable are analyzed by the average number of days it takes to pay a supplier invoice.

Most businesses cannot finance the operating cycle (accounts receivable days + inventory days) with accounts payable financing alone. Consequently, working capital financing is needed. This shortfall is typically covered by the net profits generated internally or by externally borrowed funds or by a combination of the two.

Most businesses need short-term working capital at some point in their operations.  For instance, retailers must find working capital to fund seasonal inventory build-up.  But even a business that is not seasonal occasionally experiences peak months when orders are unusually high.  This creates a need for working capital to fund the resulting inventory and accounts receivable build-up.

Some small businesses have enough cash reserves to fund seasonal working capital needs.  However, this is very rare for a new business.  If your new venture experiences a need for short-term working capital during its first few years of operation, you will have several potential sources of funding.  The important thing is to plan ahead.  If you get caught off guard, you might miss out on the one big order.

Cash flows in a cycle into, around and out of a business.  It is the business's life blood and every manager's primary task is to help keep it flowing and to use the cashflow to generate profits.  If a business is operating profitably, then it should, in theory, generate cash surpluses.  If it doesn't generate surplus, the business will eventually run out of cash.

The faster a business expands, the more cash it will need for working capital and investment.  The cheapest and best sources of cash exist as working capital right within business.  Good management of working capital will generate cash which will help improve profits and reduce risks.  Bear in mind that the cost of providing credit to customers and holding stocks can represent a substantial proportion of a firm's total profits.

There are two elements in the business cycle that absorb cash – Inventory (stocks and work-in-progress) and Receivables (debtors owing you money).  The main sources of cash are Payables (your creditors) and Equity and Loans.

**Working Capital Cycle**
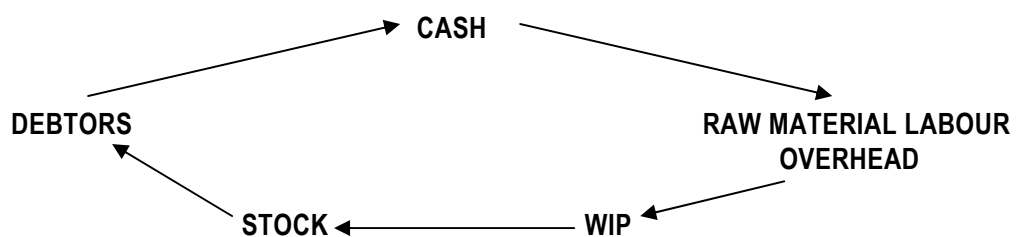


Each component of working capital (namely inventory, receivables and payables) has two dimensions ......TIME .........and MONEY, when it comes to managing working capital then time is money.  If you can get money to move faster around the cycle (e.g. collect monies due from debtors more quickly) or reduce the amount of money tied up (e.g. reduce inventory

levels relative to sales), the business will generate more cash or it will need to borrow less money to fund working capital. As a consequence, you could reduce the cost of bank interest or you will have additional free money available to support additional sales growth or investment. Similarly, if you can negotiate improved terms with suppliers e.g. get longer credit or an increased credit limit, you are effectively creating free finance to help fund future sales.

| If you……………. | Then ………………… |
|---|---|
| Collect receivables (debtors) faster | You release cash from the cycle |
| Collect receivables (debtors) slower | Your receivables soak up cash. |
| Get better credit (in terms of duration or amount) from suppliers. | You increase your cash resources. |
| Shift inventory (stocks) faster | You free up cash. |
| Move inventory (stocks) slower. | You consume more cash. |

Working capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the cycle. For example, a company holds raw materials on an average for 60 days, it gets credit from the supplier for 15 days, production process needs 15 days, finished goods are held for 30 days and 30 days credit is extended to debtors. The total of all these, 120 days, i.e., 60 – 15 + 15 + 30 + 30 days is the total working capital cycle.

The determination of working capital cycle helps in the forecast, control and management of working capital. It indicates the total time lag and the relative significance of its constituent parts. The duration of working capital cycle may vary depending on the nature of the business.

In the form of an equation, the operating cycle process can be expressed as follows:

Operating Cycle        =    R + W + F + D – C

Where,

R =        Raw material storage period

W =        Work-in-progress holding period

F =        Finished goods storage period

D =        Debtors collection period.

C =        Credit period availed.

The various components of operating cycle may be calculated as shown below:

(1)  Raw material storage period $= \dfrac{\text{Average stock of raw material}}{\text{Average cost of raw material consumption per day}}$

(2)  Work-in-progress holding period $= \dfrac{\text{Average work-in-progress inventory}}{\text{Average cost of production per day}}$

(3)  Finished goods storage period $= \dfrac{\text{Average stock of finished goods}}{\text{Average cost of goods sold per day}}$

(4)  Debtors collection period $= \dfrac{\text{Average book debts}}{\text{Average Credit Sales per day}}$

(5)  Credit period availed $= \dfrac{\text{Average trade creditors}}{\text{Average credit purchases per day}}$

**1.6.1 Working Capital Based on Operating Cycle:**  One of the method for forecasting working capital requirement is based on the concept of operating cycle.  The calculation of operating cycle and the formula for estimating working capital on its basis has been demonstrated with the help of following illustration:

**Illustration 2**

From the following information of XYZ Ltd., you are required to calculate :

(a)  Net operating cycle period.

(b)  Number of operating cycles in a year.

|       |                                              | Rs.       |
|-------|----------------------------------------------|-----------|
| (i)   | Raw material inventory consumed during the year | 6,00,000  |
| (ii)  | Average stock of raw material                | 50,000    |
| (iii) | Work-in-progress inventory                   | 5,00,000  |
| (iv)  | Average work-in-progress inventory           | 30,000    |
| (v)   | Finished goods inventory                     | 8,00,000  |
| (vi)  | Average finished goods stock held            | 40,000    |
| (vii) | Average collection period from debtors       | 45 days   |
| (viii)| Average credit period availed                | 30 days   |
| (ix)  | No. of days in a year                        | 360 days  |

**Solution**

**Calculation of Net Operating Cycle period of XYZ Ltd.**

|  | Days |
|---|---|
| **Raw material storage period: (a)** | **30** |

$$\left( \frac{\text{Average stock of raw material}}{\text{Average cost of raw material consumption per day}} \right)$$

**(Rs. 50,000 / 1667\*)**

**\*(Rs. 6,00,000 / 360 days)**

|  | Days |
|---|---|
| **W.I.P. holding period : (b)** | **22** |

$$\left( \frac{\text{Average work} - \text{in} - \text{progress inventory}}{\text{Average cost of production per day}} \right)$$

**Rs. 30,000 / 1,388)\*\***

**\*\*(Rs. 5,00,000 / 360 days)**

|  | Days |
|---|---|
| **Finished goods storage period : (c)** | **18** |

$$\left( \frac{\text{Average stock of finished goods}}{\text{Average cost of goods sold per day}} \right)$$

**(Rs.40,000 / 2,222)\*\*\***

**\*\*\*(Rs. 8,00,000 / 360 days)**

|  | Days |
|---|---|
| **Debtors collection period: (d)** | **45** |
| **Total operating cycle period:** | **115** |
| **[(a) + (b) + (c) + (d)]** |  |
| *Less:* Average credit period availed | **30** |
| (i)   Net operating cycle period | **85** |
| (ii)  Number of operating cycles in a year | **4.2** |
|  | **(360 days / 85 days)** |

The net operating cycle represents the net time gap between investment of cash and its recovery of sales revenue. If depreciation is excluded from expenses in the computation of operating cycle, the net operating cycle also represents the cash conversion cycle. It is the

net time interval between cash collections from sales of product and cash payments for the resources acquired by the firm.

The Finance Manager is required to manage the operating cycle effectively and efficiently. The length of operating cycle is the indicator of performance of management. The net operating cycle represents the time interval for which the firm has to negotiate for Working Capital from its Bankers. It enables to determine accurately the amount of working capital needed for the continuous operation of business activities. The operating cycle calls for proper monitoring of external environment of the business, changes in government policies like taxation, import policies, credit policy of Reserve Bank of India, price trend, technological advancement etc. They have since their own impact on the length of operating cycle.

### 1.6.2 Estimate of amount of Working Capital based on Current Assets and Current Liabilities

The estimate of working capital can be projected if the amount of current assets and current liabilities can be estimated as follows:

The various constituents of current assets and current liabilities have a direct bearing on the computation of working capital and the operating cycle. The holding period of various constituents of operating cycle may either contract or expand the net operating cycle period. Shorter the operating cycle period, lower will be the requirement of working capital and *vice-versa.*

### Estimation of Current Assets

The estimates of various components of working capital may be made as follows:

*(i)    Raw materials inventory:*  The funds to be invested in raw materials inventory may be estimated on the basis of production budget, the estimated cost per unit and average holding period of raw material inventory by using the following formula:

$$\left\{\frac{\begin{array}{l}\text{Estimated production}\times\text{Estimated cost of raw material}\\ \text{(in units)} \qquad\qquad\qquad\qquad\qquad\qquad \text{per unit}\end{array}}{12\,\text{months}\,/\,360\,\text{days}}\right\}\times\begin{array}{l}\text{Average raw material holding period}\\ \text{(in months}\,/\,\text{in days)}\end{array}$$

*Note*: 360 days in a year are generally assumed to facilitate calculation.

*(ii)   Work-in-progress inventory:*  The funds to be invested in work-in-progress can be estimated by the following formula:

$$\left\{\dfrac{\begin{array}{c}\text{Estimated production} \times \text{Estimated work} - \text{in} - \text{process}\\ \text{(in units)} \qquad\qquad \text{cost per unit}\end{array}}{12\,\text{months} / 360\,\text{days}}\right\} \times \begin{array}{c}\text{Average holding period of}\\ \text{W.I.P.(months / days))}\end{array}$$

*(iii) Finished Goods:* The funds to be invested in finished goods inventory can be estimated with the help of following formula:

$$\left\{\dfrac{\begin{array}{c}\text{Estimated production} \times \text{Cost of production (Per unit}\\ \text{(in units)} \qquad\qquad \text{excluding depreciation}\end{array}}{12\,\text{months} / 360\,\text{days}}\right\} \times \begin{array}{c}\text{Average holding period of finished}\\ \text{goods inventory (months / days)}\end{array}$$

*(iv) Debtors*: Funds to be invested in trade debtors may be estimated with the help of following formula:

$$\left\{\dfrac{\begin{array}{c}\text{Estimated credit sales} \times \text{Cost of sales (Per unit}\\ \text{( in units)} \qquad\qquad \text{excluding depreciation}\end{array}}{12\,\text{months}/360\,\text{days}}\right\} \times \begin{array}{c}\text{Average debtors collection}\\ \text{period (months/days)}\end{array}$$

(v)  Minimum desired Cash and Bank balances to be maintained by the firm has to be added in the current assets for the computation of working capital.

**Estimation of Current Liabilities**

Current liabilities generally affect computation of working capital.  Hence, the amount of working capital is lowered to the extent of current liabilities (other than bank credit) arising in the normal course of business.  The important current liabilities like trade creditors, wages and overheads can be estimated as follows:

(i)  *Trade creditors:*

$$\left\{\dfrac{\begin{array}{c}\text{Estimated yearly} \qquad \times \text{Raw material requirements}\\ \text{production (in units)} \qquad\qquad \text{per unit}\end{array}}{12\,\text{months}/360\,\text{days}}\right\} \times \begin{array}{c}\text{Credit period granted by}\\ \text{suppliers (months/days)}\end{array}$$

(ii) *Direct Wages:*

$$\left\{ \dfrac{\text{Estimated production} \times \text{Direct labour cost}}{12 \text{ months/360 days}} \right\} \times \begin{array}{c} \text{Average time lag in payment} \\ \text{of wages (months/days)} \end{array}$$

(iii) *Overheads (other than depreciation and amortization):*

$$\left\{ \dfrac{\text{Estimatd yearly} \times \text{Overhead cost}}{12 \text{ months / 360 days}} \right\} \times \begin{array}{c} \text{Average time lag in payment} \\ \text{of overheads (months / days)} \end{array}$$

**Note:** The amount of overheads may be separately calculated for different types of overheads. In the case of selling overheads, the relevant item would be sales volume instead of production volume.

The following illustration shows the process of working capital estimation:

**Illustration 3**

On 1ˢᵗ January, the Managing Director of Naureen Ltd. wishes to know the amount of working capital that will be required during the year. From the following information prepare the working capital requirements forecast. Production during the previous year was 60,000 units. It is planned that this level of activity would be maintained during the present year. The expected ratios of the cost to selling prices are Raw materials 60%, Direct wages 10% and Overheads 20%. Raw materials are expected to remain in store for an average of 2 months before issue to production. Each unit is expected to be in process for one month, the raw materials being fed into the pipeline immediately and the labour and overhead costs accruing evenly during the month. Finished goods will stay in the warehouse awaiting dispatch to customers for approximately 3 months. Credit allowed by creditors is 2 months from the date of delivery of raw material. Credit allowed to debtors is 3 months from the date of dispatch. Selling price is Rs.5 per unit. There is a regular production and sales cycle. Wages and overheads are paid on the 1ˢᵗ of each month for the previous month. The company normally keeps cash in hand to the extent of Rs.20,000.

**Solution**

*Working Notes:*

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value.

Hence it is 60,000 units x Rs.5 x $\dfrac{60}{100}$ = Rs.1,80,000. The monthly consumption of raw material would be Rs.15,000. Raw material requirements would be for two months; hence raw materials in stock would be Rs.30,000.

2. **Debtors:** The average sales would be Rs.25,000 p.m. Therefore, a sum of Rs.75,000/- would be the amount of sundry debtors.

3. **Work in process:** (Students may give special attention to this point). It is stated that each unit of production is expected to be in process for one month).

|  |  | *Rs.* |
|---|---|---|
| (a) | Raw materials in work-in-process (being one month's raw material requirements) | 15,000 |
| (b) | Labour costs in work-in-process | 1,250 |
|  | (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to ½ of the month's labour costs) |  |
| (c) | Overheads | 2,500 |
|  | (For ½ month as explained above) Total work-in-process | 18,750 |

4. **Finished goods inventory:**

| | |
|---|---|
| (3 month's costs of production) | 45,000 |
| Raw materials | 7,500 |
| Labour | 15,000 |
| Overheads | 67,500 |

5. **Creditors:** Suppliers allow a two months' credit period. Hence, the average amount of creditors would be Rs.30,000 being two months' purchase of raw materials.

6. **Direct Wages payable:** The direct wages for the whole year is 60,000 units × Rs.5 x 10% = Rs.30,000. The monthly direct wages would be Rs.2,500 (Rs. 30,000 ÷12). Hence, wages payable would be Rs.2,500.

7. **Overheads Payable:** The overheads for the whole year is 60,000 units × Rs.5 x 20% = Rs.60,000. The monthly overheads will be Rs.5,000 (Rs.60,000 ÷ 12). Hence overheads payable would be Rs.5,000 p.m.

**Statement of Working Capital required:**

*Current Assets:*

| | Rs. | Rs. |
|---|---|---|
| Raw materials inventory (Refer to working note 1) | 30,000 | |
| Debtors (Refer to working note 2) | 75,000 | |
| Working–in-process (Refer to working note 3) | 18,750 | |
| Finished goods inventory (Refer to working note 4) | 67,500 | |
| Cash | 20,000 | 2,11,250 |
| *Current Liabilities* | | |
| Creditors (Refer to working note 5) | 30,000 | |
| Direct wages payable (Refer to working note 6) | 2,500 | |
| Overheads payable (Refer to working note 7) | 5,000 | 37,500 |
| Estimated working capital requirements | | 1,73,750 |

**1.6.3 Working capital requirement estimation based on cash cost:** We have already seen that working capital is the difference between current assets and current liabilities. To estimate requirements of working capital, we have to forecast the amount required for each item of current assets and current liabilities. However, in practice another approach may also be useful in estimating working capital requirements. This approach is based on the fact that in the case of current assets, like sundry debtors and finished goods, etc., the exact amount of funds blocked is less than the amount of such current assets. Thus, if we have sundry debtors worth Rs.1 lakh and our cost of production is Rs.75,000, the actual amount of funds blocked in sundry debtors is Rs.75,000 the cost of sundry debtors, the rest (Rs.25,000) is profit. Again some of the cost items also are non-cash costs; depreciation is a non-cash cost item. Suppose out of Rs.75,000, Rs.5,000 is depreciation; then it is obvious that the actual funds blocked in terms of sundry debtors totaling Rs.1 lakh is only Rs.70,000. In other words, Rs.70,000 is the amount of funds required to finance sundry debtors worth Rs.1 lakh. Similarly, in the case of finished goods which are valued at cost, non-cash costs may be excluded to work out the amount of funds blocked. Many experts, therefore, calculate the working capital requirements by working out the cash costs of finished goods and sundry debtors. Under this approach, the debtors are calculated not as a percentage of sales value but as a percentage of cash costs. Similarly, finished goods are valued according to cash costs.

**Illustration 4**

The following annual figures relate to XYZ Co.,

|  | Rs. |
|---|---|
| Sales (at two months' credit) | 36,00,000 |
| Materials consumed (suppliers extend two months' credit) | 9,00,000 |
| Wages paid (monthly in arrear) | 7,20,000 |
| Manufacturing expenses outstanding at the end of the year | 80,000 |
| (Cash expenses are paid one month in arrear) | |
| Total administrative expenses, paid as above | 2,40,000 |
| Sales promotion expenses, paid quarterly in advance | 1,20,000 |

The company sells its products on gross profit of 25% counting depreciation as part of the cost of production. It keeps one months' stock each of raw materials and finished goods, and a cash balance of Rs.1,00,000.

Assuming a 20% safety margin, work out the working capital requirements of the company on cash cost basis. Ignore work-in-process.

**Solution**

**Statement of Working Capital requirements (cash cost basis)**

| A. Current Asset | | Rs | Rs . |
|---|---|---|---|
| Materials | (Rs. 9,00,000 ÷12) | 75,000 | |
| Finished Goods | (Rs. 25,80,000 ÷12) | 2,15,000 | |
| Debtors | (Rs.29,40,000÷6) | 4,90,000 | |
| Cash | | 1,00,000 | |
| Prepaid expenses (Sales promotion) | (Rs. 1,20,000÷4) | 30,000 | 9,10,000 |
| B. Current Liabilities: | | | |
| Creditors for materials | (Rs.9,00,000÷6) | 1,50,000 | |
| Wages outstanding | (Rs.7,20,000÷ 12) | 60,000 | |
| Manufacturing expenses | | 80,000 | |
| Administrative expenses | (Rs.2,40,000÷12) | 20,000 | 3,10,000 |
| Net working capital (A-B) | | | 6,00,000 |

| | |
|---|---:|
| Add safety margin 20% | 1,20,000 |
| Total working capital requirements | 7,20,000 |

**Working Notes:**

| | | |
|---|---|---:|
| (i) | Computation of Annual Cash cost of Production | *Rs.* |
| | Material consumed | 9,00,000 |
| | Wages | 7,20,000 |
| | Manufacturing expenses (Rs.80,000 x 12) | 9,60,000 |
| | Total cash cost of production | 25,80,000 |
| (ii) | Computation of Annual Cash cost of sales: | *Rs.* |
| | Cash cost of production as in (i) above | 25,80,000 |
| | Administrative Expenses | 2,40,000 |
| | Sales promotion expenses | 1,20,000 |
| | Total cash cost of sales | 29,40,000 |

**Illustration 5**

PQ Ltd., a company newly commencing business in 2005 has the undermentioned projected Profit and Loss Account:

| | *Rs.* | *Rs.* |
|---|---:|---:|
| Sales | | 2,10,000 |
| Cost of goods sold | | 1,53,000 |
| Gross Profit | | 57,000 |
| Administrative Expenses | 14,000 | |
| Selling Expenses | 13,000 | 27,000 |
| Profit before tax | | 30,000 |
| Provision for taxation | | 10,000 |
| Profit after tax | | 20,000 |
| The cost of goods sold has been arrived at as under: | | |
| Materials used | 84,000 | |
| Wages and manufacturing Expenses | 62,500 | |
| Depreciation | 23,500 | |
| | 1,70,000 | |
| *Less:* Stock of Finished goods | | |
| (10% of goods produced not yet sold) | 17,000 | |
| | 1,53,000 | |

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in advance. Suppliers of materials will extend 1-1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep Rs.8,000 in cash.

Prepare an estimate of (i) working capital, and (ii) cash cost of working capital.

**Note:** All workings should form part of the answer.

**Solution**

**(i)  Estimate of Working Capital requirements**

| Current Liabilities | Rs. | Current Assets | | Rs. |
|---|---|---|---|---|
| *Sundry Creditors:* | | *Finished stock:* | | |
| Purchases | 14,088 | Raw materials | 8,400 | |
| Provision for    taxation | 3,000 | Wages | 6,250 | |
| | --------- | Depreciation | 2,350 | 17,000 |
| | 17,088 | | | |
| | | Work-in-progress | | |
| Balance being working capital required, (say Rs.77,500) | | Materials | 12,600 | |
| | 77,543 | Wages | 3,750 | |
| | | Depreciation | 1,410 | 17,760 |
| | | Raw Material | | 16,100 |
| | | Sundry Debtors: | | |
| | | Materials | 10,080 | |
| | | Wages | 7,500 | |
| | | Depreciation | 2,820 | |
| | | Adm.     &     Selling expenses | 3,600 | |
| | | Profit | 4,000 | 28,000 |

|  |  | Prepaid Expenses: |  |  |  |
|---|---|---|---|---|---|
|  |  | Wages |  | 5,521 |  |
|  |  | Admn. & Selling expenses |  | 2,250 | 7,771 |
|  |  | Cash in hand |  |  | 8,000 |
|  | 94,631 |  |  |  | 94,631 |

**(ii) Estimate of Cash Cost of Working Capital**                                                      *Rs.*

| Working capital as per statement given above | 77,543 |
|---|---|
| *Less*: Profit and Depreciation for which funds are not needed (see working note (vii) | 10,580 |
| Cash Cost of working capital required, say Rs.67,000 | 66,963 |

**Working Notes:**

(i)   Work-in-progress                                                                                     *Rs.*

| 15% of material consumed for finished goods | 12,600 |
|---|---|
| 15% of 40% of wages and expenses | 3,750 |
| 15% of 40% of Depreciation | 1,410 |
|  | 17,760 |

(ii)   Raw materials will be 1/6th of total materials consumed i.e., Rs.84,000 for finished goods plus Rs.12,600 for work-in-progress, i.e. Rs.16,100.

(iii)   Sundry Debtors:

80% of two months' Sales, i.e., Rs.2,10,000 $\times \dfrac{80}{100} \times \dfrac{2}{12} = $ Rs.28,000

Individual items have been computed on that basis.

(iv)   Creditors for raw materials on the basis of total purchases during the year

(Rs.84,000 + Rs.12,600+Rs.16,100) $\times 1\frac{1}{2}$ /12) = Rs.14,088.

(v)   Wages paid in advance: (Rs.62,500 + Rs.3,750) × 1/12 = Rs.5,521.

(vi)   Administrative & Selling expenses paid in advance Rs.27,000 ×1/12 = Rs.2,250/-

(vii) Depreciation and profit included in the cost of current assets:

|  | Rs. |
|---|---|
| Depreciation: |  |
| Finished goods | 2,350 |
| Work-in-progress | 1,410 |
| Debtors | 2,820 |
|  | 6,580 |
| Profit included in Debtors (including income-tax, i.e., Rs.1,333) | 4,000 |
|  | 10,580 |

**Illustration 6**

M.A. Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity:

|  | Costs per unit (Rs.) |
|---|---|
| Materials | 40 |
| Direct labour and variable expenses | 20 |
| Fixed manufacturing expenses | 6 |
| Depreciation | 10 |
| Fixed administration expenses | 4 |
|  | 80 |

The selling price per unit is expected to be Rs.96 and the selling expenses Rs.5 per unit. 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows:

| Year | Production (No. of units) | Sales (No.of units) |
|---|---|---|
| 1 | 6,000 | 5,000 |
| 2. | 9,000 | 8,500 |

To assess the working capital requirements, the following additional information is available:

| (a) | Stock of materials | 2.25 months' average consumption |
|-----|--------------------|----------------------------------|
| (b) | Work-in-process | Nil |
| (c) | Debtors | 1 month's average sales. |
| (d) | Cash balance | Rs.10,000 |
| (e) | Creditors for supply of materials | 1 month's average purchase during the year. |
| (f) | Creditors for expenses | 1 month's average of all expenses during the year. |

Prepare, for the two years:

(i) A projected statement of Profit/Loss (Ignoring taxation); and

(ii) A projected statement of working capital requirements.

**Solution**

(i)

<div align="center">

**M.A. Limited**

**Projected Statement of Profit / Loss**

**(Ignoring Taxation)**

</div>

| | Year 1 | Year 2 |
|---|--------|--------|
| Production (Units) | 6,000 | 9,000 |
| Sales (Units) | 5,000 | 8,500 |
| | Rs. | Rs. |
| Sales revenue @ Rs. 96 per unit: (A) | 4,80,000 | 8,16,000 |
| *Cost of production:* | | |
| Materials @ Rs. 40 per unit | 2,40,000 | 3,60,000 |
| Direct labour and variable expenses @ Rs.20 per unit | 1,20,000 | 1,80,000 |
| Fixed manufacturing expenses | | |
| (Production Capacity: 12,000 units @ Rs.6) | 72,000 | 72,000 |
| Depreciation | | |
| (Production Capacity : 12,000 units @ Rs.10) | 1,20,000 | 1,20,000 |
| Fixed administration expenses | | |
| (Production Capacity : 12,000 units @ Rs.4) | 48,000 | 48,000 |

| | | |
|---|---:|---:|
| Total costs of production | 6,00,000 | 7,80,000 |
| *Add*: Opening stock of finished goods | | 1,00,000 |
| (Year 1 : Nil; Year 2 : 1,000 units) | | |
| Cost of goods available | 6,00,000 | 8,80,000 |
| (Year 1: 6,000 units; Year 2: 10,000 units) | | |
| *Less*: Closing stock of finished goods at average cost (year 1: 1000 units, year 2 : 1500 units) | 1,00,000 | 1,32,000 |
| Cost of goods sold | 5,00,000 | 7,48,000 |
| *Add*: Selling expenses – Variable @ 4 per unit | 20,000 | 34,000 |
| Fixed (12,000 × Re.1) | 12,000 | 12,000 |
| Cost of Sales : (B) | 5,32,000 | 7,94,000 |
| Profit (+) / Loss (-): (A-B) | (-) 52,000 | (+) 22,000 |

**Working Notes:**

1. Calculation of creditors for supply of materials:

| | Year 1 | Year 2 |
|---|---:|---:|
| | Rs. | Rs. |
| Materials consumed during the year | 2,40,000 | 3,60,000 |
| *Add*: Closing stock (2.25 month's average consumption) | 45,000 | 67,500 |
| | 2,85,000 | 4,27,500 |
| *Less:* Opening Stock | | 45,000 |
| Purchases during the year | 2,85,000 | 3,82,500 |
| Average purchases per month (Creditors) | 23,750 | 31,875 |

| | Year 1 | Year 2 |
|---|---:|---:|
| | Rs. | Rs. |
| 2. Creditors for expenses: | | |
| Total direct labour, manufacturing, administration and selling expenses for the year | 2,72,000 | 3,46,000 |
| Average per month | 22,667 | 28,833 |

**(ii) Projected statement of working capital requirements**

|  | Year 1 | Year 2 |
|---|---|---|
|  | Rs. | Rs. |
| *Current Assets:* | | |
| Stock of materials (2.25 month's average consumption) | 45,000 | 67,500 |
| Finished goods | 1,00,000 | 1,32,000 |
| Debtors (1 month's average sales) | 40,000 | 68,000 |
| Cash | 10,000 | 10,000 |
| Total Current Assets (A) | 1,95,000 | 2,77,500 |
| *Current Liabilities*: | | |
| Creditors for supply of materials | 23,750 | 31,875 |
| *Refer to working note 1)* | | |
| Creditors for expenses | 22,667 | 28,833 |
| *(Refer to working note 2)* | | |
| Total Current Liabilities: (B) | 46,417 | 60,708 |
| Estimated Working Capital Requirements: (A-B) | 1,48,583 | 2,16,792 |

**1.6.4 Effect of Double Shift Working on Working Capital requirements:** Increase in the number of hours of production has an effect on the working capital requirements. The greatest economy in introducing double shift is the greater use of fixed assets-little or marginal funds may be required for additional assets.

It is obvious that in double shift working, an increase in stocks will be required as the production rises. However, it is quite possible that the increase may not be proportionate to the rise in production since the minimum level of stocks may not be very much higher. Thus, it is quite likely that the level of stocks may not be required to be doubled as the production goes up two-fold.

The amount of materials in process will not change due to double shift working since work started in the first shift will be completed in the second; hence, capital tied up in materials in process will be the same as with single shift working. As such the cost of work-in-process, will not change unless the second shift's workers are paid at a higher rate. Fixed overheads will remain fixed whereas variable overheads will increase in proportion to the increased production. Semi-variable overheads will increase according to the variable element in them.

However, in examinations the students may increase the amount of stocks of raw materials proportionately unless instructions are to the contrary.

**Illustration 7**

Samreen Enterprises has been operating its manufacturing facilities till 31.3.2006 on a single shift working with the following cost structure:

|  | *Per Unit* |
|---|---|
|  | *Rs.* |
| Cost of Materials | 6.00 |
| Wages (out of which 40% fixed) | 5.00 |
| Overheads (out of which 80% fixed) | 5.00 |
| Profit | 2.00 |
| Selling Price | 18.00 |

Sales during 2005-06 – Rs.4,32,000. As at 31.3.2006 the company held:

|  | *Rs.* |
|---|---|
| Stock of raw materials (at cost) | 36,000 |
| Work-in-progress (valued at prime cost) | 22,000 |
| Finished goods (valued at total cost) | 72,000 |
| Sundry debtors | 1,08,000 |

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed of from suppliers will continue to remain at the present level i.e., 2 months. Lag in payment of wages and expenses will continue to remain half a month.

You are required to assess the additional working capital requirements, if the policy to increase output is implemented.

**Solution**

**Statement of cost at single shift and double shift working**

| | 24,000 units | | 48,000 Units | |
|---|---|---|---|---|
| | *Per Unit* | *Total* | *Per unit* | *Total* |
| | *Rs.* | *Rs.* | *Rs.* | *Rs.* |
| Raw materials | 6 | 1,44,000 | 5.40 | 2,59,200 |
| Wages -      Variable | 3 | 72,000 | 3.00 | 1,44,000 |
| Fixed | 2 | 48,000 | 1.00 | 48,000 |
| Overheads -  Variable | 1 | 24,000 | 1.00 | 48,000 |
| Fixed | 4 | 96,000 | 2.00 | 96,000 |
| Total cost | 16 | 3,84,000 | 12.40 | 5,95,200 |
| Profit | 2 | 48,000 | 5.60 | 2,68,800 |
| | 18 | 4,32,000 | 18.00 | 8,64,000 |

*Sales in units 2005-06*

$$= \frac{\text{Sales}}{\text{Unit selling price}} = \frac{\text{Rs.4,32,000}}{\text{Rs.18}} = 24,000 \text{ units}$$

Stock of Raw Materials in units on 31.3.2006

$$= \frac{\text{Value of stock}}{\text{Cost per unit}} = \frac{\text{Rs.36,000}}{6} = 6,000 \text{ units}$$

Stock of work-in-progress in units on 31.3.2006

$$= \frac{\text{Value of work - in - progress}}{\text{Cost per unit}} = \frac{\text{Rs.22,000}}{(\text{Rs.6} + \text{Rs.5})} = 2,000 \text{ units}$$

*Stock of finished goods in units 2005-06*

$$= \frac{\text{Value of stock}}{\text{Cost per unit}} = \frac{\text{Rs.72,000}}{\text{Rs.16}} = 4,500 \text{ units.}$$

## Comparative Statement of Working Capital Requirement

| | Single Shift | | | Double Shift | | |
|---|---|---|---|---|---|---|
| | Unit | Rate Rs. | Amount Rs. | Unit | Rate Rs. | Amount Rs. |
| Current Assets | | | | | | |
| Inventories - | | | | | | |
|    Raw Materials | 6000 | 6 | 36,00 | 12000 | 5.40 | 64,800 |
|    Work-in-Progress | 2000 | 11 | 22,000 | 2000 | 9.40 | 18,800 |
|    Finished Goods | 4500 | 16 | 72,000 | 9000 | 12.40 | 1,11,600 |
|    Sundry Debtors | 6000 | 18 | 1,08,000 | 12000 | 18.00 | 2,16,000 |
| Total Current Assets: (A) | | | 2,38,000 | | | 4,11,200 |
| Current Liabilities | | | | | | |
|    Creditors for Materials | 4000 | 6 | 24,000 | 8000 | 5.40 | 43,200 |
|    Creditors for Wages | 1000 | 5 | 5,000 | 2000 | 4.00 | 8,000 |
|    Creditors for Expenses | 1000 | 5 | 5,000 | 2000 | 3.00 | 6,000 |
| Total Current Liabilities: (B) | | | 34,000 | | | 57,200 |
| Working Capital: (A) – (B) | | | 2,04,000 | | | 3,54,000 |
| Less: Profit included in Debtors | 6000 | 2 | 12,000 | 12,000 | 5.60 | 67,200 |
| | | | 1,92,000 | | | 2,86,800 |

Increase in Working Capital requirement is (Rs.2,86,800 – Rs.1,92,000) or Rs.94,800

**Notes:**

(i) The quantity of material in process will not change due to double shift working since work started in the first shift will be completed in the second shift.

(ii) The valuation of work-in-progress based on prime cost as per the policy of the company is as under.

| | Single shift Rs. | Double shift Rs. |
|---|---|---|
| Materials | 6.00 | 5.40 |
| Wages – Variable | 3.00 | 3.00 |
|     Fixed | 2.00 | 1.00 |
| | 11.00 | 9.40 |

<div style="border:1px solid black; padding:5px;">

**UNIT – II : TREASURY AND CASH MANAGEMENT**

</div>

## 2.1 TREASURY MANAGEMENT: MEANING

Tight money, escalating interest rates and economic volatility have called for a specialised skills called *Treasury Management.* Until recently, no major efforts were made to manage cash. In the wake of the competitive business environment resulting from the liberalization of the economy, there is a pressure to manage cash. The demand for funds for expansions coupled with high interest rates, foreign exchange volatility and the growing volume of financial transactions have necessitated efficient management of money.

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

The treasury management mainly deals with working capital management and financial risk management. The former constitutes cash management and decides the asset liability mix. Financial risk management includes forex and interest rate management.

The key goal of treasury management is planning, organizing and controlling cash assets to satisfy the financial objectives of the organization. The goal may be to maximize the return on the available cash, or minimize interest cost or mobilise as much cash as possible for corporate ventures. Dealing in forex, money and commodity markets involves complex risks of fluctuating exchange rates, interest rates and prices which can affect the profitability of the organization.

Treasury managers try to minimize lapses by adopting risk transfer and hedging techniques that suit the internal policies of the organisation. Options, futures and swaps are a few of the major derivative instruments, the Treasury Managers use for hedging their risk.

## 2.2 FUNCTIONS OF TREASURY DEPARTMENT

**1. Cash Management:** The efficient collection and payment of cash both inside the organisation and to third parties is the function of the treasury department. The involvement of the department with the details of receivables and payables will be a matter of policy. There may be complete centralization within a group treasury or the treasury may simply advise subsidiaries and divisions on policy matter viz., collection/payment periods, discounts, etc. Any position between these two extremes would be possible. Treasury will normally manage surplus funds in an investment portfolio. Investment policy will consider future needs for liquid funds and acceptable levels of risk as determined by company policy.

**2.   Currency Management:** The treasury department manages the foreign currency risk exposure of the company.  In a large multinational company (MNC) the first step will usually be to set off intra-group indebtedness.  The use of matching receipts and payments in the same currency will save transaction costs. Treasury might advise on the currency to be used when invoicing overseas sales.

The treasury will manage any net exchange exposures in accordance with company policy.  If risks are to be minimized then forward contracts can be used either to buy or sell currency forward.

**3.   Funding Management:** Treasury department is responsible for planning and sourcing the company's short, medium and long-term cash needs.  Treasury department will also participate in the decision on capital structure and forecast future interest and foreign currency rates.

**4.   Banking:** It is important that a company maintains a good relationship with its bankers. Treasury department carry out negotiations with bankers and act as the initial point of contact with them.  Short-term finance can come in the form of bank loans or through the sale of commercial paper in the money market.

**5.   Corporate Finance:** Treasury department is involved with both acquisition and divestment activities within the group.  In addition it will often have responsibility for investor relations.  The latter activity has assumed increased importance in markets where share-price performance is regarded as crucial and may affect the company's ability to undertake acquisition activity or, if the price falls drastically, render it vulnerable to a hostile bid.

## 2.3   MANAGEMENT OF CASH

Management of cash is an important function of the finance manager.  The Finance Manager has to provide adequate cash to each of the units.  For the survival of the business it is absolutely essential that there should be adequate cash.  It is the duty of finance manger to have liquidity at all parts of the organization while managing cash.  On the other hand, he has also to ensure that there are no funds blocked in idle cash.  Idle cash resources entail a great deal of cost in terms of interest charges and in terms of opportunities costs.  Hence, the question of costs of idle cash must also be kept in mind by the finance manager.  A cash management scheme therefore, is a delicate balance between the twin objectives of liquidity and costs.

**2.3.1  The Need for Cash:**  The following are three basic considerations in determining the amount of cash or liquidity as have been outlined by Lord Keynes:

♦   *Transaction need:*  Cash facilitates the meeting of the day-to-day expenses and other debt payments.  Normally, inflows of cash from operations should be sufficient for this purpose.  But sometimes this inflow may be temporarily blocked.  In such cases, it is only the

reserve cash balance that can enable the firm to make its payments in time.

♦ *Speculative needs:* Cash may be held in order to take advantage of profitable opportunities that may present themselves and which may be lost for want of ready cash/settlement.

♦ *Precautionary needs:* Cash may be held to act as for providing safety against unexpected events. Safety as is explained by the saying that a man has only three friends an old wife, an old dog and money at bank.

*Facets of Cash Management*: Cash management is concerned with the managing of (i) Cash flows into and out of the firm; (ii) Cash flows within the firm; and (iii) Cash balances held by the firm at a point of time by financing deficit or investing surplus cash. It is generally represented by a cash management cycle. Sales generates cash which has to be disbursed out.

In recent years, a number of innovations have been made in cash management techniques. An obvious aim of the firm these days is to mange its cash affairs in such a way as to maintain a minimum balance of cash and to invest the surplus immediately in profitable investment opportunities.

In order to synchronise the cash receipt and payments. A firm need to develop appropriate strategies for cash management viz:

**(i) Cash Planning:** The pattern of cash inflows and outflows should be properly predicted in advance. Cash budget is a tool to achieve this objective.

**(ii) Managing the cash flows:** The cash inflows should be accelerated, while as far as possible, the outflows should be decelerated.

**(iii) Optimum cash level:** In deciding about the appropriate level of cash balances, the cost of idle cash and danger of shortage should be taken into consideration.

**(iv) Investing surplus cash:** The surplus cash should be properly invested to earn profits. The firm should decide about the division of such cash balance between various alternative short term investment opportunities such as, bank deposits, marketable securities, inter-corporate lending.

The ideal cash management system will depend upon various factors viz., product, organization structure, competition, culture and options available. The task is really complex.

The exact nature of a cash management system would depend upon the organizational structure of an enterprise. In a highly centralized organization the system would be such that the central or head office controls the inflows and outflows of cash on a routine and daily basis. In a decentralized form of organisation, where the divisions have compelete

responsibility of conducting their affairs, it may not be possible and advisable for the central office to exercise a detailed control over cash inflows and outflows.

**2.3.2  Cash Planning:**  Cash Planning is a technique to plan and control the use of cash. This protects the financial conditions of the firm by developing a projected cash statement from a forecast of expected cash inflows and outflows for a given period.  This may be done periodically either on daily, weekly or monthly basis.  The period and frequency of cash planning generally depends upon the size of the firm and philosophy of management.  As firms grows and business operations become complex, cash planning becomes inevitable for continuing success.

The very first step in this direction is to estimate the requirement of cash.  For this purpose cash flow statements and cash budget are required to be prepared.  The technique of preparing cash flow and funds flow statements have been discussed in this book.  The preparation of cash budget has however, been demonstrated here.

**2.3.3  Cash Budget:**  Cash Budget is the most significant device to plan for and control cash receipts and payments.  This represents cash requirements of business during the budget period.

One of the significant advantage of cash budget is to determine the net cash inflow or outflow so that the firm is enabled to arrange finances.  However, the firm's decision for appropriate sources of financing should depend upon factors such as cost and risk.  Cash Budget helps a firm to manage its cash position.  It also helps to utilise funds in better ways.  On the basis of cash budget, the firm can decide to invest surplus cash in marketable securities and earn profits.

The cash budget is prepared on the basis of receipts and payments method and offers following benefits:

(i)    It provides a complete picture of all items of expected cash flows.

(ii)   It is a sound tool of managing daily cash operations.

This method, however, suffers from the following limitations:

(i)    Its reliability is reduced because of the uncertainty of cash forecasts.  For example, collections may be delayed, or unanticipated demands may cause large disbursements.

(ii)   It fails to highlight the significant movements in the Working Capital items.

In order to maintain an optimum cash balance, what is required is (i) a complete and accurate forecast of net cash flows over the planning horizon and (ii) perfect synchronization of cash receipts and disbursements.  Thus, implementation of an efficient cash management system starts with the preparation of a plan of firm's operations for a period in future.  This plan will help in preparation of a statement of receipts and disbursements expected at different point of

time of that period. It will enable the management to pin point the time of excessive cash or shortage of cash. This will also help to find out whether there is any expected surplus cash still unutilized or shortage of cash which is yet to be arranged for. In order to take care of all these considerations, the firm should prepare a cash budget.

The following figure highlights the cash surplus and cash shortage position over the period of cash budget for preplanning to take corrective and necessary steps.
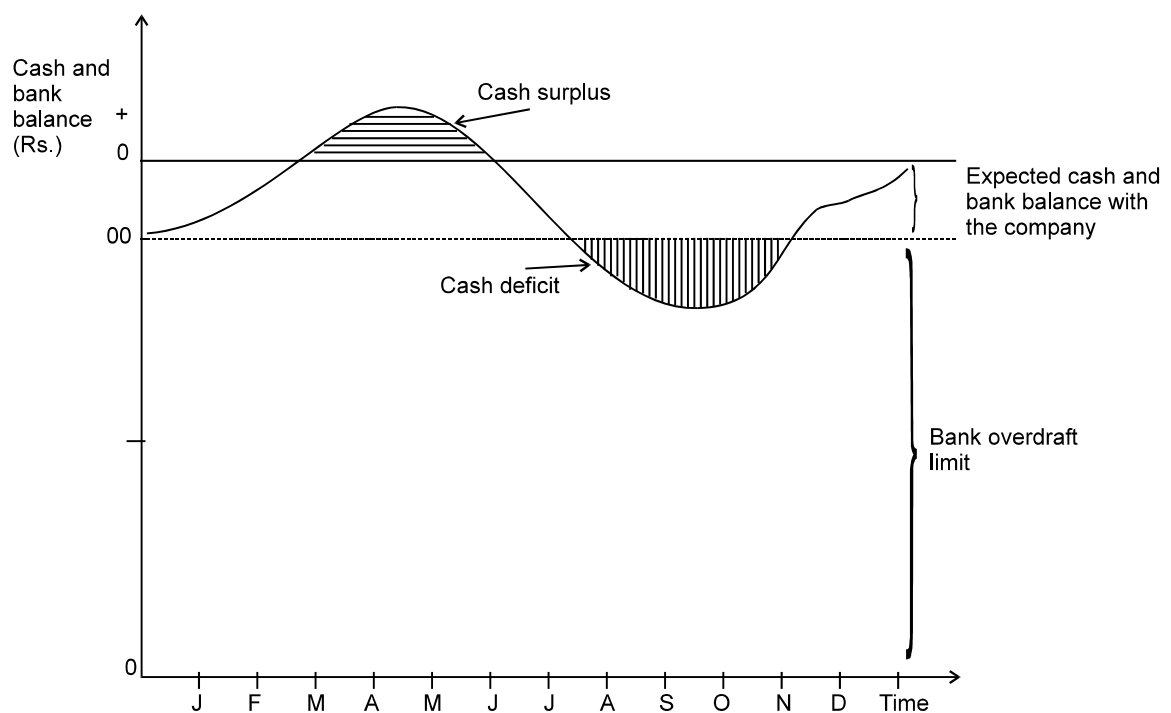


## 2.4   METHODS OF CASH FLOW BUDGETING

Cash flow budget is a detailed budget of income and cash expenditures incorporating both revenue and capital items. The cash flow budget should be prepared in the same format in which the actual position is to be presented. The year's budget is usually phased into shorter periods for control e.g., monthly or quarterly. Cash budget is concerned with liquidity must reflect changes between opening and closing debtor balances and between opening and closing creditor balances as well as focusing attention on other inflows and outflows of cash. The cash budget shows the cash flows arising from the operational budgets and the profit and assets structure. A cash budget can be prepared in the following ways:

**1. Receipts and Payments Method:** In this method all the expected receipts and payments for budget period are considered. All the cash inflow and outflow of all functional budgets including capital expenditure budgets are considered. Accruals and adjustments in accounts will not affect the cash flow budget. Anticipated cash inflow is added to the opening balance of cash and all cash payments are deducted from this to arrive at the closing balance of cash. This method is commonly used in business organizations.

**2. Adjusted Income Method:** In this method the annual cash flows are calculated by adjusting the sales revenues and cost figures for delays in receipts and payments (change in debtors and creditors) and eliminating non-cash items such as depreciation.

**3. Adjusted Balance Sheet Method:** In this method, the budgeted balance sheet is predicted by expressing each type of asset and short-term liabilities as percentage of the expected sales. The profit is also calculated as a percentage of sales, so that the increase in owners equity can be forecasted. Known adjustments, may be made to long-term liabilities and the balance sheet will then show if additional finance is needed.

It is important to note that the capital budget will also be considered in the preparation of cash flow budget because the annual budget may disclose a need for new capital investments and also, the costs and revenues of any new projects coming on stream will need to be incorporated in the short-term budgets. A number of additional financial statements, such as sources and application of funds statement or schedules or loan service payments or capital raising schedules may be produced.

The Cash Budget can be prepared for short period or for long period.

*Cash budget for short period:* Preparation of cash budget month by month would require the following estimates:

(a) *As regards receipts*:

    1.    Receipts from debtors;

    2.    Cash Sales; and

    3.    Any other source of receipts of cash (say, dividend from a subsidiary company)

(b) *As regards payments:*

    1.    Payments to be made for purchases;

    2.    Payments to be made for expenses;

    3.    Payments that are made periodically but not every month;

        (i)    debenture interest;

        (ii)   income tax paid in advance;

(iii)  sales tax etc.

4.  Special payments to be made in a particular month, for example, dividends to shareholders, redemption of debentures, repayments of loan, payment of assets acquired, etc.

### 2.4.1  Format of Cash Budget

**Co. Ltd.**

**Cash Budget**

**Period………………**

|  | Month 1 | Month 2 | Month 3 | Month 12 |
|---|---|---|---|---|
| *Receipts:* | | | | |
| 1. Opening balance | | | | |
| 2. Collection from debtors | | | | |
| 3. Cash sales | | | | |
| 4. Loans from banks | | | | |
| 5. Share capital | | | | |
| 6. Miscellaneous receipts | | | | |
| 7. Other items | | | | |
| **Total** | | | | |
| | | | | |
| *Payments:* | | | | |
| 1. Payments to creditors | | | | |
| 2. Wages | | | | |
| 3. Overheads | | | | |
| (a) | | | | |
| (b) | | | | |
| (c) | | | | |
| 4. Interest | | | | |
| 5. Dividend | | | | |
| 6. Corporate tax | | | | |

| 7. Capital expenditure | | | | |
|---|---|---|---|---|
| 8. Other items | | | | |
| **Total** | | | | |
| Closing balance | | | | |
| [Surplus (+)/Shortfall (-)] | | | | |

Students are required to do good practice in preparing the cash budgets. The following illustration will show how short term cash budgets can be prepared.

**Illustration 1**

Prepare monthly cash budget for six months beginning from April 2006 on the basis of the following information:-

(i)     Estimated monthly sales are as follows:-

| | *Rs.* | | *Rs.* |
|---|---|---|---|
| January | 1,00,000 | June | 80,000 |
| February | 1,20,000 | July | 1,00,000 |
| March | 1,40,000 | August | 80,000 |
| April | 80,000 | September | 60,000 |
| May | 60,000 | October | 1,00,000 |

(ii)    Wages and salaries are estimated to be payable as follows:-

| | *Rs.* | | *Rs.* |
|---|---|---|---|
| April | 9,000 | July | 10,000 |
| May | 8,000 | August | 9,000 |
| June | 10,000 | September | 9,000 |

(iii)   Of the sales, 80% is on credit and 20% for cash. 75% of the credit sales are collected within one month and the balance in two months. There are no bad debt losses.

(iv)    Purchases amount to 80% of sales and are made and paid for in the month preceding the sales.

(v)     The firm has 10% debentures of Rs.1,20,000. Interest on these has to be paid quarterly in January, April and so on.

(vi)    The firm is to make an advance payment of tax of Rs.5,000 in July, 2006.

(vii) The firm had a cash balance of Rs.20,000 on April 1, 2006, which is the minimum desired level of cash balance. Any cash surplus/deficit above/below this level is made up by temporary investments/liquidation of temporary investments or temporary borrowings at the end of each month (interest on these to be ignored).

**Solution**

Workings:

Collection from debtors:

*(Amount in Rs.)*

| | February | March | April | May | June | July | August | September |
|---|---|---|---|---|---|---|---|---|
| Total sales | 1,20,000 | 1,40,000 | 80,000 | 60,000 | 80,000 | 1,00,000 | 80,000 | 60,000 |
| Credit sales (80% of total sales) | 96,000 | 1,12,000 | 64,000 | 48,000 | 64,000 | 80,000 | 64,000 | 48,000 |
| Collections: | | | | | | | | |
| One month | | 72,000 | 84,000 | 48,000 | 36,000 | 48,000 | 60,000 | 48,000 |
| Two months | | | 24,000 | 28,000 | 16,000 | 12,000 | 16,000 | 20,000 |
| Total collections | | | 1,08,000 | 76,000 | 52,000 | 60,000 | 76,000 | 68,000 |

Monthly Cash Budget for Six months, April to September, 2006

*(Amount in Rs.)*

| Receipts: | April | May | June | July | August | September |
|---|---|---|---|---|---|---|
| Opening balance | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Cash sales | 16,000 | 12,000 | 16,000 | 20,000 | 16,000 | 12,000 |
| Collection from debtors | 1,08,000 | 76,000 | 52,000 | 60,000 | 76,000 | 68,000 |
| Total cash available (A) | 1,44,000 | 1,08,000 | 88,000 | 1,00,000 | 1,12,000 | 1,00,000 |

| Payments: | | | | | | |
|---|---|---|---|---|---|---|
| Purchases | 48,000 | 64,000 | 80,000 | 64,000 | 48,000 | 80,000 |
| Wages & salaries | 9,000 | 8,000 | 10,000 | 10,000 | 9,000 | 9,000 |
| Interest on debentures | 3,000 | --- | ---- | 3,000 | --- | ---- |
| Tax payment | --- | --- | ---- | 5,000 | ---- | ---- |
| Total payments (B) | 60,000 | 72,000 | 90,000 | 82,000 | 57,000 | 89,000 |
| Minimum cash balance desired | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Total cash needed (C) | 80,000 | 92,000 | 1,10,000 | 1,02,000 | 77,000 | 1,09,000 |
| Surplus deficit (A-C) | 64,000 | 16,000 | (22,000) | (2,000) | 35,000 | (9,000) |
| **Investment/financing** Temporary Investments | (64,000) | (16,000) | ---- | | (35,000) | ----- |
| Liquidation of temporary investments or temporary borrowings | ---- | ---- | 22,000 | 2,000 | ---- | 9,000 |
| Total effect of investment/financing (D) | (64,000) | (16,000) | 22,000 | 2,000 | (35,000) | 9,000 |
| Closing cash balance (A+D-B) | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |

### Illustration 2

From the following information relating to a departmental store, you are required to prepare for the three months ending 31st March, 2006:-

(a)   Monthwise cash budget on receipts and payments basis; and

(b)   Statement of Sources and uses of funds for the three months period.

It is anticipated that the working capital at 1st January, 2006 will be as follows:-

*Rs. in '000's*

| | |
|---|---|
| Cash in hand and at bank | 545 |
| Short term investments | 300 |
| Debtors | 2,570 |

| | | | |
|---|---|---|---|
| Stock | | | 1,300 |
| Trade creditors | | | 2,110 |
| Other creditors | | | 200 |
| Dividends payable | | | 485 |
| Tax due | | | 320 |
| Plant | | | 800 |

**Budgeted Profit Statement:** _Rs.in '000's_

| | January | February | March |
|---|---|---|---|
| Sales | 2,100 | 1,800 | 1,700 |
| Cost of sales | 1,635 | 1,405 | 1,330 |
| Gross Profit | 465 | 395 | 370 |
| Administrative, Selling and Distribution Expenses | | | |
| | 315 | 270 | 255 |
| Net Profit before tax | 150 | 125 | 115 |

Budgeted balances at the end of each months: _Rs. in '000's_

| | 31st Jan. | 29th Feb. | 31st March |
|---|---|---|---|
| Short term investments | 700 | --- | 200 |
| Debtors | 2,600 | 2,500 | 2,350 |
| Stock | 1,200 | 1,100 | 1,000 |
| Trade creditors | 2,000 | 1,950 | 1,900 |
| Other creditors | 200 | 200 | 200 |
| Dividends payable | 485 | -- | -- |
| Tax due | 320 | 320 | 320 |
| Plant (depreciation ignored) | 800 | 1,600 | 1,550 |

Depreciation amount to Rs.60,000 is included in the budgeted expenditure for each month.

**Solution**

Workings:                                                                *Rs. in '000'*

| (1) Payments to creditors: | Jan. 2006 | Feb.2006 | March, 2006 |
|---|---|---|---|
| Cost of Sales | 1,635 | 1,405 | 1,330 |
| Add Closing Stocks | 1,200 | 1,100 | 1,000 |
| | 2,835 | 2,505 | 2,330 |
| Less: Opening Stocks | 1,300 | 1,200 | 1,100 |
| Purchases | 1,535 | 1,305 | 1,230 |
| Add: Trade Creditors, Opening balance | 2,110 | 2,000 | 1,950 |
| | 3,645 | 3,305 | 3,180 |
| Less: Trade Creditors, closing balance | 2,000 | 1,950 | 1,900 |
| Payment | 1,645 | 1,355 | 1,280 |
| (2) Receipts from debtors: | | | |
| Debtors, Opening balances | 2,570 | 2,600 | 2,500 |
| Add Sales | 2,100 | 1,800 | 1,700 |
| | 4,670 | 4,400 | 4,200 |
| Less Debtors, closing balance | 2,600 | 2,500 | 2,350 |
| Receipt | 2,070 | 1,900 | 1,850 |

**CASH BUDGET**

(a)  3 months ending 31st March, 2006

*(Rs, in 000's)*

| | January, 2006 | Feb. 2006 | March, 2006 |
|---|---|---|---|
| Opening cash balances | 545 | 315 | 65 |
| Add Receipts: | | | |
| From Debtors | 2,070 | 1,900 | 1,850 |
| Sale of Investments | --- | 700 | ---- |
| Sale of Plant | --- | --- | 50 |
| Total (A) | 2,615 | 2,915 | 1,965 |

Deduct Payments

| | | | |
|---|---|---|---|
| Creditors | 1,645 | 1,355 | 1,280 |
| Expenses | 255 | 210 | 195 |
| Capital Expenditure | --- | 800 | --- |
| Payment of dividend | --- | 485 | --- |
| Purchase of investments | 400 | --- | 200 |
| Total payments (B) | 2,300 | 2,850 | 1,675 |
| Closing cash balance (A - B) | 315 | 65 | 290 |

(b)      **Statement of Sources and uses of Funds for the Three Month Period Ending 31st March, 2006**

| **Sources:** | *Rs.'000* | *Rs.'000* |
|---|---|---|
| Funds from operation: | | |
| Net profit | 390 | |
| Add Depreciation | 180 | 570 |
| Sale of plant | | 50 |
| | | 620 |
| Decrease in Working Capital | | 665 |
| Total | | 1,285 |
| **Uses:** | | |
| Purchase of plant | | 800 |
| Payment by dividends | | 485 |
| Total | | 1,285 |

**Statement of Changes in Working Capital**

| | January,06 | March, 06 | Increase | Decrease |
|---|---|---|---|---|
| | Rs.000 | Rs.000 | Rs.000 | Rs.000 |
| *Current Assets* | | | | |
| Cash in hand and at   Bank | 545 | 290 | | 255 |
| Short term Investments | 300 | 200 | | 100 |

| | | | | |
|---|---|---|---|---|
| Debtors | 2,570 | 2,350 | | 220 |
| Stock | 1,300 | 1,000 | | 300 |
| | 4,715 | 3,840 | | |
| *Current Liabilities* | | | | |
| Trade Creditors | 2,110 | 1,900 | 210 | --- |
| Other Creditors | 200 | 200 | --- | --- |
| Tax Due | 320 | 320 | --- | --- |
| | 2,630 | 2,420 | | |
| Working Capital | 2,085 | 1,420 | | |
| Decrease | | 665 | 665 | |
| | 2,085 | 2,085 | 875 | 875 |

**2.4.2 Cash Budget for long period:** Long-range cash forecast often resemble the projected sources and application of funds statement. The following procedure may be adopted to prepare long-range cash forecasts:

(i) Take the cash at bank and in the beginning of the year:

(ii) *Add:*

    (a) Trading profit (before tax) expected to be earned;

    (b) Depreciation and other development expenses incurred to be written off;

    (c) Sale proceeds of assets';

    (d) Proceeds of fresh issue of shares or debentures; and

    (e) Reduction in working capital that is current assets (except cash) less current liabilities.

(iii) Deduct:

    (a) Dividends to be paid.

    (b) Cost of assets to be purchased.

    (c) Taxes to be paid.

    (d) Debentures or shares to be redeemed.

    (e) Increase in working capital.

**Illustration 3**

You are given below the Profit & Loss Accounts for two years for a company:

**Profit and Loss Account**

|  | Year 1 | Year 2 |  | Year 1 | Year 2 |
|---|---|---|---|---|---|
|  | Rs. | Rs. |  | Rs. | Rs. |
| To Opening stock | 80,00,000 | 1,00,00,000 | By Sales | 8,00,00,000 | 10,00,00,000 |
| To Raw materials | 3,00,00,000 | 4,00,00,000 | By Closing stock | 1,00,00,000 | 1,50,00,000 |
| To Stores | 1,00,00,000 | 1,20,00,000 | By Misc. Income | 10,00,000 | 10,00,000 |
| To Manufacturing Expenses | 1,00,00,000 | 1,60,00,000 |  |  |  |
| To Other Expenses | 1,00,00,000 | 1,00,00,000 |  |  |  |
| To Depreciation | 1,00,00,000 | 1,00,00,000 |  |  |  |
| To Net Profit | 1,30,00,000 | 1,80,00,000 |  |  |  |
|  | 9,10,00,000 | 11,60,00,000 |  | 9,10,00,000 | 11,60,00,000 |

Sales are expected to be Rs.12,00,00,000 in year 3.

As a result, other expenses will increase by Rs.50,00,000 besides other charges. Only raw materials are in stock. Assume sales and purchases are in cash terms and the closing stock is expected to go up by the same amount as between year 1 and 2. You may assume that no dividend is being paid. The Company can use 75% of the cash generated to service a loan. How much cash from operations will be available in year 3 for the purpose? Ignore income tax.

**Solution**

**Projected Profit and Loss Account for the year 3**

|  | Year 2 Actual (Rs. in lakhs) | Year 3 Projected (Rs. in lakhs) |  | Year 2 Actual (Rs. in lakhs) | Year 3 Projected (Rs. in lakhs) |
|---|---|---|---|---|---|
| To Materials consumed | 350 | 420 | By Sales | 1,000 | 1,200 |
| To Stores | 120 | 144 | By Misc. Income | 10 | 10 |

| To Mfg. Expenses | 160 | 192 | | | |
|---|---|---|---|---|---|
| To Other expenses | 100 | 150 | | | |
| To Depreciation | 100 | 100 | | | |
| To Net profit | 180 | 204 | | | |
| | 1,010 | 1,210 | | 1,010 | 1,210 |

**Cash Flow:**

*(Rs. in lakhs)*

| | |
|---|---|
| Profit | 204 |
| *Add*: Depreciation | 100 |
| | 304 |
| *Less*: Cash required for increase in stock | 50 |
| Net cash inflow | 254 |

Available for servicing the loan: 75% of Rs.2,54,00,000 or Rs.1,90,50,000

**Working Notes:**

(i)  Material consumed in year 2: 35% of sales.

Likely consumption in year 3 : $Rs. 1200 \times \dfrac{35}{100}$ or Rs. 420 (lakhs)

(ii)  Stores are 12% of sales, as in year 2.

(iii)  Manufacturing expenses are 16% of sales.

**Note:**  The above also shows how a projected profit and loss account is prepared.

**2.4.3  Managing Cash Collection and Disbursements:**  The finance manager must control the levels of cash balance at various points in the organization.  This task assumes special importance on account of the fact that there is generally a tendency amongst divisional managers to keep cash balance in excess of their needs.  Hence, the finance manager must devise a system whereby each division of an organization retains enough cash to meet its day-to-day requirements without having surplus balance on hand.  For this, methods have to be employed to:

(a)  Speed up the mailing time of payments from customers;

(b)  Reduce the time during which payments received by the firm remain uncollected and speed up the movement of funds to disbursement banks.

Having prepared the cash budget, the finance manager should ensure that there does not exists a significant deviation between projected cash flows and actual cash flows. To achieve this cash management efficiency will have to be improved through a proper control of cash collection and disbursement. The twin objectives in managing the cash flows should be to accelerate cash collections as much as possible and to decelerate or delay cash disbursements.

**2.4.4 Accelerating Cash Collections:** A firm can conserve cash and reduce its requirements for cash balances if it can speed up its cash collections by issuing invoices quickly and taking other necessary steps for cash collection. It can be accelerated by reducing the time lag between a customer pays bill and the cheque is collected and funds become available for the firm's use. A firm can decentralized collection system known as concentration banking and lock box system to speed up cash collection and reduce float time.

**(i) Concentration Banking:** In concentration banking the company establishes a number of strategic collection centres in different regions instead of a single collection centre at the head office. This system reduces the period between the time a customer mails in his remittances and the time when they become spendable funds with the company. Payments received by the different collection centers are deposited with their respective local banks which in turn transfer all surplus funds to the concentration bank of head office. The concentration bank with which the company has its major bank account is generally located at the headquarters. Concentration banking is one important and popular way of reducing the size of the float.

**(ii) Lock Box System:** Another means to accelerate the flow of funds is a lock box system. While concentration banking, remittances are received by a collection centre and deposited in the bank after processing. The purpose of lock box system is to eliminate the time between the receipt of remittances by the company and deposited in the bank. A lock box arrangement usually is on regional basis which a company chooses according to its billing patterns.

Under this arrangement, the company rents the local post-office box and authorizes its bank at each of the locations to pick up remittances in the boxes. Customers are billed with instructions to mail their remittances to the lock boxes. The bank picks up the mail several times a day and deposits the cheques in the company's account. The cheques may be micro-filmed for record purposes and cleared for collection. The company receives a deposit slip and lists all payments together with any other material in the envelope. This procedure frees the company from handling and depositing the cheques. The main advantage of lock box system is that cheques are deposited with the banks sooner and become collected funds sooner than if they were processed by the company prior to deposit. In other words lag between the time cheques are received by the company and the time they are actually deposited in the bank is eliminated. The main drawback of lock box system is the cost of its operation. The bank provides a number of services in addition to usual clearing of cheques

and requires compensation for them. Since the cost is almost directly proportional to the number of cheques deposited. Lock box arrangements are usually not profitable if the average remittance is small. The appropriate rule for deciding whether or not to use a lock box system or for that matter, concentration banking, is simply to compare the added cost of the most efficient system with the marginal income that can be generated from the released funds. If costs are less than income, the system is profitable, if the system is not profitable, it is not worth undertaking.

**(iii) Playing the float:** Besides accelerating collections, an effective control over payments can also cause faster turnover of cash. This is possible only by making payments on the due date, making excessive use of draft (bill of exchange) instead of cheques. Availability of cash can be maximized by playing the float. In this, a firm estimates accurately the time when the cheques issued will be presented for encashment and thus utilizes the float period to its advantage by issuing more cheques but having in the bank account only so much cash balance as will be sufficient to honour those cheques which are actually expected to be presented on a particular date.

**2.4.5  Different Kinds of Float with reference to Management of Cash:** The term float is used to refer to the periods that affect cash as it moves through the different stages of the collection process. Four kinds of float with reference to management of cash are:

♦ *Billing float:* An invoice is the formal document that a seller prepares and sends to the purchaser as the payment request for goods sold or services provided. The time between the sale and the mailing of the invoice is the billing float.

♦ *Mail float:* This is the time when a cheque is being processed by post office, messenger service or other means of delivery.

♦ *Cheque processing float:* This is the time required for the seller to sort, record and deposit the cheque after it has been received by the company.

♦ *Banking processing float:* This is the time from the deposit of the cheque to the crediting of funds in the sellers account.

**2.4.6  Delaying Payments:** A firm can increase its net float by speeding up collections. It can also increase the net float by delayed disbursement of funds from the bank by increasing the mail time. A company may make payment to its outstation suppliers by a cheque and send it through mail. The delay in transit and collection of the cheque, will be used to increase the float.

**Illustration 4**

Parachi Ltd is a manufacturing company producing and selling a range of cleaning products to wholesale customers. It has three suppliers and two customers. Parachi Ltd relies on its cleared funds forecast to manage its cash.

You are an accounting technician for the company and have been asked to prepare a cleared funds forecast for the period Monday 7 January to Friday 11 January 2008 inclusive. You have been provided with the following information:

**(1) Receipts from customers**

| Customer name | Credit terms | Payment method | 7 Jan 2008 sales | 7 Dec 2007 sales |
|---|---|---|---|---|
| W Ltd | 1 calendar month | BACS | Rs.150,000 | Rs.130,000 |
| X Ltd | None | Cheque | Rs.180,000 | Rs.160,000 |

(a) Receipt of money by BACS (Bankers' Automated Clearing Services) is instantaneous.

(b) X Ltd's cheque will be paid into Parachi Ltd's bank account on the same day as the sale is made and will clear on the third day following this (excluding day of payment).

**(2) Payments to suppliers**

| Supplier name | Credit terms | Payment method | 7 Jan 2008 purchases | 7 Dec 2007 purchases | 7 Nov 2007 purchases |
|---|---|---|---|---|---|
| A Ltd | 1 calendar month | Standing order | Rs.65,000 | Rs.55,000 | Rs.45,000 |
| B Ltd | 2 calendar months | Cheque | Rs.85,000 | Rs.80,000 | Rs.75,000 |
| C Ltd | None | Cheque | Rs.95,000 | Rs.90,000 | Rs.85,000 |

(a) Parachi Ltd has set up a standing order for Rs.45,000 a month to pay for supplies from A Ltd. This will leave Parachi's bank account on 7 January. Every few months, an adjustment is made to reflect the actual cost of supplies purchased (you do NOT need to make this adjustment).

(b) Parachi Ltd will send out, by post, cheques to B Ltd and C Ltd on 7 January. The amounts will leave its bank account on the second day following this (excluding the day of posting).

**(3) Wages and salaries**

| | December 2007 | January 2008 |
|---|---|---|
| Weekly wages | Rs.12,000 | Rs.13,000 |
| Monthly salaries | Rs.56,000 | Rs.59,000 |

(a) Factory workers are paid cash wages (weekly). They will be paid one week's wages, on 11 January, for the last week's work done in December (i.e. they work a week in hand).

(b) All the office workers are paid salaries (monthly) by BACS. Salaries for December will be paid on 7 January.

**(4) Other miscellaneous payments**

(a) Every Monday morning, the petty cashier withdraws Rs.200 from the company bank account for the petty cash. The money leaves Parachi's bank account straight away.

(b) The room cleaner is paid Rs.30 from petty cash every Wednesday morning.

(c) Office stationery will be ordered by telephone on Tuesday 8 January to the value of Rs.300. This is paid for by company debit card. Such payments are generally seen to leave the company account on the next working day.

(d) Five new softwares will be ordered over the Internet on 10 January at a total cost of Rs.6,500. A cheque will be sent out on the same day. The amount will leave Parachi Ltd's bank account on the second day following this (excluding the day of posting).

**(5) Other information**

The balance on Parachi's bank account will be Rs.200,000 on 7 January 2008. This represents both the book balance and the cleared funds.

**Required:**

Prepare a cleared funds forecast for the period Monday 7 January to Friday 7 January 2008 inclusive using the information provided. Show clearly the uncleared funds float each day.

**Solution:**

**Cleared Funds Forecast**

|  | 7 Jan 08 (Monday) Rs. | 8 Jan 08 (Tuesday) Rs. | 9 Jan 08 (Wednesday) Rs. | 10 Jan 08 (Thursday) Rs. | 11 Jan 08 (Friday) Rs. |
|---|---|---|---|---|---|
| **Receipts** |  |  |  |  |  |
| W Ltd | 130,000 | 0 | 0 | 0 | 0 |
| X Ltd | 0 | 0 | 0 | 180,000 | 0 |
| **(a)** | **130,000** | **0** | **0** | **180,000** | **0** |

**Payments**

| | | | | | |
|---|---|---|---|---|---|
| A Ltd | 45,000 | 0 | 0 | 0 | 0 |
| B Ltd | 0 | 0 | 75,000 | 0 | 0 |
| C Ltd | 0 | 0 | 95,000 | 0 | 0 |
| Wages | 0 | 0 | 0 | 0 | 12,000 |
| Salaries | 56,000 | 0 | 0 | 0 | 0 |
| Petty Cash | 200 | 0 | 0 | 0 | 0 |
| Stationery | 0 | 0 | 300 | 0 | 0 |
| **(b)** | **101,200** | **0** | **170,300** | **0** | **12,000** |

Cleared excess Receipts

| | | | | | |
|---|---|---|---|---|---|
| over payments (a) – (b) | 28,800 | 0 | (170,300) | 80,000 | (12,000) |
| Cleared balance b/f | 200,000 | 228,800 | 228,800 | 58,500 | 238,500 |
| **Cleared balance c/f (c)** | **228,800** | **228,800** | **58,500** | **238,500** | **226,500** |

**Uncleared funds float**

| | | | | | |
|---|---|---|---|---|---|
| Receipts | 180,000 | 180,000 | 180,000 | 0 | 0 |
| Payments | (170,000) | (170,300) | 0 | (6,500) | (6,500) |
| **(d)** | **10,000** | **9,700** | **180,000** | **(6,500)** | **(6,500)** |
| Total book balance c/f | 238,800 | 238,500 | 238,500 | 232,000 | 220,000 |

**(c) + (d)**

**2.4.7 Controlling Disbursements:** The effective control of disbursement can also help the firm in conserving cash and reducing the financial requirements. Disbursement arise due to trade credit, which is a spontaneous, source of funds. The firm should make payments using credit terms to the fullest extent.

**2.4.8 Determining The Optimum Cash Balance:** A firm should maintain optimum cash balance to cater to the day-to-day operations. It may also carry additional cash as a buffer or safety stock. The amount of cash balance will depend on the risk-return trade off. The firm should maintain optimum - just enough, neither too much nor too little cash balance. This, however, poses a question. How to determine the optimum cash balance if cash flows are predictable and if they are not predictable?

## 2.5    CASH MANAGEMENT MODELS

In recent years several types of mathematical models have been developed which helps to determine the optimum cash balance to be carried by a business organization.  The purpose of all these models is to ensure that cash does not remain idle unnecessarily and at the same time the firm is not confronted with a situation of cash shortage.  All these models can be put in two categories-inventory type models and stochastic models.  Inventory type models have been constructed to aid the finance manager to determine optimum cash balance of his firm.  William J. Baumol's economic order quantity model applies equally to cash management problems  under conditions of certainty or where the cash flows are predictable.  However, in a situation where the EOQ Model is not applicable, stochastic model of cash management helps in determining the optimum level of cash balance.  It happens when the demand for cash is stochastic and not known in advance.

**2.5.1  William J. Baumol's Economic Order Quantity Model, (1952):**  According to this model, optimum cash level is that level of cash where the carrying costs and transactions costs are the minimum.  The carrying costs refers to the cost of holding cash, namely, the interest foregone on marketable securities.  The transaction costs refers to the cost involved in getting the marketable securities converted into cash.  This happens when the firm falls short of cash and has to sell the securities resulting in clerical, brokerage, registration and other costs.

The optimum cash balance according to this model will be that point where these two costs are minimum.  The formula for determining optimum cash balance is:

$$C = \sqrt{\frac{2U \times P}{S}}$$

Where,    C =    Optimum cash balance

U =    Annual (or monthly) cash disbursement

P =    Fixed cost per transaction.

S =    Opportunity cost of one rupee p.a. (or p.m.)

This can be explained with the following diagram:



Optimum Cash Balance
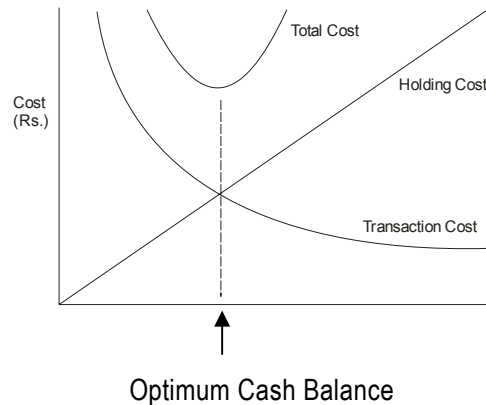
The model is based on the following assumptions:

(i)     Cash needs of the firm are known with certainty.

(ii)    The cash is used uniformly over a period of time and it is also known with certainty.

(iii)   The holding cost is known and it is constant.

(iv)   The transaction cost also remains constant.

**Illustration 5**

A firm maintains a separate account for cash disbursement.  Total disbursement are Rs.1,05,000 per month or Rs.12,60,000 per year.  Administrative and transaction cost of transferring cash to disbursement account is Rs.20 per transfer.  Marketable securities yield is 8% per annum.

Determine the optimum cash balance according to William J. Baumol model.

**Solution**

The optimum cash balance C = $\sqrt{\dfrac{2 \times \text{Rs.}12,60,000 \times \text{Rs.}20}{0.08}} = \text{Rs.}25,100$
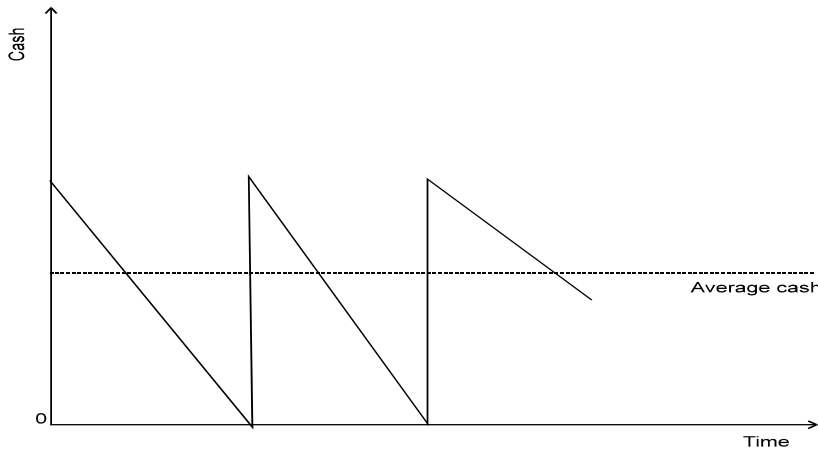
The limitation of the Baumol's model is that it does not allow the cash flows to fluctuate. Firms in practice do not use their cash balance uniformly nor they are able to predict daily cash inflows and outflows. The Miller-Orr (MO) model overcomes this shortcoming and allows for daily cash flow variation.

**2.5.2 Miller-Orr Cash Management Model (1966):** According to this model the net cash flow is completely stochastic. When changes in cash balance occur randomly the application of control theory serves a useful purpose. The Miller-Orr model is one of such control limit models. This model is designed to determine the time and size of transfers between an investment account and cash account. In this model control limits are set for cash balances. These limits may consist of h as upper limit, z as the return point; and zero as the lower limit. When the cash balance reaches the upper limit, the transfer of cash equal to h – z is invested in marketable securities account. When it touches the lower limit, a transfer from marketable securities account to cash account is made. During the period when cash balance stays between (h, z) and (z, 0) i.e. high and low limits no transactions between cash and marketable securities account is made. The high and low limits of cash balance are set up on the basis of fixed cost associated with the securities transactions, the opportunity cost of holding cash and the degree of likely fluctuations in cash balances. These limits satisfy the demands for cash at the lowest possible total costs. The following diagram illustrates the Miller-Orr model.
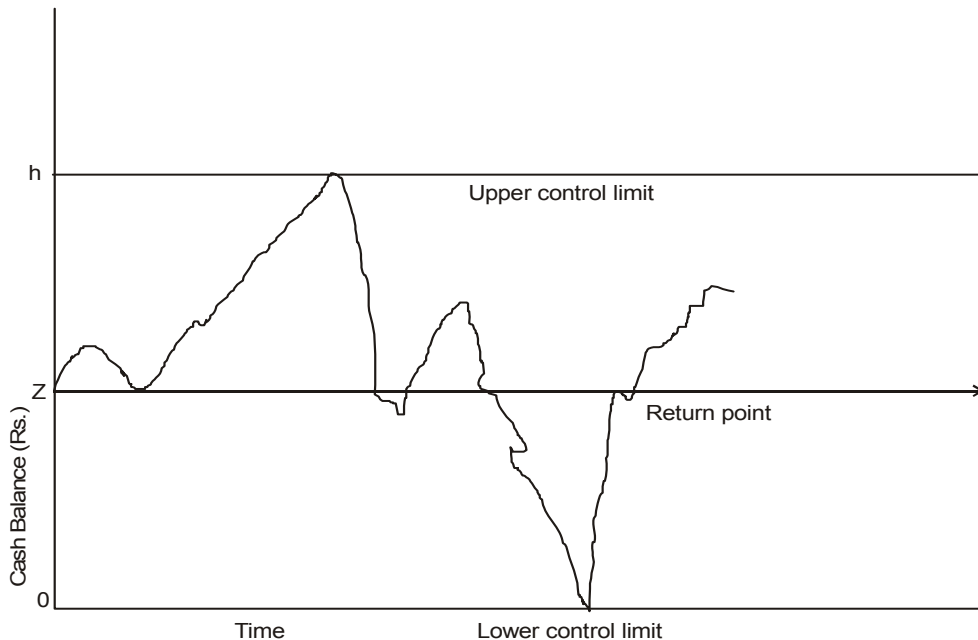
The MO Model is more realistic since it allows variations in cash balance within lower and upper limits. The finance manager can set the limits according to the firm's liquidity requirements i.e., maintaining minimum and maximum cash balance.

## 2.6 RECENT DEVELOPMENTS IN CASH MANAGEMENT

Now-a-days, electronic delivery and payment system are becoming increasingly important because of increased competition and the demand for more efficient and convenient capabilities. A considerable number of transactions and amounts of funds can be moved electronically from one place to another almost instantaneously. Consequently, the opportunities presented are not only beneficial but can create a risk to a business firm. Such threats include internal and external fraud, theft and unauthorized manipulation of financial data. Therefore, we can easily observe the rapid transition from the most basic and traditional principles to now complex strategies dominated by the technology and globalisation, but the basic goal is same i.e., the efficient utilisation of cash in a way which is consistent with the overall strategic objectives of a business unit.

**2.6.1 Electronic Fund Transfer:** With the developments which took place in the Information technology, the present banking system is switching over to the computerisation of banks branches to offer efficient banking services and cash management services to their customers. The network will be linked to the different branches, banks. This will help the customers in the following ways:

♦ Instant updation of accounts.

♦ The quick transfer of funds.

♦ Instant information about foreign exchange rates.

**2.6.2 Zero Balance Account:** For efficient cash management some firms employ an extensive policy of substituting marketable securities for cash by the use of zero balance accounts. Every day the firm totals the cheques presented for payment against the account. The firm transfers the balance amount of cash in the account if any, for buying marketable securities. In case of shortage of cash the firm sells the marketable securities.

**2.6.3 Money Market Operations:** One of the tasks of *'treasury function'* of larger companies is the investment of surplus funds in the money market. The chief characteristic of money market banking is one of size. Banks obtain funds by competing in the money market for the deposits by the companies, public authorities, High Networth Investors (HNI), and other banks. Deposits are made for specific periods ranging from overnight to one year, a highly competitive rates which reflect supply and demand on a daily, even hourly basis are quoted. Consequently, the rates can fluctuate quite dramatically, especially for the shorter-term deposits. Surplus funds can thus be invested in money market easily.

**2.6.4 Petty Cash Imprest System:** For better control on cash, generally the companies use petty cash imprest system wherein the day-to-day petty expenses are estimated taking into account past experience and future needs and generally a week's requirement of cash will be kept separate for making petty expenses. Again, the next week will commence with the pre-determined balance. This will reduce the strain of the management in managing petty cash expenses and help in the managing cash efficiently.

**2.6.5 Management of Temporary Cash Surplus**

Temporary cash surpluses can be profitably invested in the following:

♦ Short-term deposits in Banks and financial institutions.

♦ Short-term debt market instruments.

♦ Long-term debt instruments.

♦ Shares of Blue chip listed companies.

**2.6.6 Electronic Cash Management System:** Most of the cash management systems now-a-days are electronically based, since 'speed' is the essense of any cash management system. Electronically, transfer of data as well as funds play a key role in any cash management system. Various elements in the process of cash management are linked through a satellite. Various places that are interlinked may be the place where the instrument is collected, the place where cash is to be transferred in company's account, the place where the payment is to be transferred etc.

Certain networked cash management system may also provide a very limited access to third parties like parties having very regular dealings of receipts and payments with the company etc. A finance company accepting deposits from public through sub-brokers may give a limited access to sub-brokers to verify the collections made through him for determination of his commission among other things.

*Benefits:* Good cash management is a conscious process of knowing:

♦ When, where and how a company's cash needs will arise.

♦ Knowing what are the best sources of meeting at a short notice additional cash requirement.

♦ Maintaining good and cordial relations with bankers and other creditors.

**Scientific cash management results in:**

♦ Significant saving in time.

♦ Decrease in interest costs.

♦ Less paper work.

♦ Greater accounting accuracy.

♦ More control over time and funds.

♦ Supports electronic payments.

♦ Faster transfer of funds from one location to another, where required.

♦ Speedy conversion of various instruments into cash.

♦ Making available funds wherever required, whenever required.

♦ Reduction in the amount of 'idle float' to the maximum possible extent.

♦ Ensures no idle funds are placed at any place in the organization.

♦ It makes inter-bank balancing of funds much easier.

♦ It is a true form of centralised 'Cash Management'.

♦ Produces faster electronic reconciliation.

♦ Allows for detection of book-keeping errors.

♦ Reduces the number of cheques issued.

♦ Earns interest income or reduce interest expense.

Even a multinational organization having subsidiaries worldwide, can pool everything internationally so that the company offset the debts with the surplus monies from various

subsidiaries. It will result in transformation of treasury function into a profit-centre by optimizing cash and putting it on profitable use.

Creative and pro-active cash management solutions can contribute dramatically to a company's profitability and to its competitive edge. The ultimate purpose of scientific cash management is to ensure solvency, liquidity and profitability of the organization as a whole.

**2.6.7 Virtual Banking:** The practice of banking has undergone a significant change in the nineties. While banks are striving to strengthen customer base and relationship and move towards relationship banking, customers are increasingly moving away from the confines of traditional branch banking and are seeking the convenience of remote electronic banking services. And even within the broad spectrum of electronic banking the virtual banking has gained prominence

Broadly virtual banking denotes the provision of banking and related services through extensive use of information technology without direct recourse to the bank by the customer. The origin of virtual banking in the developed countries can be traced back to the seventies with the installation of Automated Teller Machines (ATMs). Subsequently, driven by the competitive market environment as well as various technological and customer pressures, other types of virtual banking services have grown in prominence throughout the world.

The Reserve Bank of India has been taking a number of initiatives, which will facilitate the active involvement of commercial banks in the sophisticated cash management system. One of the pre-requisites to ensure faster and reliable mobility of funds in a country is to have an efficient payment system. Considering the importance of speed in payment system to the economy, the RBI has taken numerous measures since mid Eighties to strengthen the payments mechanism in the country.

Introduction of computerized settlement of clearing transactions, use of Magnetic Ink Character Recognition (MICR) technology, provision of inter-city clearing facilities and high value clearing facilities, Electronic Clearing Service Scheme (ECSS), Electronic Funds Transfer (EFT) scheme, Delivery vs. Payment (DVP) for Government securities transactions, setting up of Indian Financial Network (INFINET) are some of the significant developments.

Introduction of Centralised Funds Management System (CFMS), Securities Services System (SSS), Real Time Gross Settlement System (RTGS) and Structured Financial Messaging System (SFMS) are the other top priority items on the agenda to transform the existing system into a state of the art payment infrastructure in India.

The current vision envisaged for the payment systems reforms is one, which contemplates linking up of at least all important bank branches with the domestic payment systems network thereby facilitating cross border connectivity. With the help of the systems already put in place in India and which are coming into being, both banks and corporates can exercise effective control over the cash management.

*Advantages*

The advantages of virtual banking services are as follows:

♦ Lower cost of handling a transaction.

♦ The increased speed of response to customer requirements.

♦ The lower cost of operating branch network along with reduced staff costs leads to cost efficiency.

♦ Virtual banking allows the possibility of improved and a range of services being made available to the customer rapidly, accurately and at his convenience.

The popularity which virtual banking services have won among customers, is due to the speed, convenience and round the clock access they offer.

## 2.7 CASH MANAGEMENT SERVICES – THE ICICI BANK WAY

ICICI Bank offers receivables and payable management solutions to companies under its Cash Management Services. Local cheque collection is offered from more than 630 centres and up country cheques payable at more than 4,500 centres. The cheques can be collected and credited to the centralized account.

Companies can plan their expenditure/investments as the credit is provided on a guaranteed day arrangement basis. The vast reach is offered in combination with advanced technology, which enables the companies to receive customized MIS through e-mail and web to take care of reconciliation.

Companies can also avail of ICICI Bank's payment products viz, issue of bulk demand drafts/pay orders, cheque writing, RTGS, ECS and dividend/interest warrants. These products help the companies to reduce administrative cost and improve efficiency. Companies can avoid transit delays and courier costs by using the remote printing (pay orders) facility.

*(Source: The Economic Times, New Delhi May 2, 2006)*

## 2.8 MANAGEMENT OF MARKETABLE SECURITIES

Management of marketable securities is an integral part of investment of cash as this may serve both the purposes of liquidity and cash, provided choice of investment is made correctly. As the working capital needs are fluctuating, it is possible to park excess funds in some short term securities, which can be liquidated when need for cash is felt. The selection of securities should be guided by three principles.

♦ *Safety*: Return and risks go hand in hand. As the objective in this investment is ensuring liquidity, minimum risk is the criterion of selection.

♦ *Maturity*: Matching of maturity and forecasted cash needs is essential. Prices of long

term securities fluctuate more with changes in interest rates and are therefore, more risky.

♦ *Marketability:* It refers to the convenience, speed and cost at which a security can be converted into cash. If the security can be sold quickly without loss of time and price it is highly liquid or marketable.

The choice of marketable securities is mainly limited to Government treasury bills, Deposits with banks and Intercorporate deposits. Units of Unit Trust of India and commercial papers of corporates are other attractive means of parking surplus funds for companies along with deposits with sister concerns or associate companies.

Besides this Money Market Mutual Funds (MMMFs) have also emerged as one of the avenues of short-term investment. They focus on short-term marketable securities such as Treasury bills, commercial papers certificate of deposits or call money market. There is a lock in period of 30 days after which the investment may be converted into cash. They offer attractive yields, and are popular with institutional investors and some big companies.

| UNIT – III : MANAGEMENT OF INVENTORY |
|---|

## 3.1 INVENTORY MANAGEMENT

Inventories constitute a major element of working capital. It is, therefore, important that investment in inventory is property controlled. The objectives of inventory management are, to a great extent, similar to the objectives of cash management. Inventory management covers a large number of problems including fixation of minimum and maximum levels, determining the size of inventory to be carried, deciding about the issues, receipts and inspection procedures, determining the economic order quantity, proper storage facilities, keeping check over obsolescence and ensuring control over movement of inventories.

The aspects concerning control over inventories have been discussed in Chapters 1 and 2 of Cost Accounting under Section A of this book.

UNIT – IV : MANAGEMENT OF RECEIVABLES

## 4.1    INTRODUCTION

A firm needs to offer its goods and services on credit to customers as a Business strategy to boost the sales.  This represents a considerable investment of funds so the management of this asset can have significant effect on the profit performance of the company.

The basic objective of management of sundry debtors is to optimise the return on investment on this assets known as receivables.  Large amounts are tied up in sundry debtors, there are chances of bad debts and there will be cost of collection of debts.  On the contrary, if the investment in sundry debtors is low, the sales may be restricted, since the competitors may offer more liberal terms.  Therefore, management of sundry debtors is an important issue and requires proper policies and their implementation.

While studying management of accounts receivable, we focus on its importance, what determines the investment in it, what are the decision variables involved and how do we determine them.

Investment in accounts receivables constitute a substantial portion of a firms assets. Moreover, since cash flows from a sale cannot be invested until the accounts receivable are collected their control warrants added importance, efficient collection will lead to both profitability and liquidity of the firm.

## 4.2    ROLE TO BE PLAYED BY THE FINANCE MANAGER:

It is possible that the finance manager can affect the volume of credit sales and collection period and consequently, the investment in receivables.  That is through the changes in credit policy.  The term credit policy is used to refer to the combination of three decisions variables: (i) credit standards; (ii) Credit terms; and (iii) Collection efforts.  Credit standards refer to the criteria's to decide the types of customers to whom goods could be sold on credit.  Whereas credit terms specify the duration of credit and terms of payments by customers.  Collection efforts determine the actual collection period.  The lower the collection period, the lower the investment in accounts receivables.

## 4.3    ASPECTS OF MANAGEMENT OF DEBTORS

There are basically three aspects of management of sundry debtors.

*1.    Credit policy:*  The credit policy is to be determined.  It involves a trade off between the profits on additional sales that arise due to credit being extended on the one hand and the

cost of carrying those debtors and bad debt losses on the other. This seeks to decide credit period, cash discount and other relevant matters. The credit period is generally stated in terms of net days. For example if the firm's credit terms are "net 50". It is expected that customers will repay credit obligations not later than 50 days.

Further, the cash discount policy of the firm specifies:

(a)   The rate of cash discount.

(b)   The cash discount period; and

(c)   The net credit period.

For example, the credit terms may be expressed as "3/15 net 60". This means that a 3% discount will be granted if the customer pays within 15 days; if he does not avail the offer he must make payment within 60 days.

*2.   Credit Analysis:* This require the finance manager to determine as to how risky it is to advance credit to a particular party.

*3.   Control of receivable:* This requires finance manager to follow up debtors and decide about a suitable credit collection policy. It involves both laying down of credit policies and execution of such policies.

There is always cost of maintaining receivables which comprises of following costs:

(i)   The company requires additional funds as resources are blocked in receivables which involves a cost in the form of interest (loan funds) or opportunity cost (own funds)

(ii)   Administrative costs which include record keeping, investigation of credit worthiness etc.

(iii)   Collection costs.

(iv)   Defaulting costs.

## 4.4   FACTORS DETERMINING CREDIT POLICY

The credit policy is an important factor determining both the quantity and the quality of accounts receivables. Various factors determine the size of the investment a company makes in accounts receivables. They are, for instance:

(i)   The effect of credit on the volume of sales;

(ii)   Credit terms;

(iii)   Cash discount;

(iv)   Policies and practices of the firm for selecting credit customers.

(v)   Paying practices and habits of the customers.

(vi)   The firm's policy and practice of collection.

(vii)  The degree of operating efficiency in the billing, record keeping and adjustment function, other costs such as interest, collection costs and bad debts etc., would also have an impact on the size of the investment in receivables. The rising trend in these costs would depress the size of investment in receivables.

The firm may follow a lenient or a stringent credit policy. The firm which follows a lenient credit policy sells on credit to customers on very liberal terms and standards. On the contrary a firm following a stringent credit policy sells on credit on a highly selective basis only to those customers who have proper credit worthiness and who are financially sound.

Any increase in accounts receivables that is, additional extension of trade credit not only results in higher sales but also requires additional financing to support the increased investment in accounts receivables. The costs of credit investigations and collection efforts and the chances of bad debts are also increased.

## 4.5   FACTORS UNDER THE CONTROL OF THE FINANCE MANAGER

The finance manager has operating responsibility for the management of the investment in receivables. In addition to his role of supervising the administration of credit, the finance manager is in a particularly strategic position to contribute to top management decisions relating to the best credit policies of the firm.

In the beginning, the finance manager plays a very important role in the determination of credit period and deciding the criteria for selection of credit applications. Once it has been done and the management has determined the role of credit in the package of goods and services offered, the finance manager has relatively little impact upon the level of receivables. He may, however, limit the amount of receivables by rejecting occasionally credit applications or he may speed up the conversion of receivables into cash by aggressive collection policy. But these activities have smaller effect upon the level of receivables than the initial and fundamental decision regarding the terms of credit and the overall credit standards laid down by the firm.

The basic objective of receivables management should be to maximize return on total investment. The policies which stress short credit terms, stringent credit standards, and aggressive collection policies would, no doubt, reduce the size of investment in receivables and also minimize bad debt losses, but such policies would also restrict sales and profit margins. As a consequence, despite the low investment in receivables, the rate of return on total investment of the firm would be lower than that attainable with higher levels of sales, profits and receivables. The finance manager has to strike a balance between the cost of increased investment in receivables and profits from the higher levels of sales.

**Illustration 1**

A trader whose current sales are in the region of Rs.6 lakhs per annum and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study made by a management consultant reveals the following information:-

| Credit Policy | Increase in collection period | Increase in sales | Present default anticipated |
|---|---|---|---|
| A | 10 days | Rs.30,000 | 1.5% |
| B | 20 days | Rs.48,000 | 2% |
| C | 30 days | Rs.75,000 | 3% |
| D | 45 days | Rs.90,000 | 4% |

The selling price per unit is Rs.3. Average cost per unit is Rs.2.25 and variable costs per unit are Rs.2.

The current bad debt loss is 1%. Required return on additional investment is 20%. Assume a 360 days year.

Which of the above policies would you recommend for adoption?

**Solution**

**Evaluation of Credit Policies**

**Part I**

| | | Credit Policy | | | |
|---|---|---|---|---|---|
| | Exiting | A | B | C | D |
| Credit Period (Days) | 30 | 40 | 50 | 60 | 75 |
| Expected additional sales (Rs.) | | 30,000 | 48,000 | 75,000 | 90,000 |
| Contribution of additional sales (one-third of selling price) | | 10,000 | 16,000 | 25,000 | 30,000 |
| Bad debs (Expected Sales × Default percentage) | 6,000 | 9,450 | 12,960 | 20,250 | 27,600 |
| Additional bad debts | -- | 3,450 | 6,960 | 14,250 | 21,600 |
| Contribution of additional sales less additional bad | __ | 6,550 | 9,040 | 10,750 | 8,400 |

debts (A)

**Part II**

| | | | | | |
|---|---|---|---|---|---|
| Expected sales (Rs.) | 6,00,000 | 6,30,000 | 6,48,000 | 6,75,000 | 6,90,000 |
| Receivables turnover ratio | 12 | 9 | 7.2 | 6 | 4.8 |
| Average receivables | 50,000 | 70,000 | 90,000 | 1,12,500 | 1,43,750 |
| Investment in receivables | | | | | |
| (Receivables × Variable cost i.e, two-thirds of sales price i.e. Rs.50,000 × 2/3 = Rs.33,333 and so on) | 33,333 | 46,667 | 60,000 | 75,000 | 95,833 |
| Additional investment in receivables | __ | 13,334 | 26,667 | 41,667 | 62,500 |
| Required return on additional investment at 20% (B) | __ | 2,667 | 5,333 | 8,333 | 12,500 |
| Excess of additional contribution over required return on additional investment in receivables (A)-(B) | __ | 3,883 | 3,707 | 2,417 | (4,100) |

The additional contribution over required return on additional investment in receivables is the maximum under Credit Policy A. Hence, Policy A is recommended for adoption followed by B and C. Policy D cannot be adopted because it would result in the reduction of the existing profits.

**Illustration 2**

XYZ Corporation is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently, the firm has annual credit sales of Rs.50 lakhs and accounts receivable turnover ratio of 4 times a year. The current level of loss due to bad debts is Rs.1,50,000. The firm is required to give a return of 25% on the investment in new accounts receivables. The company's variable costs are 70% of the selling price. Given the following information, which is the better option?

*(Amount in Rs.)*

|  | *Present Policy* | *Policy Option I* | *Policy Option I* |
|---|---|---|---|
| Annual credit sales | 50,00,000 | 60,00,000 | 67,50,000 |
| Accounts receivable turnover ratio | 4 times | 3 times | 2.4 times |
| Bad debt losses | 1,50,000 | 3,00,000 | 4,50,000 |

**Solution**

## XYZ CORPORATION

### Evaluation of Credit Policies

*(Amount in Rs.)*

|  | *Present Policy* | *Policy Option I* | *Policy Option II* |
|---|---|---|---|
| Annual credit sales | 50,00,000 | 60,00,000 | 67,50,000 |
| Accounts receivable turnover | 4 times | 3 times | 2.4 times |
| Average collection period | 3 months | 4 months | 5 months |
| Average level of accounts receivable | 12,50,000 | 20,00,000 | 28,12,500 |
| Marginal increase in investment in receivable less profit margin | ___ | 5,25,000 | 5,68,750 |
| Marginal increase in sales | ___ | 10,00,000 | 7,50,000 |
| Profit on marginal increase in sales (30%) | ___ | 3,00,000 | 2,25,000 |
| Marginal increase in bad debt losses | ___ | 1,50,000 | 1,50,000 |
| Profit on marginal increase in sales less marginal bad debts loss | ___ | 1,50,000 | 75,000 |
|  | ___ |  |  |
| Required return on marginal investment @ 25% | ___ | 1,31,250 | 1,42,188 |
| Surplus (loss) after required rate of return | ___ | 18,750 | (67,188) |

It is clear from the above that the policy option I has a surplus of Rs.18,750/- whereas option II shows a deficit of Rs.67,188/- on the basis of 25% return. Hence policy option I is better.

**Illustration 3**

As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by Rs.1,00,000 p.a. Production and Selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%.

Should the sales manager's proposal be accepted?

Also find the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were (i) 30%, (ii) 40% and (iii) 60%.

**Solution**

**Extension of credit to a group of new customers:**

| Profitability of additional sales: | Rs. |
|---|---|
| Increase in sales per annum | 1,00,000 |
| Less Bad debt losses (10%) of sales | 10,000 |
| Net sales revenue | 90,000 |
| Less Production and selling expenses (80% of sales) | 80,000 |
| Profit before tax | 10,000 |
| Less Income tax (50%) | 5,000 |
| Profit after tax | 5,000 |

**Average investment in additional receivables.**

Period of credit: 1 ½ months

Receivables turnover: $\dfrac{12}{1\frac{1}{2}} = 8$

Average amount of receivables: $\dfrac{Rs.1,00,000}{8} = Rs.12,500$

Average investment in receivables: Rs.12,500 × 80% = Rs.10,000

The available rate of return: $\dfrac{Rs.5,000}{Rs.10,000} \times 100 = 50\%$

Since the available rate of return is 50%, which is higher than the required rate of return of 25%, the Sales Manager's proposal should be accepted.

(i)  Acceptable degree of risk of non-payment if the required rate of return (after tax is 30%)

Required amount of profit after tax on investment:

Rs.10,000 × 30% = Rs.3,000

Required amount of profit before tax at this level:

$$\frac{Rs.3,000 \times 100}{50} = Rs.6,000$$

Net sales revenue required:

Rs.80,000 + Rs.6,000 = Rs.86,000

Acceptable amount of bad debt losses:

Rs.1,00,000 – Rs.86,000 = Rs.14,000

Acceptable degree of risk of non-payment:

$$\frac{Rs.14,000}{Rs.1,00,000} \times 100 = 14\%$$

(ii)  Acceptable degree of risk of non-payment if the required rate of return (after tax) is 40%:

Required amount of profit after tax on investment:

Rs.10,000 × 40% = Rs.4,000

Required amount of profit before tax

$$\frac{Rs.4,000 \times 100}{50} = Rs.8,000$$

Net sales revenue required:

Rs.80,000 + Rs.8,000 = Rs.88,000

Acceptable amount of bad debt losses:

Rs.1,00,000 – Rs.88,000 = Rs.12,000

Acceptable degree of risk of non-payment:

$$\frac{Rs.12,000}{1,00,000} \times 100 = 12\%$$

(iii) Acceptable degree of risk of non-payment of the required rate of return (after tax) is 60%:

Required amount of profit after tax on investment:

   Rs.10,000 × 60% = Rs.6,000

Required amount of profit before tax:

$$\frac{Rs.6,000 \times 100}{50} = Rs.12,000$$

Net sales revenue required:

Rs.80,000 + Rs.12,000 = Rs.92,000

Acceptable amount of bad debt losses:

Rs.1,00,000 – Rs.92,000 = Rs.8,000

Acceptable degree of risk of non-payment:

$$\frac{Rs.8,000}{Rs.1,00,000} \times 100 = 8\%$$

## Illustration 4

Slow Payers are regular customers of Goods Dealers Ltd., Calcutta and have approached the sellers for extension of a credit facility for enabling them to purchase goods from Goods Dealers Ltd.  On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

| Schedule | Pattern |
|---|---|
| At the end of 30 days | 15% of the bill |
| At the end of 60 days | 34% of the bill. |
| At the end of 90 days | 30% of the bill. |
| At the end of 100 days | 20% of the bill. |
| Non-recovery | 1% of the bill. |

Slow Payers want to enter into a firm commitment for purchase of goods of Rs.15 lakhs in 2005, deliveries to be made in equal quantities on the first day of each quarter in the calendar year.  The price per unit of commodity is Rs.150 on which a profit of Rs.5 per unit is expected to be made.  It is anticipated by Goods Dealers Ltd., that taking up of this contract would mean an extra recurring expenditure of Rs.5,000 per annum.  If the opportunity cost of funds in the hands of Goods Dealers is 24% per annum, would you as the finance manager of the seller recommend the grant of credit to Slow Payers?  Workings should form part of your answer. Assume year of 360 days.

**Solution**

**Evaluation of Extension of Credit Facility to Slow Payers:**

| | | | |
|---|---|---|---|
| (i) | Anticipated Return on the Contract | | *Rs.* |
| (ii) | Margin return: $\left(\dfrac{Rs.15,00,000}{150} \times 5\right)$ | | 50,000 |
| | *Less*: Recurring annual costs | | 5,000 |
| | | | ———— |
| | Net anticipated return | | 45,000 |
| (ii) | Quarterly sales value of the goods to be delivered on 1st January, 1st April, 1st July nd 1st October: $\left(\dfrac{Rs.15,00,000}{4}\right)$ | | 3,75,000 |

(iii) Opportunity Cost (Interest Cost) of Funds to be Locked up:

| *Amount due for each quarter* | *Period (Days)* | *Products for each quarter* |
|---|---|---|
| Rs.56,250 (15% of Rs.3,75,000) | 30 days | 16,87,500 |
| Rs.1,27,500 (34% of Rs.3,75,000). | 60 days | 76,50,000 |
| Rs.1,12,500 (30% of Rs.3,75,000) | 90 days | 1,01,25,000 |
| Rs.75,000 (20% of Rs.3,75,000) | 100 days | 75,00,000 |
| Rs.3,750 (1% of Rs.3,75,000) | Non recovery (See Note 1) | ———— |
| | Total Products | 2,69,62,500 |
| Amount of interest cost for the year @ 24% p.a.: | 71,900 | |

$$\left(\frac{2,69,62,500}{360}\times\frac{24}{100}\times4\right)$$

| | | |
|---|---|---|
| (iv) | Total Non-recovery of Bad Debts for the year:<br>(Rs.3,750 × 4) | 15,000 |
| (v) | Profitability of Proposed Grant of Credit Facility: | |

|  |  |  |
|---|---|---|
| Net anticipated return from sales | | 45,000 |
| *Less*: Interest cost on funds | | |
| :Locked up | 71,900 | 86,900 |
| ........ Bad debts | 15,000 | (41,900) |
| Profits (Loss) | | |

In the light of the above the finance manager will not recommend the grant of credit facility to Slow Payers as it is not profitable.

**Note:**(i) Interest cost could be calculated on the amount of bad debts also.

(ii) Interest cost could be calculated on the amount of cost of sales instead of sales value.

## 4.6    FINANCING RECEIVABLES

Pledging of accounts receivables and Factoring have emerged as the important sources of financing of accounts receivables now a days.

**(i)   Pledging:**  This refers to the use of a firm's receivable to secure a short term loan.  A firm's receivables can be termed as its most liquid assets and this serve as prime collateral for a secured loan.   The lender scrutinizes the quality of the accounts receivables, selects acceptable accounts, creates a lien on the collateral and fixes the percentage of financing receivables which ranges around 50 to 90%.   The major advantage of pledging accounts receivables is the ease and flexibility it provides to the borrower. Moreover, financing is done regularly.  This, however, suffers on account of high cost of financing.

**(ii)  Factoring:**  Factoring is a new concept in financing of accounts receivables.  This refers to out right sale of accounts receivables to a factor or a financial agency.  A factor is a firm that acquires the receivables of other firms.  The factoring lays down the conditions of the sale in a factoring agreement.  The factoring agency bears the right of collection and services the accounts for a fee.
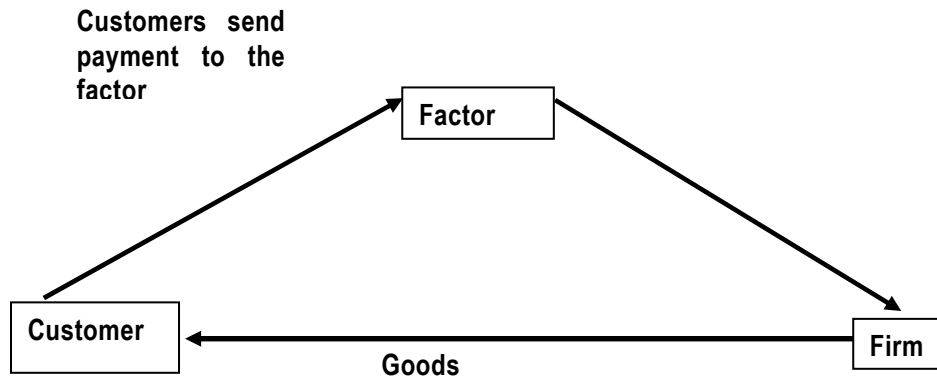
Normally, factoring is the arrangement on a non-recourse basis where in the event of default the loss is borne by this factor. However, in a factoring arrangement with recourse, in such situation, the accounts receivables will be turned back to the firm by the factor for resolution. There are a number of financial distributors providing factoring services in India. Some commercial banks and other financial agencies provide this service. The biggest advantages of factoring are the immediate conversion of receivables into cash and predicted pattern of cash flows. Financing receivables with the help of factoring can help a company having liquidity without creating a net liability on its financial condition. Besides, factoring is a flexible financial tool providing timely funds, efficient record keepings and effective management of the collection process. This is not considered to be as a loan. There is no debt repayment, no compromise to balance sheet, no long term agreements or delays associated with other methods of raising capital. Factoring allows the firm to use cash for the growth needs of business.

**Illustration 5**

A Factoring firm has credit sales of Rs.360 lakhs and its average collection period is 30 days. The financial controller estimates, bad debt losses are around 2% of credit sales. The firm spends Rs.1,40,000 annually on debtors administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avoidable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @15% p.a. after withholding 10% as reserve. What should the firm do?

Assume 360 days in a year.

**Solution**

Average level of receivables = Rs.360 lakhs × $\dfrac{30}{360}$ = 30 lakhs

| | | |
|---|---|---|
| Factoring Commission = 1% of Rs.30,00,000 | = | Rs.30,000 |
| Reserve = 10% of Rs.30,00,000 | = | Rs.3,00,000 |
| Total  (i) | = | Rs.3,30,000 |

Thus, the amount available for advance is

| | |
|---|---|
| Average level of receivables | Rs.30,00,000 |
| *Less*: Total (i) from above | Rs. 3,30,000 |
| (ii) | Rs.26,70,000 |
| *Less*: Interest @ 15% p.a. for 30 days | Rs. 33,375 |
| Net Amount of Advance available. | Rs.26,36,625 |

**Evaluation of Factoring Proposal**

Cost to the Firm

Factoring Commission = Rs.30,00,000 × $\dfrac{360}{30}$ = Rs. 3,60,000

Interest charges =  Rs. 33,375 × $\dfrac{360}{30}$ = $\dfrac{\text{Rs.4,00,500}}{\text{Rs.7,60,500}}$

Savings to the firm

| | Rs. |
|---|---|
| Cost of credit administration | 1,40,000 |
| Cost of bad-debt losses, 0.02 × 360 lakhs | 7,20,000 |
| | 8,60,000 |

.  The Net benefit to the firm

| | Rs. |
|---|---|
| Savings to the firm | 8,60,000 |
| - Cost to the firm | 7,60,500 |
| Net Savings | 99,500 |

**Conclusion:** Since the savings to the firm exceeds the cost to the firm on account of factoring, . The proposal is acceptable.

## 4.7 INNOVATIONS IN RECEIVABLE MANAGEMENT

During the recent years, a number of tools, techniques, practices and measures have been invented to increase effectiveness in accounts receivable management.

Following are the major determinants for significant innovations in accounts receivable management and process efficiency.

1. **Re-engineering Receivable Process:** In some of the organizations real cost reductions and performance improvements have been achieved by re-engineering in accounts receivable process. Re-engineering is a fundamental re-think and re-design of business processes by incorporating modern business approaches. The nature of accounts receivables is such that decisions made elsewhere in the organization are likely to affect the level of resources that are expended on the management of accounts receivables.

   The following aspects provides an opportunity to improve the management of accounts receivables.

   (a) **Centralisation:** Centralisation of high nature transactions of accounts receivables and payable is one of the practice for better efficiency. This focuses attention on specialized groups for speedy recovery.

   (b) **Alternative Payment Strategies:** Alternative payment strategies in addition to traditional practices, result into efficiencies in the management of accounts receivables. It is observed that payment of accounts outstanding is likely to be quicker where a number of payment alternatives are made available to customers. Besides, this convenient payment methods is a marketing tool that is of benefit in attracting and retaining customers. The following alternative modes of payment may also be used alongwith traditional methods like Cheque Book etc., for making timely payment, added customer service, reducing remittance processing costs and improved cash flows and better debtor turnover.

      (i) *Direct debit:* I.e., authorization for the transfer of funds from the purchasers bank account.

      (ii) *Integrated Voice Response*: This system uses human operators and a computer based system to allow customers to make payment over phone, generally by credit card. This system has proved to be beneficial in the orgnisations processing a large number of payments regularly.

      (iii) *Collection by a third party*: The payment can be collected by an authorized external firm. The payments can be made by cash, cheque, credit card or

Electronic fund transfer. Banks may also be acting as collecting agents of their customers and directly depositing the collections in customers bank accounts.

(iv) *Lock Box Processing:* Under this system an outsourced partner captures cheques and invoice data and transmits the file to the client firm for processing in that firm's systems.

(v) Payments via Internet.

**(c) Customer Orientation:** Where individual customers or a group of customers have some strategic importance to the firm a case study approach may be followed to develop good customer relations. A critical study of this group may lead to formation of a strategy for prompt settlement of debt.

2. **Evaluation of Risk:** Risk evaluation is a major component in the establishment of an effective control mechanism. Once risks have been properly assessed controls can be introduced to either contain the risk to an acceptable level or to eliminate them entirely. This also provides an opportunity for removing inefficient practices. This involves a re-think of processes and questioning the way that tasks are performed. This also opens the way for efficiency and effectiveness benefits in the management of accounts receivables.

3. **Use of Latest Technology:** Technological developments now-a-days provides an opportunity for improvement in accounts receivables process. The major innovations available are the integration of systems used in the management of accounts receivables, the automation and the use of e-commerce.

**(a) E-commerce** refer to the use of computer and electronic telecommunication technologies, particularly on an inter-organisational level, to support trading in goods and services. It uses technologies such as Electronic Data Inter-change (EDI), Electronic Mail, Electronic Funds Transfer (EFT) and Electronic Catalogue Systems to allow the buyer and seller to transact business by exchange of information between computer application systems.

**(b) Accounts Receivable Systems**: Now-a-days all the big companies develop and maintain automated receivable management systems. Manual systems of recording the transactions and managing receivables is not only cumbersome but ultimately costly also. These integrated systems automatically update all the accounting records affected by a transaction. For example, if a transaction of credit sale is to be recorded, the system increases the amount the customer owes to the firm, reduces the inventory for the item purchased, and records the sale. This system of a company allows the application and tracking of receivables and collections, using the automated receivables system allows the company to store important

information for an unlimited number of customers and transactions, and accommodate efficient processing of customer payments and adjustments.

4. **Receivable Collection Practices:** The aim of debtors collection should be to reduce, monitor and control the accounts receivable at the same time maintain customer goodwill. The fundamental rule of sound receivable management should be to reduce the time lag between the sale and collection. Any delays that lengthen this span causes receivables to unnecessary build up and increase the risk of bad debts. This is equally true for the delays caused by billing and collection procedures as it is for delays caused by the customer.

The following are major receivable collection procedures and practices:

(i)   Issue of Invoice.

(ii)  Open account or open-end credit.

(iii) Credit terms or time limits.

(iv)  Periodic statements.

(v)   Use of payment incentives and penalties.

(vi)  Record keeping and Continuous Audit.

(vii) Export Factoring: Factors provide comprehensive credit management, loss protection collection services and provision of working capital to the firms exporting internationally.

(viii) Business Process Outsourcing: This refers to a strategic business tool whereby an outside agency takes over the entire responsibility for managing a business process.

5. **Use of Financial tools/techniques:** The finance manager while managing accounts receivables uses a number of financial tools and techniques. Some of them have been described hereby as follows:

**(i)    Credit analysis:** While determining the credit terms, the firm has to evaluate individual customers in respect of their credit worthiness and the possibility of bad debts. For this purpose, the firm has to ascertain credit rating of prospective customers.

*Credit rating:* An important task for the finance manager is to rate the various debtors who seek credit facility. This involves decisions regarding individual parties so as to ascertain how much credit can be extended and for how long. In foreign countries specialized agencies are engaged in the task of providing rating information regarding individual parties. Dun and Broadstreet is one such source.

The finance manager has to look into the credit-worthiness of a party and sanction credit limit only after he is convinced that the party is sound. This would involve an analysis of the financial status of the party, its reputation and previous record of meeting commitments.

The credit manager here has to employ a number of sources to obtain credit information. The following are the important sources:

Trade references; Bank references; Credit bureau reports; Past experience; Published financial statements; and Salesman's interview and reports.

Once the credit-worthiness of a client is ascertained, the next question is to set a limit of the credit. In all such enquiries, the credit manager must be discreet and should always have the interest of high sales in view.

**(ii)       Decision tree analysis of granting credit:**  The decision whether to grant credit or not is a decision involving costs and benefits. When a customer pays, the seller makes profit but when he fails to pay the amount of cost going into the product is also gone.  If the relative chances of recovering the dues can be decided it can form a probability distribution of payment or non-payment.  If the chances of recovery are 9 out of 10 then probability of recovery is 0.9 and that of default is 0.1.

Credit evaluation of a customer shows that the probability of recovery is 0.9 and that of default is 0.1.  the revenue from the order is Rs.5 lakhs and cost is Rs.4 lakhs.  The decision is whether credit should be granted or not.

The analysis is presented in the following diagram.
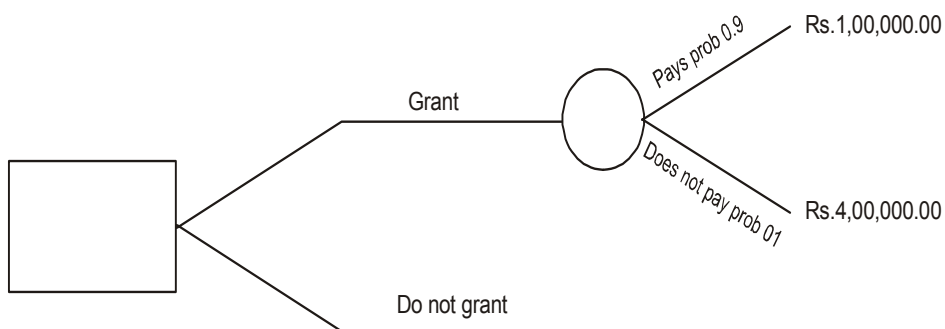


The weighted net benefit is Rs.[1,00,000 × 0.9 i.e. 90,000 – 0.1 × 4,00,000 i.e. 40,000] = 50,000.  So credit should be granted.

**(iii) Control of receivables:**  Another aspect of management of debtors is the control of receivables.  Merely setting of standards and framing a credit policy is not sufficient; it is, equally important to control receivables.

**(iv) Collection policy:** Efficient and timely collection of debtors ensure that the bad debt losses are reduced to the minimum and the average collection period is shorter. If a firm spends more resources on collection of debts, it is likely to have smaller bad debts. Thus, a firm must work out the optimum amount that it should spend on collection of debtors. This involves a trade off between the level of expenditure on the one hand and decrease in bad debt losses and investment in debtors on the other.

The collection cell of a firm has to work in a manner that it does not create too much resentment amongst the customers. On the other hand, it has to keep the amount of the outstandings in check. Hence, it has to work in a very smoothen manner and diplomatically.

It is important that clear-cut procedures regarding credit collection are set up. Such procedures must answer questions like the following:

(a)  How long should a debtor balance be allowed to exist before collection process is started.

(b)  What should be the procedure of follow up with defaulting customer? How reminders are to be sent and how should each successive reminder be drafted?

(c)  Should there be a collection machinery whereby personal calls by company's representatives are made?

(d)  What should be the procedure for dealing with doubtful accounts? Is legal action to be instituted? How should account be handled?

## 4.8   MONITORING OF RECEIVABLES

**(i)   Computation of average age of receivables:**  It involves computation of average collection period.

**(ii)  Ageing Schedule:**  When receivables are analysed according to their age, the process is known as preparing the ageing schedules of receivables. The computation of average age of receivables is a quick and effective method of comparing the liquidity of receivables with the liquidity of receivables in the past and also comparing liquidity of one firm with the liquidity of the other competitive firm. It also helps the firm to predict collection pattern of receivables in future. This comparison can be made periodically. The purpose of classifying receivables by age groups is to have a closer control over the quality of individual accounts. It requires going back to the receivables ledger where the dates of each customer's purchases and payments are available. The ageing schedule, by indicating a tendency for old accounts to accumulate, provides a useful supplement to average collection period of receivables/sales analysis. Because an analysis of receivables in terms of associated dates of sales enables the firm to recognise the recent increases, and slumps in sales. To ascertain the condition of receivables for control purposes, it may be considered desirable to compare the current ageing schedule with

an earlier ageing schedule in the same firm and also to compare this information with the experience of other firms. The following is an illustration of the ageing schedule of receivables:-

**Ageing Schedule**

| Age Classes (Days) | As on 30th June, 2005 | | | As on 30th September, 2005 | | |
|---|---|---|---|---|---|---|
| | *Month of Sale* | *Balance of Receivables (Rs.)* | *Percentage to total* | *Month of Sale* | *Balance of Receivables (Rs.)* | *Percentage to total* |
| 1-30 | June | 41,500 | 11.9 | September | 1,00,000 | 22.7 |
| 31-60 | May | 74,200 | 21.4 | August | 2,50,000 | 56.8 |
| 61-90 | April | 1,85,600 | 53.4 | July | 48,000 | 10.9 |
| 91-120 | March | 35,300 | 10.2 | June | 40,000 | 9.1 |
| 121 and more | Earlier | 10,800 | 3.1 | Earlier | 2,000 | 0.5 |
| | | 3,47,400 | 100 | | 4,40,000 | 100 |

The above ageing schedule shows a substantial improvement in the liquidity of receivables for the quarter ending September, 2005 as compared with the liquidity of receivables for the quarter ending June, 2005. It could be possible due to greater collection efforts of the firm.

**(iii) Collection Programme:**

(a) Monitoring the state of receivables.

(b) Intimation to customers when due date approaches.

(c) Telegraphic and telephonic advice to customers on the due date.

(d) Threat of legal action on overdue A/cs.

(e) Legal action on overdue A/cs.

The following diagram shows the relationship between collection expenses and bad debt losses which has to be established as initial increase in collection expenses may have only a small impact on bad debt losses.

**UNIT – V : MANAGEMENT OF PAYABLES (CREDITORS)**

There is an old age saying in business that if you can buy well then you can sell well. Management of your creditors and suppliers is just as important as the management of your debtors. Trade creditor is a spontaneous source of finance in the sense that it arises from ordinary business transaction. It is important to look after your creditors - slow payment by you may create ill-feeling and can signal that your company is inefficient (or in trouble!).Creditors are a vital part of effective cash management and should be managed carefully to enhance the cash position.

## 5.1 COST AND BENEFITS OF TRADE CREDIT

**(a) Cost of availing Trade Credit**

Normally it is considered that the trade credit does not carry any cost. However, it carries following costs:

(i) **Price:** There is often a discount on the price that the firm undergoes when it uses trade credit, since it can take advantage of the discount only if it pays immediately. This discount can translate into a high implicit cost.

(ii) **Loss of goodwill:** If the credit is overstepped, suppliers may discriminate against delinquent customers if supplies become short. As with the effect of any loss of goodwill, it depends very much on the relative market strengths of the parties involved.

(iii) **Cost of managing:** Management of creditors involves administrative and accounting costs that would otherwise be incurred.

(iv) **Conditions:** Sometimes most of the suppliers insists that for availing the credit facility the order should be of some minimum size or even on regular basis.

**(b) Cost of not taking Trade Credit**

On the other hand the costs of not availing credit facilities are as under:

(i) **Impact of inflation:** If inflation persists then the borrowers are favoured over the lenders with the the levels of interest rates not seeming totally to redress the balance.

(ii) **Interest:** Trade credit is a type of interest free loan, therefore failure to avail this facility has an interest cost. This cost is further increased if interest rates are higher.

(iii) **Inconvenience:** Sometimes it may also cause inconvenience to the supplier if the supplier is geared to the deferred payment.

## 5.2 COMPUTATION OF COST OF PAYABLES

By using the trade credit judiciously, a firm can reduce the effect of growth or burden on investments in Working Capital.

Now question arises how to calculate the cost of not taking the discount. The following equation can be used to calculate nominal cost, on an annual basis of not taking the discount.

$$\frac{d}{100-d} \times \frac{365\,days}{t}$$

However the above formula does not take into account the compounding effect and therefore the cost of credit shall be even higher. The cost of lost cash discount can be estimated by the formula:

$$\left(\frac{100}{100-d}\right)^{\frac{365}{t}} - 1$$

d= size of discount i.e. for 6% discount, d=6

t= the reduction in the payment period in days, necessary to obtain the early discount or Days Credit Outstanding – Discount Period.

**Example:** Suppose ABC Ltd. has been offered credit terms from its major supplier of 2/10, net 45. Hence the company has the choice of paying Rs. 10 per Rs. 100 or to invest the Rs. 98 for an additional 35 days and eventually pay the supplier Rs. 100 per Rs. 100. The decision as to whether the discount should be accepted depends on the opportunity cost of investing Rs. 98 for 35 days. What should the company do.

**Solution**

If the company does not avail the cash discount and pays the amount after 45 days, the implied cost of interest per annuam would be approximately:

$$\left(\frac{100}{100-2}\right)^{\frac{365}{35}} - 1 = 23.5\%$$

Now let us assume that ABC Ltd. can invest the additional cash and can obtain an annual return of 25% and if the amount of invoice is Rs. 10,000. The alternatives are as follows:

|  | Refuse discount Rs. | Accept discount Rs. |
|---|---|---|
| Payment to supplier | 10,000 | 9,800 |
| Return from investing Rs. 9,800 between day 10 and day 45: | | |
| $\dfrac{35}{365} \times \text{Rs.}9,800 \times 25\%$ | (235) | |
| Net Cost | 9,765 | 9,800 |

Thus it is better for the company to refuse the discount, as return on cash retained is more than the saving on account of discount.

## UNIT – VI: FINANCING OF WORKING CAPITAL

### 6.1    INTRODUCTION

After determining the amount of working capital required, the next step to be taken by the finance Manager is to arrange the funds.  As discussed earlier, it is advisable that the finance manager bifurcates the working capital requirements between the permanent working capital and temporary working capital.  The permanent working capital is always needed irrespective of sales fluctuations, hence should be financed by the long-term sources such as debt and equity.  On the contrary the temporary working capital may be financed by the short-term sources of finance.

The short-term sources of finance, which are generally expected to be matured within the same operating cycle or say within the same accounting year or at the most in next year, finance a major portion of total current assets.  This requires a number of decisions to be taken by the finance manager with regard to the Cash Balance and the timing of cash to be maintained, investment in short-term securities, when the payment to creditors is to be made, when and how much funds are to be raised by borrowings.  Most of these sources are not often close substitute for one another because each source has unique characteristics, advantages and disadvantages.  The present unit, focuses on (i) the different sources of financing working capital requirements as well as recent developments.

Broadly speaking, the working capital finance may be classified between the two categories:

(i)     Spontaneous sources.

(ii)    Negotiable sources.

The finance manager has to be very careful while selecting a particular source, or a combination thereof for financing of working capital.  Generally, the following parameters will guide his decisions in this respect:

(i)    Cost factor

(ii)    Impact on credit rating

(iii)    Feasibility

(iv)    Reliability

(v)    Restrictions

(vi)    Hedging approach or matching approach i.e., Financing of assets with the same maturity as of assets.

The spontaneous sources of finance are those which naturally arise in the course of business operations. Trade credit, credit from employees, credit from suppliers of services, etc. Are some of the examples which may be quoted in this respect.

On the other hand the negotiated sources, as the name implies, are those which have to be specifically negotiated with lenders say, commercial banks, financial institutions, general public etc.

## 6.2 SOURCES OF FINANCE

**6.2.1** As outlined above trade credit is a spontaneous source of finance which is normally extended to the purchaser organization by the sellers or services providers. This source of financing working capital is more important since it contributes to about one-third of the total short-term requirements. The dependence on this source is higher due to lesser cost of finance as compared with other sources. Trade credit is guaranteed when a company acquires supplies, merchandise or materials and does not pay immediately. If a buyer is able to get the credit with out completing much formalities, it is termed as 'open account trade credit.'

On the other hand in the case of "Bills Payable" the purchaser will have to give a written promise to pay the amount of the bill/invoice either on demand or at a fixed future date to the seller or the bearer of the note.

Due to its simplicity, easy availability and lesser explicit cost, the dependence on this source is much more in all small or big organizations. Especially, for small enterprises this form of credit is more helpful to small and medium enterprises. The amount of such financing depends on the volume of purchases and the payment timing.

Another spontaneous source of short-term financing is the accrued expenses or the outstanding expenses liabilities. The accrued expenses refer to the services availed by the firm, but the payment for which has yet to be made. It is a built in and an automatic source of finance as most of the services like wages, salaries, taxes, duties etc., are paid at the end of the period. The accrued expenses represent an interest free source of finance. There is no explicit or implicit cost associated with the accrued expenses and the firm can ensure liquidity by accruing these expenses.

**6.2.2 Inter-corporate Loans and Deposits:** Sometime, organizations having surplus funds invest for shot-term period with other organizations. The rate of interest will be higher than the bank rate of interest and depending on the financial soundness of the borrower company. This source of finance reduces dependence on bank financing.

**6.2.3 Commercial Papers:** Commercial Paper (CP) is an unsecured promissory note issued by a firm to raise funds for a short period. This is an instrument that enables highly rated corporate borrowers for short-term borrowings and provides an additional financial instrument

to investors with a freely negotiable interest rate. The maturity period ranges from minimum 7 days to less than 1 year.

**6.2.4  Commercial Papers in India:** Since the CP represents an unsecured borrowing in the money market, the regulation of CP comes under the purview of the Reserve Bank of India which issued guidelines in 1990 on the basis of the recommendations of the Vaghul Working Group.  These guidelines were aimed at:

(i)   Enabling the highly rated corporate borrowers to diversify their sources of short term borrowings, and

(ii)  To provide an additional instrument to the short term investors.

These guidelines have stipulated certain conditions meant primarily to ensure that only financially strong companies come forward to issue the CP.  Subsequently, these guidelines have been modified.  The main features of the guidelines relating to issue of CP in India may be summarized as follows:

(i)   CP should be in the form of usance promissory note negotiable by endorsement and delivery.  It can be issued at such discount to the face value as may be decided by the issuing company.  CP is subject to payment of stamp duty.

(ii)  The aggregate amount that can be raised by commercial papers is not restricted any longer to the company's cash credit component of the Maximum Permissible Bank Finance.

(iii) CP is issued in the denomination of Rs.5,00,000, but the maximum lot or investment is Rs.25,00,000 per investor.  The secondary market transactions can be of Rs.5,00,000 or multiples thereof.  The total amount proposed to be issued should be raised within two weeks from the date on which the proposal is taken on record by the bank.

(iv)  CP should be issued for a minimum period of 7 days and a maximum of less than 1 year. No grace period is allowed for repayment and if the maturity date falls on a holiday, then it should be paid on the previous working day.  Each issue of CP is treated as a fresh issue.

(v)   Commercial papers can be issued by a company whose (i) tangible net worth is not less than Rs.5 crores, (ii) funds based working capital limit is not less than 4 crores, (iii) shares are listed on a stock exchange, (iv) specified credit rating of P2 is obtained from CRISIL or A2 from ICRA, and (v) the current ratio is 1.33:1.

(vi)  The issue expenses consisting of dealers fees, credit rating agency fees and other relevant expenses should be borne by the issuing company.

(vii) CP may be issued to any person, banks, companies.  The issue of CP to NRIs can only be on a non-repatriable basis and is not transferable.

(viii) CP can be issued up to 100% of the fund based working capital loan limit. The working capital limit is reduced accordingly on issuance of CP.

(ix) Deposits by the issue of CP have been exempted from the provisions of section 58A of the Companies Act, 1956.

Any company proposing to issue CP has to submit an application to the bank which provide working capital limit to it, along with the credit rating of the firm. The issue has to be privately placed within two weeks by the company or through a merchant banker. The initial investor pays the discounted value of the CP to the firm. Thus, CP is issued only through the bank who has sanctioned the working capital limit to the company. It is counted as a part of the total working capital limit and it does not increase the working capital resources of the firm.

$$\text{Annual Financing Cost} = \frac{FV - SP}{SP} \times \frac{360}{MP}$$

Where    FV    =    Face value of CP

SP    =    Issue price of CP

MP    =    Maturity period of CP.

For example, a CP of the face value of Rs.6,00,000 is issued at Rs.5,80,000 for a maturity period of 120 days. The annual financing cost of the CP is:

$$\text{Annual Financing Cost} = \frac{\text{Rs.6,00,000} - \text{Rs.5,80,000}}{\text{Rs.5,80,000}} \times \frac{360}{120}$$

= 10.34%

In the same case, if the maturity period is 180 days, then the annual financing cost is:

$$\text{Annual Financing Cost} = \frac{\text{Rs.6,00,000} - \text{Rs.5,80,000}}{\text{Rs.5,80,000}} \times \frac{360}{180}$$

= 6.90%

For the same maturity periods of 120 days and 180 days, if the issue price is taken at Rs.5,60,000, then the annual financing cost comes to 21.42% and 14.28% respectively. So, it can be seen that the cost of CP varies inversely to the issue price as well as the maturity period.

**6.2.5 CP as a Source of Financing:** From the point of the issuing company, CP provides the following benefits:

(a)    CP is sold on an unsecured basis and does not contain any restrictive conditions.

(b) Maturing CP can be repaid by selling new CP and thus can provide a continuous source of funds.

(c) Maturity of CP can be tailored to suit the requirement of the issuing firm.

(d) CP can be issued as a source of fund even when money market is tight.

(e) Generally, the cost of CP to the issuing firm is lower than the cost of commercial bank loans.

However, CP as a source of financing has its own limitations:

(i) Only highly credit rating firms can use it.  New and moderately rated firm generally are not in a position to issue CP.

(ii) CP can neither be redeemed before maturity nor can be extended beyond maturity.

**6.2.6  Funds Generated from Operations**:  Funds generated from operations, during an accounting period, increase working capital by an equivalent amount.  The two main components of funds generated from operations are profit and depreciation.  Working capital will increase by the extent of funds generated from operations.  Students may refer to funds flow statement given earlier in this chapter.

**6.2.7  Public Deposits:**  Deposits from the public is one of the important source of finance particularly for well established big companies with huge capital base for short and medium-term.

**6.2.8  Bills Discounting:**  Bill discounting is recognized as an important short term Financial Instrument and it is widely used method of short term financing.  In a process of bill discounting, the supplier of goods draws a bill of exchange with direction to the buyer to pay a certain amount of money after a certain period, and gets its acceptance from the buyer or drawee of the bill.

**6.2.9  Bill Rediscounting Scheme:** The bill rediscounting Scheme was introduced by Reserve Bank of India with effect from 1st November, 1970 in order to extend the use of the bill of exchange as an instrument for providing credit and the creation of a bill market in India with a facility for the rediscounting of eligible bills by banks.  Under the bills rediscounting scheme, all licensed scheduled banks are eligible to offer bills of exchange to the Reserve Bank for rediscount.

**6.2.10 Factoring:** Students may refer to the unit on Receivable Management wherein the concept of factoring has been discussed.  Factoring is a method of financing whereby a firm sells its trade debts at a discount to a financial institution.  In other words, factoring is a continuous arrangement between a financial institution, (namely the factor) and a firm (namely the client) which sells goods and services to trade customers on credit.  As per this arrangement, the factor purchases the client's trade debts including accounts receivables

either with or without recourse to the client, and thus, exercises control over the credit extended to the customers and administers the sales ledger of his client. To put it in a layman's language, a factor is an agent who collects the dues of his client for a certain fee.

The differences between Factoring and Bills discounting are as follows:

(i) Factoring is called as 'Invoice factoring' whereas bills discounting is known as "Invoice discounting".

(ii) In factoring the parties are known as client, factor and debtor whereas in bills discounting they are known as Drawer, Drawee and Payee.

(iii) Factoring is a sort of management of book debts whereas bills discounting is a sort of borrowing from commercial banks.

(iv) For factoring there is no specific Act; whereas in the case of bills discounting, the Negotiable Instrument Act is applicable.

## 6.3 WORKING CAPITAL FINANCE FROM BANKS

Banks in India today constitute the major suppliers of working capital credit to any business activity. Recently, some term lending financial institutions have also announced schemes for working capital financing. The two committees viz., Tandon Committee and Chore Committee have evolved definite guidelines and parameters in working capital financing, which have laid the foundations for development and innovation in the area.

### 6.3.1 Instructions on Working Capital Finance by Banks

**Assessment of Working Capital**

• Reserve Bank of India has withdrawn the prescription, in regard to assessment of working capital needs, based on the concept of Maximum Permissible Bank Finance, in April 1997. Banks are now free to evolve, with the approval of their Boards, methods for assessing the working capital requirements of borrowers, within the prudential guidelines and exposure norms prescribed. Banks, however, have to take into account Reserve Bank's instructions relating to directed credit (such as priority sector, export, etc.), and prohibition of credit (such as bridge finance, rediscounting of bills earlier discounted by NBFCs) while formulating their lending policies.

• With the above liberalizations, all the instructions relating to MPBF issued by RBI from time to time stand withdrawn. Further, various instructions/guidelines issued to banks with objective of ensuring lending discipline in appraisal, sanction, monitoring and utilization of bank finance cease to be mandatory. However, banks have the option of incorporating such of the instructions/guidelines as are considered necessary in their lending policies/procedures.

## 6.4    FACTORS DETERMINING CREDIT POLICY

The bank credit will generally be in the following forms:

- **Cash Credit:**   This facility will be given by the banker to the customers by giving certain amount of credit facility on continuous basis.  The borrower will not be allowed to exceed the limits sanctioned by the bank.

- **Bank Overdraft:**  It is a short-term borrowing facility made available to the companies in case of urgent need of funds.  The banks will impose limits on the amount they can lend.  When the borrowed funds are no longer required they can quickly and easily be repaid.  The banks issue overdrafts with a right to call them in at short notice.

- **Bills Discounting:**  The company which sells goods on credit, will normally draw a bill on the buyer who will accept it and sends it to the seller of goods.  The seller, in turn discounts the bill with his banker.  The banker will generally earmarks the discounting bill limit.

- **Bills Acceptance:**  To obtain finance under this type of arrangement a company draws a bill of exchange on bank.  The bank accepts the bill thereby promising to pay out the amount of the bill at some specified future date.

- **Line of Credit:**  Line of Credit is a commitment by a bank to lend a certain amount of funds on demand specifying the maximum amount.

- **Letter of Credit:**  It is an arrangement by which the issuing bank on the instructions of a customer or on its own behalf undertakes to pay or accept or negotiate or authorizes another bank to do so against stipulated documents subject to compliance with specified terms and conditions.

- **Bank Guarantees:**  Bank guarantee is one of the facilities that the commercial banks extend on behalf of their clients in favour of third parties who will be the beneficiaries of the guarantees.

**Self Examination Questions**

**A.  Objective Type Questions**

1.    The credit terms may be expressed as "3/15 net 60".  This means that a 3% discount will be granted if the customer pays within 15 days, if he does not avail the offer he must make payment within 60 days.

     (a)   I agree with the statement

     (b)   I do not agree with the statement

     (c)   I cannot say.

2. The term 'net 50' implies that the customer will make payment.

   (a) Exactly on 50th day

   (b) Before 50th day

   (c) Not later than 50th day

   (iv) None of the above.

3. Trade credit is a source of :

   (a) Long-term finance

   (b) Medium term finance

   (c) Spontaneous source of finance

   (d) None of the above.

4. The term float is used in

   (a) Inventory Management

   (b) Receivable Management

   (c) Cash Management

   (d) Marketable securities.

5. William J Baumol's model of Cash Management determines optimum cash level where the carrying cost and transaction cost are:

   (a) Maximum

   (b) Minimum

   (c) Medium

   (d) None of the above.

6. In Miller – ORR Model of Cash Management:

   (a) The lower, upper limit, and return point of Cash Balances are set out

   (b) Only upper limit and return point are decided

   (c) Only lower limit and return point are decided

   (d) None of the above are decided.

7. Working Capital is defined as

   (a) Excess of current assets over current liabilities

   (b) Excess of current liabilities over current assets

   (c)   Excess of Fixed Assets over long-term liabilities

   (d)   None of the above.

8.   Working Capital is also known as "Circulating Capital, fluctuating Capital and revolving capital".  The aforesaid statement is;

   (a)   Correct

   (b)   Incorrect

   (c)   Cannot say.

9.   The basic objectives of Working Capital Management are:

   (a)   Optimum utilization of resources for profitability

   (b)   To meet day-to-day current obligations

   (c)   Ensuring marginal return on current assets is always more than cost of capital

   (d)   Select any one of the above statement.

10.   The term Gross Working Capital is known as:

   (a)   The investment in current liabilities

   (b)   The investment in long-term liability

   (c)   The investment in current assets

   (d)   None of the above.

11.   The term net working capital refers to the difference between the current assets minus current liabilities.

   (a)   The statement is correct

   (b)   The statement is incorrect

   (c)   I cannot say.

12.   The term "Core current assets' was coined by

   (a)   Chore Committee

   (b)   Tandon Committee

   (c)   Jilani Committee

   (d)   None of the above.

13. The concept operating cycle refers to the average time which elapses between the acquisition of raw materials and the final cash realization.  This statement is

    (a) Correct

    (b) Incorrect

    (c) Partially True

    (d) I cannot say.

14. As a matter of self-imposed financial discipline can there be a situation of zero working capital now-a-days in some of the professionally managed organizations.

    (a) Yes

    (b) No

    (c) Impossible

    (d) Cannot say.

15. Over trading arises when a business expands beyond the level of funds available.  The statement is

    (a) Incorrect

    (b) Correct

    (c) Partially correct

    (d) I cannot say.

16. A Conservative Working Capital strategy calls for high levels of current assets in relation to sales.

    (a) I agree

    (b) Do not agree

    (c) I cannot say.

17. The term Working Capital leverage refer to the impact of level of working capital on company's profitability.  This measures the responsiveness of ROCE for changes in current assets.

    (a) I agree

    (b) Do not agree

    (c) The statement is partially true.

18. The term spontaneous source of finance refers to the finance which naturally arise in the course of business operations. The statement is

    (a) Correct

    (b) Incorrect

    (c) Partially Correct

    (d) I cannot say.

19. Under hedging approach to financing of working capital requirements of a firm, each asset in the balance sheet assets side would be offset with a financing instrument of the same approximate maturity. This statement is

    (a) Incorrect

    (b) Correct

    (c) Partially correct

    (d) I cannot say.

20. Trade credit is a

    (a) Negotiated source of finance

    (b) Hybrid source of finance

    (c) Spontaneous source of finance

    (d) None of the above.

21. Factoring is a method of financing whereby a firm sells its trade debts at a discount to a financial institution. The statement is

    (a) Correct

    (b) Incorrect

    (c) Partially correct

    (d) I cannot say.

22. A factoring arrangement can be both with recourse as well as without recourse:

    (a) True

    (b) False

    (c) Partially correct

    (d) Cannot say.

23. The Bank financing of working capital will generally be in the following form. Cash Credit, Overdraft, bills discounting, bills acceptance, line of credit; Letter of credit and bank guarantee.

    (a) I agree

    (b) I do not agree

    (c) I cannot say.

24. When the items of inventory are classified according to value of usage, the technique is known as:

    (a) XYZ Analysis

    (b) ABC Analysis

    (c) DEF Analysis

    (d) None of the above.

25. When a firm advises its customers to mail their payments to special Post Office collection centers, the system is known as.

    (a) Concentration banking

    (b) Lock Box system

    (c) Playing the float

    (d) None of the above.

**Answer to Objective Type Questions**

**1.** (a); **2.**(c); **3.** (c); **4.** (c); **5.** (b); **6.** (a); **7.** (a); **8.** (a); **9.** (b); **10.** (c); **11.** (a); **12.** (b); **13.** (a); **14.** (a); **15.** (b); **16.** (a); **17.** (a); **18.** (a); **19.** (b); **20.** (c); **21.** (a); **22.** (a); **23.** (a); **24.** (b); **25.** (b).

**B.   Practical Problems**

1. Foods Ltd. is presently operating at 60% level producing 36,000 packets of snack foods and proposes to increase capacity utilization in the coming year by 33 % over the existing level of production.

   The following data has been supplied:

   (i)    Unit cost structure of the product at current level:                           *Rs.*

   Raw Material                                                                          4

   Wages (Variable)                                                                     2

   Overheads (Variable)                                                                 2

| | |
|---|---:|
| Fixed Overheads | 1 |
| Profit | 3 |
| Selling Price | 12 |

(ii) Raw materials will remain in stores for 1 month before being issued for production. Material will remain in process for further 1 month. Suppliers grant 3 months credit to the company.

(iii) Finished goods remain in godown for 1 month.

(iv) Debtors are allowed credit for 2 months.

(v) Lag in wages and overhead payments is 1 month and these expenses accrue evenly throughout the production cycle.

(vi) No increase either in cost of inputs or selling price is envisaged.

Prepare a projected profitability statement and the working capital requirement at the new level, assuming that a minimum cash balance of Rs.19,500 has to be maintained.

2. A newly formed company has applied to the commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production *plus* 4,000 units of work-in-progress. Based on the above activity estimated cost per unit is:

*(Rs. per unit)*

| | |
|---|---:|
| Raw material | 80 |
| Direct wages | 30 |
| Overheads (exclusive of depreciation) | 60 |
| Total cost | 170 |
| Selling price | 200 |

Raw materials in stock: average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

| | |
|---|---:|
| Finished goods in stock | 8,000 units |
| Credit allowed by suppliers | Average 4 weeks |
| Credit allowed to debtors/receivables | Average 8 weeks |
| Lag in payment of wages | Average 1½ weeks |
| Cash at banks (for smooth operation) is expected to be | Rs.25,000 |

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

Find out: the net working capital required.

3. The following is the projected Balance Sheet of Excel Limited as on 31-3-2004. The company wants to increase the fund-based limits from the Zonal Bank from Rs.100 lakhs to Rs.300 lakhs:

**Balance Sheet as on 31-3-2004**

*(Rs. lakhs)*

| Liabilities | Rs. | Assets | Rs. |
|---|---|---|---|
| Share Capital | 100 | Fixed Assets | 800 |
| Reserves & Surplus | 150 | Current Assets | 1,000 |
| Secured Loans | 450 | Miscellaneous Expenditure | 150 |
| Unsecured Loans | 1,050 | | |
| Current Liabilities | 200 | | |
| | 1,950 | | 1,950 |

The following are the other information points to be considered:

(1) Secured loans include instalments payable to financial institutions before 31-3-2004 Rs.100 lakhs.

(2) Secured loans include working capital facilities expected from Zonal Bank Rs.300 lakhs.

(3) Unsecured loans include fixed deposits from public amounting to Rs.400 lakhs out of which Rs.100 lakhs are due for repayment before 31-3-2004.

(4) Unsecured loans include Rs.600 lakhs of zero interest fully convertible debentures due for conversion on 30-9-2003.

(5) Current assets include deferred receivables due for payment after 31-3-2004 Rs.40 lakhs.

(6) The company has introduced a voluntary retirement scheme for workers costing Rs.40 lakhs payable on 31-3-2008 and this amount is included in current liabilities:

   (i) You are required to calculate from the above information the maximum permissible bank finance by all the three methods for working capital as per Tandon Committee norms. For your exercise, assume that core current assets constitute 25% of the current assets.

   (ii) Also compute the Current Ratio for all the three methods.

4. A company newly commencing business in 2003 has the under mentioned Projected Profit and Loss Account:

| | | |
|---|---:|---:|
| Sales | | 42,00,000 |
| Cost of goods sold | | 30,60,000 |
| **Gross Profit** | | 11,40,000 |
| Administrative expenses | 2,80,000 | |
| Selling expenses | 2,60,000 | 5,40,000 |
| Profit before tax | | 6,00,000 |
| Provision for taxation | | 2,00,000 |
| **Profit after tax** | | 4,00,000 |

The cost of goods sold has been arrived at as under *(Rs)*

| | |
|---|---:|
| Material used | 16,80,000 |
| Wages and manufacturing expenses | 12,50,000 |
| Depreciation | 4,70,000 |
| | 34,00,000 |
| *Less*: Stock of finished goods (10% of goods produced not yet sold) | 3,40,000 |
| | 30,60,000 |

The figures given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping material equal to two months consumption in stock.

All expenses will be paid one month in arrear. Suppliers of material will extend 1½ month's credit; Sales will be 20% for cash and the rest at two months' credit; 90% of the Income-tax will be paid in advance in quarterly instalments. The company wishes to keep Rs.1,00,000 in cash.

Prepare an estimate of the requirement of (i) Working Capital; and (ii) Cash Cost of Working Capital.

5. A company is considering its working capital investment and financial policies for the next year. Estimated fixed assets and current liabilities for the next year are Rs.2.60 crore and Rs.2.34 crore respectively. Estimated Sales and EBIT depend on current assets investment, particularly inventories and book-debts. The Financial Controller of the company is examining the following alternative Working Capital Policies:

(Rs. Crores)

| Working Capital Policy | Investment in Current Assets | Estimated Sales | EBIT |
|---|---|---|---|
| Conservative | 4.50 | 12.30 | 1.23 |
| Moderate | 3.90 | 11.50 | 1.15 |
| Aggressive | 2.60 | 10.00 | 1.00 |

After evaluating the working capital policy, the Financial Controller has advised the adoption of the moderate working capital policy. The company is now examining the use of long-term and short-term borrowings for financing its assets. The company will use Rs.2.50 crore of the equity funds. The corporate tax rate is 35%. The company is considering the following debt alternatives:

| Financing Policy | Short-term Debt | Long-term Debt |
|---|---|---|
| Conservative | 0.54 | 1.12 |
| Moderate | 1.00 | 0.66 |
| Aggressive | 1.50 | 0.16 |
| Interest rate- Average | 12% | 16% |

You are required to calculate the following:

(a) Working Capital Investment for each Policy: (a) Net Working Capital position; (b) Rate of Return; (c) Current ratio.

(b) Financing for each policy; (a) Net Working Capital; (b) Rate of Return of Shareholders equity; (c) Current ratio.

6. The turnover of R Ltd. is Rs.60 lakhs of which 80% is on credit. Debtors are allowed one month to clear off the dues. A factor is willing to advance 90% of the bills raised on credit for a fee of 2% a month plus a commission of 4% on the total amount of debts. R Ltd. as a result of this arrangement is likely to save Rs.21,600 annually in management costs and avoid bad debts at 1% on the credit sales.

   A scheduled bank has come forward to make an advance equal to 90% of the debts at an interest rate of 18% p.a. However, its processing fee will be at 2% on the debts. Would you accept factoring or the offer from the bank?

7. A Bank is analyzing the receivables of Jackson Company in order to identify acceptable collateral for a short-term loan. The company's credit policy is 2/10 net 30. the bank lends 80 per cent on accounts where customers are not currently overdue and where the average payment period does not exceed 10 days past the net period. A schedule of

Jackson's receivables has been prepared.  How much will the bank lend on a pledge of receivables, if the bank uses a 10 per cent allowance for cash discount and returns?

| Account | Amount Rs. | Days Outstanding In days | Average Payment Period historically |
|---|---|---|---|
| 74 | 25,000 | 15 | 20 |
| 91 | 9,000 | 45 | 60 |
| 107 | 11,500 | 22 | 24 |
| 108 | 2,300 | 9 | 10 |
| 114 | 18,000 | 50 | 45 |
| 116 | 29,000 | 16 | 10 |
| 123 | 14,000 | 27 | 48 |

8.  A Ltd. has a total sales of Rs.3.2 crores and its average collection period is 90 days.  The past experience indicates that bad debt losses are 1.5% on Sales.  The expenditure incurred by the firm in administering its receivable collection efforts are Rs.5,00,000.  A factor is prepared to buy the firm's receivables by charging 2% commission.  The factor will pay advance on receivables to the firm at an interest rate of 18% p.a. after withholding 10% as reserve.  Calculate the effective cost of factoring to the Firm.

9.  Explain briefly some of the techniques of inventory control used in manufacturing organization.

10. Ten items kept in inventory by the School of Management Studies at State University are listed below.  Which items should be classified as 'A' items, 'B' items and 'C' items? What percentage of items is in each class?  What percentage of total annual value is in each class?

| Item | Annual Usage | Value per unit (Rs.) |
|---|---|---|
| 1 | 200 | 40.00 |
| 2 | 100 | 360.00 |
| 3 | 2,000 | 0.20 |
| 4 | 400 | 20.00 |
| 5 | 6,000 | 0.04 |
| 6 | 1,200 | 0.80 |
| 7 | 120 | 100.00 |
| 8 | 2,000 | 0.70 |
| 9 | 1,000 | 1.00 |
| 10 | 80 | 400.00 |

11  Economic Enterprises require 90,000 units of a certain item annually.  The cost per unit is Rs.3, the cost per purchase order is Rs.300 and the Inventory carrying cost Rs.6 per unit per year.

(i)   What is the Economic Order Quantity.

(ii)  What should the firm do if the supplier offers discounts as below, viz.,

| Order quantity | Discounts% |
|---|---|
| 4,500 – 5,999 | 2 |
| 6,000 and above | 3 |

12. The annual demand for an item of raw material is 4,000 units and the purchase price is expected to be Rs.90 per unit.  The incremental cost processing an order is Rs.135 and the cost of storage is estimated to be Rs.12 per unit.  What is the optimal order quantity and total relevant cost of this order quantity?

Suppose that Rs.135 as estimated to be the incremental cost of processing an order is incorrect and should have been Rs.80.  All other estimates are correct.  What is the difference in cost on account of this error?

Assume at the commencement of the period that a supplier offers 4,000 units at a price of Rs.86.  The materials will be delivered immediately and placed in the stores.  Assume that the incremental cost of placing the order is zero and original estimate of Rs.135 for placing an order for the economic batch is correct.  Should the order be accepted?

13. (a)  The following details are available in respect of a firm:

|  |  |  |
|---|---|---|
| (i) | Annual requirement of inventory | 40,000 units |
| (ii) | Cost per unit (other than carrying and ordering cost) | Rs.16 |
| (iii) | Carrying costs are likely to be | 15% per year |
| (iv) | Cost of placing order | Rs.480 per order |

Determine the economic ordering quantity.

(b)  The experience of the firm being out of stock is summarized below:

| (1) | Stock out (No. of units) | No. of times |
|---|---|---|
|  | 500 | 1 (1) |
|  | 400 | 2 (2) |
|  | 250 | 3 (3) |
|  | 100 | 4 (4) |

|  |  |
|---|---|
| 50 | 10 (10) |
| 0 | 80 (80) |

Figures in brackets indicate percentage of time the firm has been out of stock.

(2)  Stock out costs are Rs.40 per unit.

(3)  Carrying cost of inventory per unit is Rs.20.

Determine the optimal level of stock out inventory.

(c)  A firm has 5 different levels in its inventory.

The relevant details are given.  Suggest a breakdown of the items into A, B and C classifications:

| Item No. | Avg. No. of units inventory | Avg. Cost per unit (Rs.) |
|---|---|---|
| 1 | 20,000 | 60 |
| 2 | 10,000 | 100 |
| 3 | 32,000 | 11 |
| 4 | 28,000 | 10 |
| 5 | 60,000 | 3.40 |

14.  A firm is engaged in the manufacture of two products A and B.  Product A uses one unit of Component P and two units of Components Q.  Products B uses two units of Component P, one unit of Component Q and two units of Component R.  Component R which is assembled in the factory uses one unit of Component Q.  Components P and Q are purchased from the market.  The firm has prepared the following forecast for sales and inventory for the next year:

|  |  | Products | |
|---|---|---|---|
|  |  | A | B |
| Sales | Units | 8,000 | 15,000 |
| Inventories: |  |  |  |
| At the end of the year | Units | 1,000 | 2,000 |
| At the beginning of the year | Units | 3,000 | 5,000 |

The production of both the products and the assembling of the component R will be spread out uniformly throughout the year.

The firm at present orders its inventory of components P and Q in quantities equivalent to 3 months consumption. The firm has been advised that savings in the provisioning of components can arise by changing over to the ordering system based on economic ordering quantities. The firm has compiled the following data relating to the two Components:

(Rs.)

| Particulars | P | Q |
|---|---|---|
| Component usage per annum | 30,000 | 48,000 |
| Price per unit | 2.00 | 0.80 |
| Order placing costs per order | 15.00 | 15.00 |
| Carrying costs per annum | 20% | 20% |

Required:

(a) Prepare a budget of production and requirements of components for the next year.

(b) Find the economic order quantity.

(c) Based on the economic order quantity calculated in (b) above, calculate the savings arising from switching over to the new ordering system both in terms of cost and reduction in working capital.

15. Radiance Garments Ltd. manufactures readymade garments and sells them on credit basis through a network of dealers. Its present sale is Rs.60 lakh per annum with 20 days credit period. The company is contemplating an increase in the credit period with a view to increasing sales. Present variable costs are 70% of sales and the total fixed costs Rs.8 lakh per annum. The company expects pre-tax return on investment @ 25%. Some other details are given as under:

| Proposed Credit Policy | Average Collection Period (days) | Expected Annual Sales (Rs.lakh) |
|---|---|---|
| I | 30 | 65 |
| II | 40 | 70 |
| III | 50 | 74 |
| IV | 60 | 75 |

Required: When credit policy should the company adopt? Present your answer in a tabular form. Assume 360 days a year. Calculation should be made upto two digits after decimal.

16. H. Ltd. has a present annual sales level of 10,000 units at Rs.300 per unit. The variable cost is Rs.200 per unit and the fixed costs amount to Rs.3,00,000 per annum. The present credit period allowed by the company is 1 month. The company is considering a proposal to increase the credit periods to 2 months and 3 months and has made the following estimates:

|  | *Existing* | *Proposal* | |
|---|---|---|---|
| Credit Policy | 1 month | 2 months | 3 months |
| Increase in Sales | - | 15% | 30% |
| % of Bad Debts | 1% | 3% | 5% |

There will be increase in fixed cost by Rs.50,000 on account of increase of sales beyond 25% of present level.

The company plans on a pretax return of 20% on investment in receivables. You are required to calculate the most paying credit policy for the company.

17. Star Limited manufacturers of Colour T.V. sets, are considering the liberalization of existing credit terms to three of their large Customers A,B and C. The credit period and likely quantity of TV sets that will be lifted by the customers are as follows:

|  | *Quantity Lifted (No. of TV Sets)* | | |
|---|---|---|---|
| *Credit Period (Days)* | *A* | *B* | *C* |
| 0 | 1,000 | 1,000 | – |
| 30 | 1,000 | 1,500 | – |
| 60 | 1,000 | 2,000 | 1,000 |
| 90 | 1,000 | 2,500 | 1,500 |

The selling price per TV set is Rs.9,000. The expected contribution is 20% of the selling price. The cost of carrying debtors averages 20% per annum.

You are required:

(a) Determine the credit period to be allowed to each customer. (Assume 360 day in a year for calculation purposes).

(b) What other problems the company might face in allowing the credit period as determined in (a) above?

18. The present credit terms of P Company are 1/10 net 30. Its annual sales are Rs.80 lakhs, its average collection period is 20 days. Its variable costs and average total costs to sales are 0.85 and 0.95 respectively and its cost of capital is 10 per cent. The proportion of sales on which customers currently take discount is 0.5. P Company is considering relaxing its discount terms to 2/10 net 30. Such relaxation is expected to increase sales by Rs.5 lakhs, reduce the average collection period to 14 days and increase the proportion of discount to sales to 0.8. What will be the effect of relaxing the discount policy on company's profit? Take year as 360 days.

19. The credit manager of XYZ Ltd. is reappraising the company's policy. The company sells its products on terms of net 30. Cost of goods sold is 85% of sales and fixed costs are further 5% of sales. XYZ classifies its customers on a scale of 1 to 4. During the past five years, the experience was as under:

| Classification | Default as a percentage of sales | Average collection period-in-days for non-defaulting accounts |
|---|---|---|
| 1 | 0 | 45 |
| 2 | 2 | 42 |
| 3 | 10 | 40 |
| 4 | 20 | 80 |

The average rate of interest is 15%. What conclusions do you draw about the Company's Credit Policy? What other factors should be taken into account before changing the present policy? Discuss.

20. Easy Limited specializes in the manufacture of a computer component. The component is currently sold for Rs.1,000 and its variable cost is Rs.800. For the year ended 31-3-2006 the company sold on an average 400 components per month.

At present the company grants one month credit to its customers. The company is thinking of extending the same to two months on account of which the following is expected:

| | |
|---|---|
| Increase in Sales | 25% |
| Increase in Stock | Rs.2,00,000 |
| Increase in Creditors | Rs.1,00,000 |

You are required:

To advise the company on whether or not to extend the credit terms if:

(a) all customers avail the extended credit period of two months; and

(b) existing customers do not avail the credit terms but only the new customers avail the same. Assume in this case the entire increase in sales is attributable to the new customers.

21 Star Limited is manufacturer of various electronic gadgets. The annual turnover for the year 2006 was Rs.730 lakhs. The company has a wide network of sales outlets all over the country. The turnover is spread evenly for each of the 50 weeks of the working year. All sales are for credit and sales within the week are also spread evenly over each of the five working days.

All invoicing of credit sales is carried out at the Head Office in Bombay. Sales documentation is sent by post daily from each location to the Head Office for the past two years. Delays in preparing and dispatching invoices were noticed. As a result, only some of the invoices were dispatched in the same week and the remainder the following week.

An analysis of the delay in invoicing (being the interval between the date of sale and the date of despatch of the invoice indicated the following pattern:

| No. of days of delay in invoicing | 3 | 4 | 5 | 6 |
|---|---|---|---|---|
| % of weeks sales | 20 | 10 | 40 | 30 |

A further analysis indicated that the debtors take on an average 36 days of credit before paying. This period is measured from the day of despatch of the invoice rather than the date of sale.

It is proposed to hire an agency for undertaking the invoicing work at various locations. The agency has assured that the maximum delay would be reduced to three days under the following pattern:

| No. of days of delay in invoicing | 0 | 1 | 2 |
|---|---|---|---|
| % of weeks sales | 40 | 40 | 20 |

The agency has also offered additionally to monitor the collections which will reduce the credit period to 30 days.

Star Limited expects to save Rs.4,000 per month in postage costs. All working funds are borrowed from a local bank at simple interest rate of 20% p.a.

The agency has quoted a fee of Rs.2,00,000 p.a. for the invoicing work and Rs.2,50,000 p.a. for monitoring collections and is willing to offer a discount of Rs.50,000 provided both the works are given. You are required to advise Star Limited about the acceptance of agency's proposal. Working should form part of the answer.

22. Pollock Co. Pvt. Ltd., which is operating for the last 5 years, has approached Sudershan Industries for grant of credit limit on account of goods bought from the latter, annexing Balance Sheet and Income Statement for the last 2 years as below:

### Pullock Co. Pvt. Ltd. – Balance Sheet (Rs. '000)

| Liabilities | Current year | Last year | Assets | Current year | Last year |
|---|---|---|---|---|---|
| Share Capital Equity (Rs.10) | 600 | 600 | Plant & Equipment (Less Depreciation) | 1,500 | 1,400 |
| Share Premium | 400 | 400 | Land | 750 | 750 |
| Retained Earnings | 900 | 700 | | | |
| Total Equity | 1,900 | 1,700 | Total Fixed Assets | 2,250 | 2,150 |
| First Mortgage | 200 | 300 | Inventories | 580 | 300 |
| Second Mortgage | -- | 200 | Account Receivable | 350 | 200 |
| Bonds | 300 | 300 | Marketable Securities | 120 | 120 |
| Long-term Liabilities | 500 | 800 | Cash | 100 | 80 |
| Account Payable | 300 | 60 | Total Current Assets | 1,150 | 700 |
| Notes Payable | 600 | 220 | | | |
| Secured Liabilities | 100 | 70 | | | |
| Total Current Liabilities | 1,000 | 350 | | | |
| | 3,400 | 2,850 | | 3,400 | 2,850 |

### Pollock Co. Pvt. Ltd. – Income Statement (Rs.'000)

| Particulars | Current Year | | Last Year | |
|---|---|---|---|---|
| Sales | 5,980 | | 5,780 | |
| Income from investments | 20 | 6,000 | 20 | 5,800 |
| Opening inventory | 300 | | 400 | |

| Total Manufacturing Costs | 4,200 | | 3,200 | |
| Ending Inventory | (580) | 3,920 | (300) | 3,300 |
| | | 2,080 | | 2,500 |
| General and Admn. Expenses | | 950 | | 750 |
| Operating Income | | 1,130 | | 1,750 |
| Interest Expenses | | 60 | | 62 |
| Earnings before Taxes | | 1,070 | | 1,688 |
| Income-tax | | 480 | | 674 |
| Net Income after Taxes | | 590 | | 1,014 |
| Dividend declared and paid | | | | 250 |

Sudershan Industries has established the following broad guidelines for granting credit limits to its customers:

(i) Limit credit limit to 10% of net worth and 20% of the net working capital.

(ii) Not to give credit in excess of Rs.1,00,000 to any single customer.

You are required to detail the steps required for establishing credit limits to Pollock Co. Pvt. Ltd. In this case what you consider to be reasonable credit limit.

23 The annual cash requirement of A Ltd. is Rs.10 lakhs. The company has marketable securities in lot sizes of Rs.50,000, Rs.1,00,000, Rs.2,00,000, Rs.2,50,000 and Rs.5,00,000. Cost of conversion of marketable securities per lot is Rs.1,000. The company can earn 5% annual yield on its securities.

You are required to prepare a table indicating which lot size will have to be sold by the company. Also show that the economic lot size can be obtained by the Baumol Model.

24. JPL has two dates when it receives its cash inflows, i.e., Feb. 15 and Aug. 15. On each of these dates, it expects to receive Rs.15 crore. Cash expenditure are expected to be steady throughout the subsequent 6 month period. Presently, the ROI in marketable securities is 8% per annum, and the cost of transfer from securities to cash is Rs.125 each time a transfer occurs.

(i) What is the optimal transfer size using the EOQ model? What is the average cash balance?

(ii) What would be your answer to part (i), if the ROI were 12% per annum and the transfer costs were Rs.75/-? Why do they differ from those in part (i)?

25. Beta Limited has an annual turnover of Rs.84 crores and the same is spread over evenly each of the 50 weeks of the working year. However, the pattern within each week is that the daily rate of receipts on Mondays and Tuesdays is twice that experienced on the other three days of the week. The cost of banking per day is estimated at Rs.2,500. It is suggested that banking should be done daily or twice a week. Tuesdays and Fridays as compared to the current practice of banking only on Fridays. Beta Limited always operates on bank overdraft and the current rate of interest is 15% per annum. This interest charge is applied by the bank on a simple daily basis.

    Ignoring taxation, advise Beta Limited the best course of banking. For your exercise, use 360 days a year for computational purposes.

26. The following is the Balance Sheet of Amar Industries Ltd. as at 31st March, 2006:

    *(Rs. lakhs)*

    **Liabilities**

    | | |
    |---|---|
    | Capital and Reserves | 1,650 |
    | 12% Debentures | 900 |
    | Creditors for purchases | 600 |
    | Creditors for expenses | 70 |
    | Provision for bonus | 30 |
    | Provision for tax | 100 |
    | Proposed dividends | 50 |
    | | 3,400 |

    **Assets**

    | | |
    |---|---|
    | Fixed Assets at cost | 1,300 |
    | *Less*: Depreciation | 400 |
    | | 900 |
    | Sundry debtors | 700 |
    | Stocks and stores | 1,200 |
    | Loans and advances | 500 |
    | Cash and bank balances | 100 |
    | | 3,400 |

    The projected Profit and Loss Account for the first four months in 2006-2007 shows the following:

*(Rs.lakhs)*

| Particulars | | April | May | June | July |
|---|---|---|---|---|---|
| Sales | | 800 | 800 | 900 | 900 |
| Excise duty recoveries | | 80 | 80 | 90 | 90 |
| | (a) | 880 | 880 | 990 | 990 |
| Materials: | | | | | |
| Opening Stock | | 1200 | 1200 | 1260 | 1320 |
| *Add:* Purchases | | 600 | 660 | 720 | 720 |
| *Less:* Closing Stock | | 1200 | 1260 | 1320 | 1320 |
| Net | | 600 | 600 | 660 | 720 |
| Expenses | | 180 | 180 | 200 | 200 |
| Excise duty | | 80 | 84 | 88 | 92 |
| | (b) | 860 | 864 | 948 | 1012 |
| Profi/(Loss)t | (a)-(b) | 20 | 16 | 42 | (22) |

The following are relevant additional information:

(i)   10% of sales are for cash and the balance on 30 days' credit.

(ii)  Creditors for purchases are paid in 30 days.

(iii) Expenses include:

   (a)   interest payable at the end of each quarter.

   (b)   depreciation of Rs.10 lakhs per month;

   (c)   provision for bonus to workmen of Rs.5 lakhs per month, payable only in October, 2006.

   (d)   one-half of rest of the expenses payable in the month following.

(iv) Rs.250 lakhs of debentures are redeemable by 30th June.

(v)  Provision for taxation includes Rs.70 lakhs of surplus provision carried forward from earlier years besides the balance for the year 2005-2006 payable before 30th June, 2006.

(vi) Annual General Meeting is to be held on 31st May, 2006.

(vii) Over-draft is permissible interest on which may be ignored.  You are required to prepare the cash budgets for the months of April to July, 2006 on a monthly basis.

27.    The following information is available in respect of ABC Ltd:

(1)    Materials are purchased and received one month before being used and payment is made to suppliers two months after receipt of materials.

(2)    Cash is received from customers three months after finished goods are sold and delivered to them.

(3)    No time lag applies to payment of wages and expenses.

(4)    The following figures apply to recent and future months:

| Month | Materials received | Sales | Wages and Expenses |
|---|---|---|---|
| January | 20,000 | 30,000 | 9,500 |
| Febuary | 22,000 | 33,000 | 10,000 |
| March | 24,000 | 36,000 | 10,500 |
| April | 26,000 | 39,000 | 11,000 |
| May | 28,000 | 42,000 | 11,500 |
| June | 30,000 | 45,000 | 12,000 |
| July | 32,000 | 48,000 | 12,500 |
| August | 34,000 | 51,000 | 13,000 |

(5)    Cash balance at the beginning of April is Rs.10,000.

(6)    all products are sold immediately they have been made and that materials used and sums spent on wages and expenses during any particular month relate strictly to the sales made during that month.

Prepare cash flow forecast month by month from April to July, profit and loss forecast for four months (April-July) and a movement of funds statement for the four-month period (April-July).

28.    Fixed overheads excluding bank interest amount to Rs.6,00,000 per annum spread out evenly throughout the year.

Sales forecast is as under:

| Product | July | August | Sept. | Oct. | Nov. 2005 |
|---|---|---|---|---|---|
| L | 4,200 | 4,600 | 3,600 | 4,000 | 4,500 |
| B | 2,100 | 2,300 | 1,800 | 2,000 | 1,900 |

Production: 75% of each months' sales will be produced in the month of sale and 25% in the previous months.

Sales Pattern:

L:     -One-third of sales will be on cash basis on which cash discount of 2% is allowed.

        -One third will be on documents against payment basis.

        The documents will be discounted by the bank in the month of sales itself.

        -Balance of one-third will be on documents against acceptance basis.

        The payment under this scheme will be received in the third month.

        For e.g. for sales made in September, payment will be received in November.

B:     80% of the sales will be against cash to be received in the month of sales and the balance 20% will be received next following month.

*Direct Materials:* 50% of the direct materials required for each month's production will be purchased in the previous month and the balance in the month of production itself. The payment will be made in the month next following the purchase.

*Direct Wages:* 80% of the direct wages will be paid in the month of use of direct labour for production and the balance in the next following month.

*Variable Overheads:* 50% to be paid in the month of incurrence and the balance in the next following month.

*Fixed Overheads:* 40% will be paid in the month of incurrence and the other 40% in the next following month. The balance of 20% represents depreciation.

The bill discounting charges payable to the bank in the month in which the bills are discounted amount to 50 paise per Rs.100 of bills discounted.

A cash balance of Rs.1,00,000 will be maintained on 1st July, 2006.

Prepare a cash budget monthwise for July, August and September, 2006.

29. A new manufacturing company is to be incorporated from January 1, 2003. Its authorised capital will be Rs.2 crore divided into 20 lakh equity shares of Rs.10 each. It intends to raise capital by issuing equity shares of Rs.1 crore (fully paid) on 1st January. Besides, a loan of Rs.13 lakh @12% per annum will be obtained from a financial institution on 1st January and further borrowings will be made at the same rate of interest on the first day of the month in which borrowing is required. All borrowings will be repaid alongwith interest on the expiry of one year. The company will make payment for the following assets in January:

|  | *(Rs. lakhs)* |
|---|---|
| Plant and Machinery | 20 |
| Land and Building | 40 |
| Furniture | 10 |
| Motor Vehicles | 10 |
| Stock of Raw Materials | 10 |

The following further details are available:

(i)   Projected Sales (January-June):

|  | *(Rs. lakhs)* |  | *(Rs. lakhs)* |
|---|---|---|---|
| January | 30 | April | 40 |
| February | 35 | May | 40 |
| March | 35 | June | 45 |

(ii)   Gross Profit will be 25% on sales.

(iii)  The company will make credit sales only and these will be collected in the second month following sales.

(iv)  Creditors will be paid in the first month following credit purchases. There will be credit purchases only.

(v)   The company will keep minimum stock of raw materials of Rs.10 lakhs.

(vi)  Depreciation will be charged @10% per annum on cost on all fixed assets.

(vii) Payment of preliminary expenses of Rs.1 lakh will be made in January.

(viii) Wages and salaries will be Rs.2 lakhs each month and will be paid on the first day of the next month.

(ix)  Administrative expenses of Rs.1 lakh per month will be paid in the month of their incurrence.

Assume no minimum required cash balance.

You are required to prepare the monthly cash budget (January-June), the projected Income Statement for the 6 month period and the projected Balance Sheet as on 30th June, 2003.

30. Dyer Ltd. manufactures a variety of products using a standardized process, which takes one month to complete. Each production batch is started at the beginning of a month and is transferred to finished goods at the beginning of the next month. The cost structure, based on current selling price is:

| | % |
|---|---|
| Sale Price | 100 |
| Variable Costs | |
| Raw Materials | 30 |
| Other Variable Costs | 40 |
| Total Variable Cost – used for Stock Valuation | 70 |
| Contribution | 30 |

Activity levels are constant throughout the year and annual sales, all of which are made on credit are Rs.24,00,000. Dyer Ltd. is now planning to increase sales volume by 50% and unit sales price by 10%, such expansion would not alter the fixed costs of Rs.50,000 per month, which includes monthly depreciation of plant of Rs.10,000. Similarly raw material and other variable costs per unit will not alter as a result of the price rise.

In order to facilitate the envisaged increases several changes would be required in the long run. The relevant changes are:-

(i) The average credit period allowed to customers will increase to 70 days;

(ii) Suppliers will continue to be paid on strictly monthly terms;

(iii) Raw material stocks held will continue to be sufficient for one month's production;

(iv) Stocks of finished goods held will increase to one month's output;

(v) There will be no change in the production period and other variable costs will continue to be paid for in the month of production;

(vi) The current end-of-month working capital position is:

| | | (Rs.'000) |
|---|---|---|
| Raw Materials | 60 | |
| WIP | 140 | |
| Finished Goods | 70 | 270 |
| Debtors | | 200 |

|                                        |     |
| -------------------------------------- | --- |
|                                        | 470 |
| Creditors                              | 60  |
| Net Working Capital – Excluding Cash   | 410 |

Compliance with the long-term changes required by the expansion will be spread over several months. The relevant points concerning the transitional arrangements are:

(i) The cash balance anticipated at the end of the May is Rs.80,000.

(ii) Upto and including June all sales will be made on one month's credit. From July all sales will be on the transitional credit terms which will mean:

> 60% of sales will take 2 months' credit.
>
> 40% of sales will take 3 months' credit.

(iii) Sale price increase will occur with effect from sales in the month of August.

(iv) Production will increase by 50% with effect from the month of July. Raw material purchases made in June will reflect this.

(v) Sales volume will increase by 50% from sales made in October.

Required:

(a) Show the long-term increase in annual profit and long-term working capital requirements as a result of the plans for expansion and a price increase. (Costs of financing the extra working capital requirements may be ignored).

(b) Produce a monthly cash forecast for the period from June to December, the first seven months of the transitional period. Prepare also a working capital position at the end of December.

(c) Using your findings for (a) and (b) above, make brief comments to the management of Dyer Ltd. on the major factors concerning the financial aspects of the expansion which should be brought to their attention.

Assume that there are 360 days in a year and each month contains 30 days.

# APPENDIX

**TABLE A**
Present value of one rupee due at the end of *n* years

| N | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | N |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|
| 01 | .99010 | .98039 | .97007 | .96154 | .95238 | .94340 | .93458 | .92593 | .91743 | .90909 | 01 |
| 02 | .98030 | .96117 | .94260 | .92456 | .90703 | .89000 | .87344 | .85734 | .84168 | .82645 | 02 |
| 03 | .97059 | .94232 | .91514 | .88900 | .86384 | .83962 | .81630 | .79383 | .77218 | .75131 | 03 |
| 04 | .96098 | .92385 | .88849 | .85480 | .82270 | .79209 | .76290 | .73503 | .70843 | .68301 | 04 |
| 05 | .95147 | .90573 | .86261 | .82193 | .78353 | .74726 | .71299 | .68058 | .64993 | .62092 | 05 |
| 06 | .94204 | .88797 | .83748 | .79031 | .74622 | .70496 | .66634 | .60317 | .59627 | .56447 | 06 |
| 07 | .93272 | .87056 | .81309 | .75992 | .71068 | .66506 | .62275 | .58349 | .54703 | .51316 | 07 |
| 08 | .92348 | .85349 | .78941 | .73069 | .67684 | .62741 | .58201 | .54027 | .50187 | .46651 | 08 |
| 09 | .91434 | .83675 | .76642 | .70259 | .64461 | .59190 | .54393 | .50025 | .46043 | .42410 | 09 |
| 10 | .90529 | .82035 | .74409 | .67556 | .61391 | .55839 | .50835 | .46319 | .42241 | .38554 | 10 |
| 11 | .89632 | .80426 | .72242 | .64958 | .58468 | .52679 | .47509 | .42888 | .38753 | .35049 | 11 |
| 12 | .88745 | .78849 | .70138 | .62460 | .55684 | .49697 | .44401 | .39711 | .35553 | .31863 | 12 |
| 13 | .87866 | .77303 | .68095 | .60057 | .53032 | .46884 | .41496 | .36770 | .32618 | .28966 | 13 |
| 14 | .86996 | .75787 | .66112 | .57747 | .50507 | .44230 | .38782 | .34046 | .29925 | .26333 | 14 |
| 15 | .86135 | .74301 | .64186 | .55526 | .48102 | .41726 | .36245 | .31524 | .27454 | .23939 | 15 |
| 16 | .85282 | .72845 | .62317 | .53391 | .45811 | .39365 | .33873 | .29189 | .25187 | .21763 | 16 |
| 17 | .84438 | .71416 | .60502 | .51337 | .43630 | .37136 | .31657 | .27027 | .23107 | .19784 | 17 |
| 18 | .83602 | .70016 | .58739 | .49363 | .41552 | .35034 | .29586 | .25025 | .21199 | .17986 | 18 |
| 19 | .82774 | .68643 | .57029 | .47464 | .39573 | .33051 | .27651 | .23171 | .19449 | .16351 | 19 |
| 20 | .81954 | .67297 | .55367 | .45639 | .37689 | .31180 | .25842 | .21455 | .17843 | .14864 | 20 |
| 21 | .81143 | .65978 | .53755 | .43883 | .35894 | .29415 | .24151 | .19866 | .16370 | .13513 | 21 |
| 22 | .80340 | .64684 | .52189 | .42195 | .34185 | .27750 | .22571 | .18394 | .15018 | .12285 | 22 |
| 23 | .79544 | .63416 | .50669 | .40573 | .32557 | .26180 | .21095 | .17031 | .13778 | .11168 | 23 |
| 24 | .78757 | .62172 | .49193 | .39012 | .31007 | .24698 | .19715 | .15770 | .12640 | .10153 | 24 |
| 25 | .77977 | .60953 | .47760 | .37512 | .29530 | .23300 | .18425 | .14602 | .11597 | .09230 | 25 |

**TABLE A (cont.)**
**Present value of one rupee due at the end of n years**

| N | 11% | 12% | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | N |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| 01 | .90090 | .89286 | .88496 | .87719 | .86957 | .86207 | .85470 | .84746 | .84034 | .83333 | 01 |
| 02 | .81162 | .79719 | .78315 | .76947 | .75614 | .74316 | .73051 | .71818 | .70616 | .69444 | 02 |
| 03 | .73119 | .71178 | .69305 | .67497 | .65752 | .64066 | .62437 | .60863 | .59342 | .57870 | 03 |
| 04 | .65873 | .63552 | .61332 | .59208 | .57175 | .55229 | .53365 | .51579 | .49867 | .48225 | 04 |
| 05 | .59345 | .56743 | .54276 | .51937 | .49718 | .47611 | .45611 | .43711 | .41905 | .40188 | 05 |
| 06 | .53464 | .50663 | .48032 | .45559 | .43233 | .41044 | .38984 | .37043 | .35214 | .33490 | 06 |
| 07 | .48166 | .45235 | .42506 | .39964 | .37594 | .35383 | .33320 | .31392 | .29592 | .27908 | 07 |
| 08 | .43393 | .40388 | .37616 | .35056 | .32690 | .30503 | .28478 | .26604 | .24867 | .23257 | 08 |
| 09 | .39092 | .36061 | .33288 | .30751 | .28426 | .26295 | .24340 | .22546 | .20897 | .19381 | 09 |
| 10 | .35218 | .32197 | .29459 | .26974 | .24718 | .22668 | .20804 | .19106 | .17560 | .16151 | 10 |
| 11 | .31728 | .28748 | .26070 | .23662 | .21494 | .19542 | .17781 | .16192 | .14756 | .13459 | 11 |
| 12 | .28584 | .25667 | .23071 | .20756 | .18691 | .16846 | .15197 | .13722 | .12400 | .11216 | 12 |
| 13 | .25751 | .22917 | .20416 | .18207 | .16253 | .14523 | .12989 | .11629 | .10420 | .09346 | 13 |
| 14 | .23199 | .20462 | .18068 | .15971 | .14133 | .12520 | .11102 | .09855 | .08757 | .07789 | 14 |
| 15 | .20900 | .18270 | .15989 | .14010 | .12289 | .10793 | .09489 | .08352 | .07359 | .06491 | 15 |
| 16 | .18829 | .16312 | .14150 | .12289 | .10686 | .09304 | .08110 | .07078 | .06184 | .05409 | 16 |
| 17 | .16963 | .14564 | .12522 | .10780 | .09293 | .08021 | .06932 | .05998 | .05196 | .04507 | 17 |
| 18 | .15282 | .13004 | .11081 | .09456 | .08080 | .06914 | .05925 | .05083 | .04367 | .03756 | 18 |
| 19 | .13768 | .11611 | .09806 | .08295 | .07026 | .05961 | .05064 | .04308 | .03669 | .03130 | 19 |
| 20 | .12403 | .10367 | .08678 | .07276 | .06110 | .05139 | .04328 | .03651 | .03084 | .02608 | 20 |
| 21 | .11174 | .09256 | .07680 | .06383 | .05313 | .04430 | .03699 | .03094 | .02591 | .02174 | 21 |
| 22 | .10067 | .08264 | .06796 | .05599 | .04620 | .03819 | .03162 | .02622 | .02178 | .01811 | 22 |
| 23 | .09069 | .07379 | .06014 | .04911 | .04017 | .03292 | .02702 | .02222 | .01830 | .01509 | 23 |
| 24 | .08170 | .06588 | .05322 | .04308 | .03493 | .02838 | .02310 | .01883 | .01538 | .01258 | 24 |
| 25 | .07361 | .05882 | .04710 | .03779 | .03038 | .02447 | .01974 | .01596 | .01292 | .01048 | 25 |

## TABLE A (cont.)
### Present value of one rupee due at the end of *n* years

| N | 21% | 22% | 23% | 24% | 25% | 26% | 27% | 28% | 29% | 30% | N |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| 01 | .82645 | .81967 | .81301 | .80645 | .80000 | .79365 | .78740 | .78125 | .77519 | .76923 | 01 |
| 02 | .68301 | .67186 | .66098 | .65036 | .64000 | .62988 | .62000 | .61035 | .60093 | .59172 | 02 |
| 03 | .56447 | .55071 | .53738 | .52449 | .51200 | .49991 | .48819 | .47684 | .46583 | .45517 | 03 |
| 04 | .46651 | .45140 | .43690 | .42297 | .40906 | .39675 | .38440 | .37253 | .36111 | .35013 | 04 |
| 05 | .38554 | .37000 | .35520 | .34411 | .32768 | .31488 | .30268 | .29104 | .27993 | .26933 | 05 |
| 06 | .31863 | .30328 | .28878 | .27509 | .26214 | .24991 | .23833 | .22737 | .21700 | .20718 | 06 |
| 07 | .26333 | .24859 | .23478 | .22184 | .20972 | .19834 | .18766 | .17764 | .16822 | .15937 | 07 |
| 08 | .21763 | .20376 | .19088 | .17891 | .16777 | .15741 | .14776 | .13878 | .13040 | .12259 | 08 |
| 09 | .17986 | .16702 | .15519 | .14428 | .13422 | .12493 | .11635 | .10842 | .10109 | .09430 | 09 |
| 10 | .14864 | .13690 | .12617 | .11635 | .10737 | .09915 | .09161 | .08470 | .07836 | .07254 | 10 |
| 11 | .12285 | .11221 | .10258 | .09383 | .08590 | .07869 | .07214 | .06617 | .06075 | .05580 | 11 |
| 12 | .10153 | .09198 | .08339 | .07567 | .06872 | .06245 | .05680 | .05170 | .04709 | .04292 | 12 |
| 13 | .08391 | .07539 | .06780 | .06103 | .05498 | .04957 | .04472 | .04039 | .03650 | .03302 | 13 |
| 14 | .06934 | .06180 | .05512 | .04921 | .04398 | .03934 | .03522 | .03155 | .02830 | .02540 | 14 |
| 15 | .05731 | .05065 | .04481 | .03969 | .03518 | .03122 | .02773 | .02465 | .02194 | .01954 | 15 |
| 16 | .04736 | .04152 | .03643 | .03201 | .02815 | .02478 | .02183 | .01926 | .01700 | .01503 | 16 |
| 17 | .03914 | .03403 | .02962 | .02581 | .02252 | .01967 | .01719 | .01505 | .01318 | .01156 | 17 |
| 18 | .03235 | .02789 | .02408 | .02082 | .01801 | .01561 | .01354 | .01175 | .01022 | .00889 | 18 |
| 19 | .02673 | .02286 | .01958 | .01679 | .01441 | .01239 | .01066 | .00918 | .00792 | .00684 | 19 |
| 20 | .02209 | .01874 | .01592 | .01354 | .01153 | .00983 | .00839 | .00717 | .00614 | .00526 | 20 |
| 21 | .01826 | .01536 | .01294 | .01092 | .00922 | .00780 | .00661 | .00561 | .00476 | .00405 | 21 |
| 22 | .01509 | .01259 | .01052 | .00880 | .00738 | .00619 | .00520 | .00438 | .00369 | .00311 | 22 |
| 23 | .01247 | .01032 | .00855 | .00710 | .00590 | .00491 | .00410 | .00342 | .00286 | .00239 | 23 |
| 24 | .01031 | .00846 | .00695 | .00573 | .00472 | .00390 | .00323 | .00267 | .00222 | .00184 | 24 |
| 25 | .00852 | .00693 | .00565 | .00462 | .00378 | .00310 | .00254 | .00209 | .00172 | .00142 | 25 |

## TABLE A (cont.)
### Present value of one rupee due at the end of *n* years

| N | 31% | 32% | 33% | 34% | 35% | 36% | 37% | 38% | 39% | 40% | N |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----|
| 01 | .76336 | .75758 | .75188 | .74627 | .74074 | .73529 | .72993 | .72464 | .71942 | .71429 | 01 |
| 02 | .58272 | .57392 | .56532 | .55692 | .54870 | .45066 | .53279 | .52510 | .51757 | .51020 | 02 |
| 03 | .44482 | .43479 | .42505 | .41561 | .40644 | .39745 | .38890 | .38051 | .37235 | .36443 | 03 |
| 04 | .33956 | .32939 | .31959 | .31016 | .30107 | .29231 | .28387 | .27573 | .26788 | .26031 | 04 |
| 05 | .25920 | .24953 | .24029 | .23146 | .22301 | .21493 | .20720 | .19980 | .19272 | .18593 | 05 |
| 06 | .19787 | .18904 | .18067 | .17273 | .16520 | .15804 | .15124 | .14479 | .13865 | .13281 | 06 |
| 07 | .15104 | .14321 | .13584 | .12890 | .12237 | .11621 | .11040 | .10492 | .09975 | .09486 | 07 |
| 08 | .11530 | .10849 | .10214 | .09620 | .09064 | .08545 | .08058 | .07603 | .07176 | .06776 | 08 |
| 09 | .08802 | .08219 | .07680 | .07179 | .06714 | .06283 | .05882 | .05509 | .05163 | .04840 | 09 |
| 10 | .06719 | .06227 | .05774 | .05357 | .04973 | .04620 | .04293 | .03992 | .03714 | .03457 | 10 |
| 11 | .05129 | .04717 | .04341 | .03998 | .03684 | .03397 | .03134 | .02893 | .02672 | .02469 | 11 |
| 12 | .03915 | .03574 | .03264 | .02984 | .02729 | .02498 | .02887 | .02096 | .01922 | .01764 | 12 |
| 13 | .02989 | .02707 | .02454 | .02227 | .02021 | .01837 | .01670 | .01519 | .01383 | .01260 | 13 |
| 14 | .02281 | .02051 | .01845 | .01662 | .01497 | .01350 | .01219 | .01101 | .00995 | .00900 | 14 |
| 15 | .01742 | .01554 | .01387 | .01240 | .01109 | .00993 | .00890 | .00789 | .00716 | .00643 | 15 |
| 16 | .01329 | .01177 | .01043 | .00925 | .00822 | .00730 | .00649 | .00578 | .00515 | .00459 | 16 |
| 17 | .01015 | .00892 | .00784 | .00691 | .00609 | .00537 | .00474 | .00419 | .00370 | .00328 | 17 |
| 18 | .00775 | .00676 | .00590 | .00515 | .00451 | .00395 | .00346 | .00304 | .00267 | .00234 | 18 |
| 19 | .00591 | .00512 | .00443 | .00385 | .00334 | .00290 | .00253 | .00220 | .00192 | .00167 | 19 |
| 20 | .00451 | .00388 | .00333 | .00287 | .00247 | .00213 | .00184 | .00159 | .00138 | .00120 | 20 |
| 21 | .00345 | .00294 | .00251 | .00214 | .00183 | .00157 | .00135 | .00115 | .00099 | .00085 | 21 |
| 22 | .00263 | .00223 | .00188 | .00160 | .00136 | .00115 | .00098 | .00084 | .00071 | .00061 | 22 |
| 23 | .00201 | .00169 | .00142 | .00119 | .00101 | .00085 | .00072 | .00061 | .00051 | .00044 | 23 |
| 24 | .00153 | .00128 | .00107 | .00089 | .00074 | .00062 | .00052 | .00044 | .00037 | .00031 | 24 |
| 25 | .00117 | .00097 | .00080 | .00066 | .00055 | .00046 | .00038 | .00032 | .00027 | .00022 | 25 |

**TABLE B**

Present value of one rupee per year, *n* years at *r*%

| YEAR | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .9901 | .9804 | .9709 | .9615 | .9524 | .9434 | .9346 | .9259 | .9174 | .9091 | 1 |
| 2 | 1.9704 | 1.9416 | 1.9135 | 1.8861 | 1.8594 | 1.8334 | 1.8080 | 1.7833 | 1.7591 | 1.7355 | 2 |
| 3 | 2.9410 | 2.8839 | 2.8286 | 2.7751 | 2.7232 | 2.6730 | 2.6243 | 2.5771 | 2.5313 | 2.4868 | 3 |
| 4 | 3.9020 | 3.8077 | 3.7171 | 3.6299 | 3.5459 | 3.4651 | 3.3872 | 3.3121 | 3.2397 | 3.1699 | 4 |
| 5 | 4.8535 | 4.7134 | 4.5797 | 4.4518 | 4.3295 | 4.2123 | 4.1002 | 3.9927 | 3.8896 | 3.7908 | 5 |
| 6 | 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4.6229 | 4.4859 | 4.3553 | 6 |
| 7 | 6.7282 | 6.4720 | 6.2302 | 6.0020 | 5.7863 | 5.5824 | 5.3893 | 5.2064 | 5.0329 | 4.8684 | 7 |
| 8 | 7.6517 | 7.3254 | 7.0196 | 6.7327 | 6.4632 | 6.2098 | 5.9713 | 5.7466 | 5.5348 | 5.3349 | 8 |
| 9 | 8.5661 | 8.1622 | 7.7861 | 7.4353 | 7.1078 | 6.8017 | 6.5152 | 6.2469 | 5.9852 | 5.7590 | 9 |
| 10 | 9.4714 | 8.9825 | 8.5302 | 8.1109 | 7.7217 | 7.3601 | 7.0236 | 6.7101 | 6.4176 | 6.1446 | 10 |
| 11 | 10.3677 | 9.7868 | 9.2526 | 8.7604 | 8.3064 | 7.8868 | 7.4987 | 7.1389 | 6.8052 | 6.4951 | 11 |
| 12 | 11.2552 | 10.5753 | 9.9539 | 9.3850 | 8.8632 | 8.3838 | 7.9427 | 7.5361 | 7.1607 | 6.8137 | 12 |
| 13 | 12.1338 | 11.3483 | 10.6349 | 9.9856 | 9.3935 | 8.8527 | 8.3576 | 7.9038 | 7.4869 | 7.1034 | 13 |
| 14 | 13.0038 | 12.1062 | 11.2960 | 10.5631 | 9.8986 | 9.2950 | 8.7454 | 8.2442 | 7.7861 | 7.3667 | 14 |
| 15 | 13.8651 | 12.8492 | 11.9379 | 11.1183 | 10.3796 | 9.7122 | 9.1079 | 8.5595 | 8.0607 | 7.6061 | 15 |
| 16 | 14.7180 | 13.5777 | 12.5610 | 11.6522 | 10.8377 | 10.1059 | 9.4466 | 8.8514 | 8.3125 | 7.8237 | 16 |
| 17 | 15.5624 | 14.2918 | 13.1660 | 12.1656 | 11.2740 | 10.4772 | 9.7632 | 9.1216 | 8.5436 | 8.0215 | 17 |
| 18 | 16.3984 | 14.9920 | 13.7534 | 12.6592 | 11.6895 | 10.8276 | 10.0591 | 9.3719 | 8.7556 | 8.2014 | 18 |
| 19 | 17.2261 | 15.6784 | 14.3237 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 | 8.3649 | 19 |
| 20 | 18.0457 | 16.3514 | 14.8774 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | 9.1285 | 8.5136 | 20 |
| 21 | 18.8571 | 17.0111 | 15.4149 | 14.0291 | 12.8211 | 11.7640 | 10.8355 | 10.0168 | 9.2922 | 8.6487 | 21 |
| 22 | 19.6605 | 17.6580 | 15.9368 | 14.4511 | 13.1630 | 12.0416 | 11.0612 | 10.2007 | 9.4424 | 8.7715 | 22 |
| 23 | 20.4559 | 18.2921 | 16.4435 | 14.8568 | 13.4885 | 12.3033 | 11.2722 | 10.3710 | 9.5802 | 8.8832 | 23 |
| 24 | 21.2435 | 18.9139 | 16.9355 | 15.2469 | 13.7986 | 12.5503 | 11.4693 | 10.5287 | 9.7066 | 8.9847 | 24 |
| 25 | 22.0233 | 19.5234 | 17.4131 | 15.6220 | 14.0939 | 12.7833 | 11.6536 | 10.6748 | 9.8226 | 9.0770 | 25 |

**TABLE B (cont.)**
Present value of one rupee per year, $n$ years at $r\%$

| YEAR | 11% | 12% | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .9009 | .8929 | .8850 | .8772 | .8696 | .8621 | .8547 | .8475 | .8403 | .8333 | 1 |
| 2 | 1.7125 | 1.6901 | 1.6681 | 1.6467 | 1.6257 | 1.6052 | 1.5852 | 1.5656 | 1.5465 | 1.5278 | 2 |
| 3 | 2.4437 | 2.4018 | 2.3612 | 2.3216 | 2.2832 | 2.2459 | 2.2096 | 2.1743 | 2.1399 | 2.1065 | 3 |
| 4 | 3.1024 | 3.0373 | 2.9745 | 2.9137 | 2.8550 | 2.7982 | 2.7432 | 2.6901 | 2.6386 | 2.5887 | 4 |
| 5 | 3.6959 | 3.6048 | 3.5172 | 3.4331 | 3.3522 | 3.2743 | 3.1993 | 3.1272 | 3.0576 | 2.9906 | 5 |
| 6 | 4.2305 | 4.1114 | 3.9976 | 3.8887 | 3.7845 | 3.6847 | 3.5892 | 3.4976 | 3.4098 | 3.3255 | 6 |
| 7 | 4.7122 | 4.5638 | 4.4226 | 4.2883 | 4.1604 | 4.0386 | 3.9224 | 3.8115 | 3.7057 | 3.6046 | 7 |
| 8 | 5.1461 | 4.9676 | 4.7988 | 4.6389 | 4.4873 | 4.3436 | 4.2072 | 4.0776 | 3.9544 | 3.8372 | 8 |
| 9 | 5.5370 | 5.3282 | 5.1317 | 4.9464 | 4.7716 | 4.6065 | 4.4506 | 4.3030 | 4.1633 | 4.0310 | 9 |
| 10 | 5.8892 | 5.6502 | 5.4262 | 5.2161 | 5.0188 | 4.8332 | 4.6586 | 4.4941 | 4.3389 | 4.1925 | 10 |
| 11 | 6.2065 | 5.9377 | 5.6869 | 5.4527 | 5.2337 | 5.0286 | 4.8364 | 4.6560 | 4.4865 | 4.3271 | 11 |
| 12 | 6.4924 | 6.1944 | 5.9176 | 5.6603 | 5.4206 | 5.1971 | 4.9884 | 4.7932 | 4.6105 | 4.4392 | 12 |
| 13 | 6.7499 | 6.4235 | 6.1218 | 5.8424 | 5.5831 | 5.3423 | 5.1183 | 4.9095 | 4.7147 | 4.5327 | 13 |
| 14 | 6.9819 | 6.6282 | 6.3025 | 6.0021 | 5.7245 | 5.4675 | 5.2293 | 5.0081 | 4.8023 | 4.6106 | 14 |
| 15 | 7.1909 | 6.8109 | 6.4624 | 6.1422 | 5.8474 | 5.5755 | 5.3242 | 5.0916 | 4.8759 | 4.6755 | 15 |
| 16 | 7.3792 | 6.9740 | 6.6039 | 6.2651 | 5.9542 | 5.6685 | 5.4053 | 5.1624 | 4.9377 | 4.7296 | 16 |
| 17 | 7.5488 | 7.1196 | 6.7291 | 6.3729 | 6.0472 | 5.7487 | 5.4746 | 5.2223 | 4.9897 | 4.7746 | 17 |
| 18 | 7.7016 | 7.2497 | 6.8399 | 6.4674 | 6.1280 | 5.8178 | 5.5339 | 5.2732 | 5.0333 | 4.8122 | 18 |
| 19 | 7.8393 | 7.3658 | 6.9380 | 6.5504 | 6.1982 | 5.8775 | 5.5845 | 5.3162 | 5.0700 | 4.8435 | 19 |
| 20 | 7.9633 | 7.4694 | 7.0248 | 6.6231 | 6.2593 | 5.9288 | 5.6278 | 5.3527 | 5.1009 | 4.8696 | 20 |
| 21 | 8.0751 | 7.5620 | 7.1016 | 6.6870 | 6.3125 | 5.9731 | 5.6648 | 5.3837 | 5.1268 | 4.8913 | 21 |
| 22 | 8.1757 | 7.6446 | 7.1695 | 6.7429 | 6.3587 | 6.0113 | 5.6964 | 5.4099 | 5.1486 | 4.9094 | 22 |
| 23 | 8.2664 | 7.7184 | 7.2297 | 6.7921 | 6.3988 | 6.0442 | 5.7234 | 5.4321 | 5.1668 | 4.9245 | 23 |
| 24 | 8.3481 | 7.7843 | 7.2829 | 6.8351 | 6.4338 | 6.0726 | 5.7465 | 5.4509 | 5.1822 | 4.9371 | 24 |
| 25 | 8.4217 | 7.8431 | 7.3300 | 6.8729 | 6.4641 | 6.0971 | 5.7662 | 5.4669 | 5.1951 | 4.9476 | 25 |

# TABLE B (cont.)
## Present value of one rupee per year, n years at r%

| YEAR | 21% | 22% | 23% | 24% | 25% | 26% | 27% | 28% | 29% | 30% | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .8264 | .8197 | .8130 | .8065 | .8000 | .7937 | .7874 | .7813 | .7752 | .7692 | 1 |
| 2 | 1.5095 | 1.4915 | 1.4740 | 1.4568 | 1.4400 | 1.4235 | 1.4074 | 1.3916 | 1.3761 | 1.3609 | 2 |
| 3 | 2.0739 | 2.0422 | 2.0114 | 1.9813 | 1.9520 | 1.9234 | 1.8956 | 1.8684 | 1.8420 | 1.8161 | 3 |
| 4 | 2.5404 | 2.4936 | 2.4483 | 2.4043 | 2.3616 | 2.3202 | 2.2800 | 2.2410 | 2.2031 | 2.1662 | 4 |
| 5 | 2.9260 | 2.8636 | 2.8035 | 2.7454 | 2.6893 | 2.6351 | 2.5827 | 2.5320 | 2.4830 | 2.4356 | 5 |
| 6 | 3.2446 | 3.1669 | 3.0923 | 3.0205 | 2.9514 | 2.8850 | 2.8210 | 2.7594 | 2.7000 | 2.6427 | 6 |
| 7 | 3.5079 | 3.4155 | 3.3270 | 3.2423 | 3.1611 | 3.0833 | 3.0087 | 2.9370 | 2.8682 | 2.8021 | 7 |
| 8 | 3.7256 | 3.6193 | 3.5179 | 3.4212 | 3.3289 | 3.2407 | 3.1564 | 3.0758 | 2.9986 | 2.9247 | 8 |
| 9 | 3.9054 | 3.7863 | 3.6731 | 3.5655 | 3.4631 | 3.3657 | 3.2728 | 3.1842 | 3.0997 | 3.0190 | 9 |
| 10 | 4.0541 | 3.9232 | 3.7993 | 3.6819 | 3.5705 | 3.4648 | 3.3644 | 3.2689 | 3.1781 | 3.0915 | 10 |
| 11 | 4.1769 | 4.0354 | 3.9018 | 3.7757 | 3.6564 | 3.5435 | 3.4365 | 3.3351 | 3.2388 | 3.1473 | 11 |
| 12 | 4.2785 | 4.1274 | 3.9852 | 3.8514 | 3.7251 | 3.6060 | 3.4933 | 3.3868 | 3.2859 | 3.1903 | 12 |
| 13 | 4.3624 | 4.2028 | 4.0530 | 3.9124 | 3.7801 | 3.6555 | 3.6381 | 3.4272 | 3.3224 | 3.2233 | 13 |
| 14 | 4.4317 | 4.2646 | 4.1082 | 3.9616 | 3.8241 | 3.6949 | 3.5733 | 3.4587 | 3.3507 | 3.2487 | 14 |
| 15 | 4.4890 | 4.3152 | 4.1530 | 4.0013 | 3.8593 | 3.7261 | 3.6010 | 3.4834 | 3.3726 | 3.2682 | 15 |
| 16 | 4.5364 | 4.3567 | 4.1894 | 4.0333 | 3.8874 | 3.7509 | 3.6228 | 3.5026 | 3.3896 | 3.2832 | 16 |
| 17 | 4.5755 | 4.3908 | 4.2190 | 4.0591 | 3.9099 | 3.7705 | 3.6400 | 3.5177 | 3.4028 | 3.2948 | 17 |
| 18 | 4.6079 | 4.4187 | 4.2431 | 4.0799 | 3.9279 | 3.7861 | 3.6536 | 3.5294 | 3.4130 | 3.3037 | 18 |
| 19 | 4.6346 | 4.4415 | 4.2627 | 4.0967 | 3.9424 | 3.7985 | 3.6642 | 3.5386 | 3.4210 | 3.3105 | 19 |
| 20 | 4.6567 | 4.4603 | 4.2786 | 4.1103 | 3.9539 | 3.8083 | 3.6726 | 3.5458 | 3.4271 | 3.3158 | 20 |
| 21 | 4.6750 | 4.4756 | 4.2916 | 4.1212 | 3.9631 | 3.8161 | 3.6792 | 3.5514 | 3.4319 | 3.3198 | 21 |
| 22 | 4.6900 | 4.4882 | 4.3021 | 4.1300 | 3.9705 | 3.8223 | 3.6844 | 3.5558 | 3.4356 | 3.3230 | 22 |
| 23 | 4.7025 | 4.4985 | 4.3106 | 4.1371 | 3.9764 | 3.8273 | 3.6885 | 3.5592 | 3.4384 | 3.3254 | 23 |
| 24 | 4.7128 | 4.5070 | 4.3176 | 4.1428 | 3.9811 | 3.8312 | 3.6918 | 3.5619 | 3.4406 | 3.3272 | 24 |
| 25 | 4.7213 | 4.5139 | 4.3232 | 4.1474 | 3.9849 | 3.8342 | 3.6943 | 3.5640 | 3.4423 | 3.3286 | 25 |

**TABLE B (cont.)**
Present value of one rupee per year, n years at r%

| YEAR | 31% | 32% | 33% | 34% | 35% | 36% | 37% | 38% | 39% | 40% | YEAR |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | .7634 | .7576 | .7519 | .7463 | .7407 | .7353 | .7299 | .7246 | .7194 | .7143 | 1 |
| 2 | 1.3461 | 1.3315 | 1.3172 | 1.3032 | 1.2894 | 1.2760 | 1.2627 | 1.2497 | 1.2370 | 1.2245 | 2 |
| 3 | 1.7909 | 1.7663 | 1.7423 | 1.7188 | 1.6959 | 1.6735 | 1.6516 | 1.6302 | 1.6093 | 1.5889 | 3 |
| 4 | 2.1305 | 2.0957 | 2.0618 | 2.0290 | 1.9969 | 1.9658 | 1.9355 | 1.9060 | 1.8772 | 1.8492 | 4 |
| 5 | 2.3897 | 2.3452 | 2.3021 | 2.2604 | 2.2200 | 2.1807 | 2.1427 | 2.1058 | 2.0699 | 2.0352 | 5 |
| 6 | 2.5875 | 2.5342 | 2.4828 | 2.4331 | 2.3852 | 2.3388 | 2.2939 | 2.2506 | 2.2086 | 2.1680 | 6 |
| 7 | 2.7386 | 2.6775 | 2.6187 | 2.5620 | 2.5075 | 2.4550 | 2.4043 | 2.3555 | 2.3083 | 2.2628 | 7 |
| 8 | 2.8539 | 2.7860 | 2.7208 | 2.6582 | 2.5982 | 2.5404 | 2.4849 | 2.4315 | 2.3801 | 2.3306 | 8 |
| 9 | 2.9419 | 2.8681 | 2.7976 | 2.7300 | 2.6653 | 2.6033 | 5.5437 | 2.4866 | 2.4317 | 2.3790 | 9 |
| 10 | 3.0091 | 2.9304 | 2.8553 | 2.7836 | 2.7150 | 2.6495 | 2.5867 | 2.5265 | 2.4689 | 2.4136 | 10 |
| 11 | 3.0604 | 2.9776 | 2.8987 | 2.8236 | 2.7519 | 2.6834 | 2.6180 | 2.5555 | 2.4956 | 2.4383 | 11 |
| 12 | 3.0995 | 3.0133 | 2.9314 | 2.8534 | 2.7792 | 2.7084 | 2.6409 | 2.5764 | 2.5148 | 2.4559 | 12 |
| 13 | 3.1294 | 3.0404 | 2.9559 | 2.8757 | 2.7994 | 2.7268 | 2.6576 | 2.5916 | 2.5286 | 2.4685 | 13 |
| 14 | 3.1522 | 3.0609 | 2.9744 | 2.8923 | 2.8144 | 2.7403 | 2.6698 | 2.6026 | 2.5386 | 2.4775 | 14 |
| 15 | 3.1696 | 3.0764 | 2.9883 | 2.9047 | 2.8255 | 2.7502 | 2.6787 | 2.6106 | 2.5457 | 2.4839 | 15 |
| 16 | 3.1829 | 3.0882 | 2.9987 | 2.9104 | 2.8337 | 2.7575 | 2.6852 | 2.6164 | 2.5509 | 2.4885 | 16 |
| 17 | 3.1931 | 3.9071 | 3.0065 | 2.9209 | 2.8398 | 2.7629 | 2.6899 | 2.6206 | 2.5546 | 2.4918 | 17 |
| 18 | 3.2008 | 3.1039 | 3.0124 | 2.9260 | 2.8443 | 2.7668 | 2.6934 | 2.6236 | 2.5573 | 2.4941 | 18 |
| 19 | 3.2067 | 3.1090 | 3.0169 | 2.9299 | 2.8476 | 2.7697 | 2.6959 | 2.6258 | 2.5592 | 2.4958 | 19 |
| 20 | 3.2112 | 3.1129 | 3.0202 | 2.9327 | 2.8501 | 2.7718 | 2.6977 | 2.6274 | 2.5606 | 2.4970 | 20 |
| 21 | 3.2147 | 3.1158 | 3.0227 | 2.9349 | 2.8519 | 2.7734 | 2.6991 | 2.6285 | 2.5616 | 2.4979 | 21 |
| 22 | 3.2173 | 3.1180 | 3.0246 | 2.9365 | 2.8533 | 2.7746 | 2.7000 | 2.6294 | 2.5623 | 2.4985 | 22 |
| 23 | 3.2193 | 3.1197 | 3.0260 | 2.9377 | 2.8543 | 2.7754 | 2.7008 | 2.6300 | 2.5628 | 2.4989 | 23 |
| 24 | 3.2209 | 3.1210 | 3.0271 | 2.9386 | 2.8550 | 2.7760 | 2.7013 | 2.6304 | 2.5632 | 2.4992 | 24 |
| 25 | 3.2220 | 3.1220 | 3.0279 | 2.9392 | 2.8556 | 2.7765 | 2.7017 | 2.6307 | 2.5634 | 2.4994 | 25 |